

A BIOPSYCHOSOCIAL MODEL OF DIETARY RESTRAINT
IN EARLY ADOLESCENT BOYS

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The current study replicated and extended previous research by examining empirically the direct and indirect influence of social pressure (to lose weight and diet), social body comparisons, internalization of the thin ideal, body dissatisfaction, self-esteem, and cardiorespiratory fitness on self-reported dietary restraint in a diverse sample of middle school boys ($n = 663$); M_{age} was 12.49 years ($SD = .99$). With IRB approval, parental consent, and child assent, during annual FITNESSGRAM testing, participants completed questionnaires that measured the study's constructs. Cardiorespiratory fitness (CRF) was determined by the boys' performance on the PACER running test. The proposed model was examined using structural equation modeling (SEM). Because measures demonstrated univariate and multivariate normality, the maximum likelihood procedure within EQS to examine the measurement and structural models was used. Fit was determined using a two-index procedure. Participants were randomly split into exploratory (Sample A - 331) and confirmatory (Sample B - 332) samples. For Sample A, the measurement and structural models fit the data well. The structural model was confirmed in Sample B, with the same paths being significant and nonsignificant. For both Sample A and Sample B, 35% of the Dietary Restraint variance was explained. These findings support a multifactorial approach to understanding boys' self-reported dietary restraint, and illuminate the negative influence of sociocultural weight pressures and salutary effects of CRF on early adolescents' psychosocial well-being and dietary behaviors.

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CHAPTER 1

INTRODUCTION

Overview

Over the past several decades, numerous etiological models of disordered eating have been examined in girls and women (Striegel-Moore & Bulik, 2007). Within the past decade, researchers (e.g., Cafri et al., 2005; Halliwell & Harvey, 2006; Petrie, Greenleaf, & Martin, 2010; Valois, Zullig, Huebner, & Drane, 2003) have begun to examine disordered eating and dietary intent (i.e., intentional restriction of caloric intake for to lose weight; Stice, Sysko, Roberto, & Allison, 2010) in boys because (a) adolescence appears to be a risk period for the development of disordered eating behaviors (Stice & Peterson, 2007), (b) boys, like girls, are self-reporting relatively high levels of dieting (Ricciardelli & McCabe, 2003b), and (c) the etiology of dietary intent appears to be multidimensional, including psychosocial (e.g., internalization, body comparisons) and physical factors (e.g., adiposity and fitness). Moreover, self-reported dietary restraint has been associated with negative health outcomes, including binge eating (Goldschmidt, Wall, Loth, Le Grange, & Neumark-Sztainer 2012; Hautala et al., 2008), weight cycling (i.e., cycles of weight loss and weight gain; Fisher, Sinton, & Birch, 2009; Mathews & Lynn, 2008; Neumark-Sztainer, Wall, Story, Perry, & Standish, 2012), and obesity (Burton, Smit, & Lightowler, 2007).

Although significant developmental transitions (e.g., the transition from childhood to adolescence) is a timeframe when girls are at increased risk for the development of eating disorders (Eddy, Keel, & Leon, 2010; Stice & Bulik, 2008; Stice & Peterson, 2007) and similar outcomes would be expected for boys (Halliwell & Harvey, 2006; Roemmich, Lambiase, Lobarinas, & Balantekin, 2011; Smolak & Thompson, 2009), few studies have examined the

simultaneous influence of social (i.e., social pressure to lose weight and diet, social body comparisons), psychological (i.e., internalization, body satisfaction, and self-esteem) and physical factors (i.e., cardiorespiratory fitness) on early adolescent boys' dietary intentions. Thus, the purpose of the present study was to replicate and extend previous research (e.g., Halliwell & Harvey, 2006; Ricciardelli & McCabe, 2004) by examining empirically the direct and indirect influence of social pressure (to lose weight and diet), social body comparisons, internalization of the thin ideal, body dissatisfaction, self-esteem, and cardiorespiratory fitness on self-reported dietary restraint in middle school boys.

Sociocultural Pressures, Influences, and Models

Over the past 30 years for girls and women, and within the past 10 to 15 years for boys and men, researchers have identified sociocultural factors (e.g., social pressures to lose weight and diet) as primary in explaining the development of body image concerns and eating disorders (e.g., Karazsia & Crowther, 2009, 2010; Keery, van den Berg, & Thompson, 2004; Menzel et al., 2011; Striegel-Moore & Bulik, 2007; Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004; Tiggemann, 2011). Researchers (e.g., Dutton, 1995; Kirk, 2002; Pope, Phillips, & Olivardia, 2000) suggest that Western cultural norms of masculinity and femininity are socially constructed, defined by attributes (e.g., competitiveness, strength) and appearance (e.g., the hyper-mesomorphic physical ideal), and reinforced by important socializing agents (e.g., the media; Marcell, Sonenstein, Eftim & Pleck, 2011).

Moreover, the media, family members, and peers have been identified as primary socializing agents that convey societal appearance norms (Halliwell & Harvey, 2006; Ricciardelli & McCabe, 2004; Striegel-Moore & Bulik, 2007). The deleterious effects of social

pressures (to diet and lose weight) from families, peers, and the media on the dietary intentions of girls and women and boys and men has been underscored in sociocultural models of disordered eating (Halliwell & Harvey, 2006; Striegel-Moore & Bulik, 2007). Because societal appearance standards shape the messages the media, family members, and peers communicate to boys regarding their weight and appearance, such pressures lead boys to believe that (a) masculinity is intimately tied to the physical ideal and social acceptance, (b) physical appearance reflects valued attributes, such as self-discipline, independence, and popularity, and (c) they can achieve societal appearance norms through dietary restraint and exercise (Crocker & Park, 2004; Field et al., 2003; Puhl & Latner, 2007; Levine & Chapman, 2011). Over time, and through repeated exposure, such cultural appearance standards influence how boys interact socially, view their bodies, and evaluate their appearance (Blatt & Blass, 1996; Maccoby & Martin, 1993; Vartanian & Herman, 2006). Boys' high level of attunement to their social environments would make them vulnerable to pressures regarding gender-roles (DeWall, Maner, & Rouby, 2009; Smolak & Stein, 2010), including societal appearance norms (i.e., leanness and muscularity; Cafri, Blevins, & Thompson, 2006; Olivardia, Pope, Borowiecki, & Cohane, 2004). Social pressures (to lose weight and diet) would lead boys to develop a narrow definition of how their bodies should look, become dissatisfied with their weight shape, and appearance and, in turn, diet to approximate societal appearance norms (McCreary, & Sasse, 2000; Schwartz & Brownell, 2004; Levine & Chapman, 2011).

Consistent with this assertion, researchers (e.g., Kjelsås, Bjørnstrøm, & Gøtestam, 2004; Ricciardelli & McCabe, 2003b, 2001a) have documented the relatively high percentages of boys are dissatisfied with their bodies and engaging in self-reported dietary restraint. For example, in a sample of 8 to 9 year old boys, 45.3% were scared about being overweight, 29.5% thought about

being thinner, and 37.4% reported that they had been on a diet (McCabe & Ricciardelli, 2003b). Thus, researchers (e.g., Bardone-Cone, Cass, & Ford, 2008; Cafri et al., 2005; Cafri, van den Berg, & Thompson, 2006; Ricciardelli & McCabe, 2004; Ricciardelli, McCabe, Holt, & Finemore, 2003) have developed “biopsychosocial” models to explain the development of body image concerns and dietary intent in boys and men. For example, Cafri et al. (2005) and Ricciardelli and McCabe (2004) identified biological (e.g., pubertal status and timing), psychological (e.g., self-esteem), and social factors (e.g., parent, peer, and media influences, social body comparisons) that would lead to the development of disordered eating, including self-reported dietary restraint in adolescent boys and men. Consistent with sociocultural models of disorder eating in girls and women, Cafri et al. (2005) and Ricciardelli and McCabe (2004) suggest that social pressures (to lose weight and diet), social body comparisons, and internalization of the societal body ideal increases boys’ vulnerability for becoming dissatisfied with their weight, shape, and appearance, developing low self-esteem., and engaging in disordered eating, including dieting.

Although Cafri et al.’s (2005) and Ricciardelli and McCabe’s (2004) studies did not examine empirically their proposed biopsychosocial models, Halliwell and Harvey (2006) examined the relative influence of sociocultural (e.g., weight pressure) and psychological factors (e.g., internalization) on self-reported dieting and food preoccupation in a combined sample of boys and girls between ages 11 and 16 years. For boys, social pressures from family and peers (to be thin) were related directly to social body comparisons with peers, internalization of the thin ideal, body dissatisfaction, and disordered eating (i.e., dieting and food preoccupation); social body comparisons led directly to higher internalization of the thin ideal which, in turn, led directly to higher body dissatisfaction and body dissatisfaction led directly to more dieting and

food preoccupation (Halliwell & Harvey, 2006). Their model accounted for 8% of the variance in social body comparisons with peers, 13% of internalization, 13% of body dissatisfaction, and 24% of boys' self-reported dieting and food preoccupation (Halliwell & Harvey, 2006). Given the numerous physical (e.g., increases in height, weight, and musculature) and social changes (e.g., emphasis on extrafamilial relationships; Berk, 2009; Jones, 2001) boys undergo during adolescence (i.e., 6th, 7th, and 8th grade), it may be a key timeframe to examine a biopsychosocial model of dietary restraint in boys.

Current Study

The purpose of the current study is to replicate and extend the sociocultural model proposed by Halliwell and Harvey (2006) by examining the combined influence of psychosocial (i.e., social weight pressure, social body comparisons, internalization, body dissatisfaction, and self-esteem) and physical (i.e., cardiorespiratory fitness) factors on self-reported dietary restraint in boys. Based on previous research (e.g., Cafri et al., 2005; Halliwell & Harvey, 2006; Ricciardelli & McCabe, 2004), the following pathways were hypothesized: (a) social pressures to lose weight and diet was expected to relate directly to higher levels of social body comparisons, internalization and dietary intent, and to lower body satisfaction and self-esteem, (b) social body comparisons were expected to relate directly to increased internalization, (c) internalization was expected to relate directly to lower satisfaction with body size and shape, (d) body dissatisfaction was expected to relate directly to lower self-esteem and more dietary intent, (e) self-esteem was expected to relate directly to lower dietary intent, and (d) cardiorespiratory fitness was expected to relate directly to increased self-esteem and lower levels of body dissatisfaction and dietary restraint in early adolescent boys (see Figure 2).

CHAPTER 2

LITERATURE REVIEW

Within the past decade, researchers (e.g., Cafri et al., 2005; Halliwell & Harvey, 2006; Petrie, Greenleaf, & Martin, 2010; Valois, Zullig, Huebner, & Drane, 2003) have begun to examine dieting and dietary intent among adolescent boys. Defined as the "...intentional or sustained restriction of caloric intake for the purposes of weight loss or maintenance" (Stice, Sysko, Roberto, & Allison, 2010, p. 331), this increased focus on dieting in adolescent boys has occurred for three primary reasons. First, relatively high percentages of boys are dissatisfied with their bodies and engaging in self-reported dietary restraint (Kjelsås, Bjørnstrøm, & Gøtestam, 2004; Ricciardelli & McCabe, 2003b, 2001a). For example, in a sample of 8 to 9 year old boys, 45.3% were scared about being overweight, 29.5% thought about being thinner, and 37.4% reported that they had been on a diet (McCabe & Ricciardelli, 2003b). Second, self-reported dietary restraint has been associated with a host of negative health outcomes, including binge eating (Goldschmidt, Wall, Loth, Le Grange, & Neumark-Sztainer, 2012; Hautala et al., 2008), weight cycling (i.e., cycles of weight loss and weight gain; Fisher, Sinton, & Birch, 2009; Mathews & Lynn, 2008; Neumark-Sztainer, Wall, Story, Perry, & Standish, 2012), and obesity (Burton, Smit, & Lightowler, 2007). Third, the transition from childhood to adolescence is a time when girls and women are at increased risk for the development of eating disorders (Eddy, Keel, & Leon, 2010; Stice & Bulik, 2008; Stice & Peterson, 2007), and similar outcomes are expected for boys (Halliwell & Harvey, 2006; Smolak & Thompson, 2009). During these transitional periods, when stress is high and cognitive controls are taxed, individuals attempting to diet are vulnerable to engaging in more severe forms of disordered eating behaviors (Baumeister, Gailliot, DeWall, & Oaten, 2006; Loth, van den Berg, Eisenberg, & Neumark-Sztainer, 2008;

Vohs & Baumeister, 2011). For example, in boys aged 8 to 12 years, Roemmich, Lambiase, Lobarinas, and Balantekin (2011) found that the combination of stress and self-reported dietary restraint was related positively to consumption of unhealthy “comfort foods” (e.g., potato chips) and negatively to healthy foods (e.g., pretzels).

Given that (a) adolescence appears to be a risk period for the development of disordered eating behaviors (Stice & Bulik, 2008; Stice & Peterson, 2007), (b) boys, like girls, are dissatisfied with their bodies and engage in dietary behaviors at relatively high levels (McCabe & Ricciardelli, 2003b), (c) the etiology of dietary intent appears to be multidimensional (Cafri et al., 2005), including physical (e.g., adiposity and fitness), psychological (e.g., internalization), and social (e.g., social pressures) factors, and (d) few studies have examined the potential causes of boys’ dietary intent (Ricciardelli & McCabe, 2004), the current study will extend previous research (e.g., Halliwell & Harvey, 2006) by not only addressing psychosocial factors (e.g., internalization, body comparisons), but also considering the relative influences of cardiorespiratory fitness and self-esteem on self-reported dietary intent in middle school boys. In this review, I discuss sociocultural influences (and models) on dietary intent, emphasizing the Halliwell and Harvey (2006) study, and then provide a detailed discussion of each factor in the proposed model (i.e., social weight pressure, social body comparison, internalization, cardiorespiratory fitness, body dissatisfaction, and self-esteem).

Sociocultural Pressures, Influences, and Models

Over the past 30 years for girls and women, and within the past 10 to 15 years for boys and men, researchers have identified sociocultural factors as primary in explaining the development of body image concerns and eating disorders (e.g., Karazsia & Crowther, 2009,

2010; Keery, van den Berg, & Thompson, 2004; Menzel et al., 2011; Striegel-Moore & Bulik, 2007; Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004; Tiggemann, 2011).

Broadly, these etiological models posit that body ideals are socially constructed representations of Western cultural norms of masculinity and femininity (Dutton, 1995; Kirk, 2002; Pope, Phillips, & Olivardia, 2000). Being a man (and thus being masculine) traditionally has been defined as a set of attributes (e.g., physical strength, competitiveness, and dominance) and beliefs (e.g., be respected; Stets & Burke, 2000). Shared expectations of masculinity are maintained and reinforced through social relationships, such as in gender-segregated peer groups that engage in gender stereotypic activities (Marcell, Sonenstein, Eftim & Pleck, 2011). For example, Martin and Fabes (2001) found that boys and girls, aged 3 to 6 years, who spent more time interacting with same-sex peers engaged in gender-stereotyped behaviors (e.g., boys engaged in more competitive play activities than girls and girls engaged in more cooperative behaviors than boys) six months later, suggesting that peers are instrumental in the gender-intensification process, which is defined as increased pressure from parents, peers, and the media to adopt gender-stereotypes, including societal body ideals (Smolak & Stein, 2006, 2010). Through this gender-intensification process, boys are socialized to believe that being male is defined in terms of their masculinity (Stets & Burke, 2000).

Although the male body historically has been defined through what it can do – functionality (Puhl & Heuer, 2009; Puhl & Latner, 2007) – society’s increasing focus on the leanness and muscularity of the male body (Leit, Gray, & Pope, 2001; Leit, Pope, & Gray, 2002) may explain why boys and men are becoming more concerned about the size, shape, and appearance of their bodies and dissatisfied with how they look (Cafri et al., 2005; Barlett, Vowels, & Saucier, 2008). In a study examining how society’s representation of the male body

has changed from 1967 to 1997, Pope, Olivardia, Gruber, and Borowiecki (1999) found that measures of the muscularity and leanness (i.e., waist, chest, and bicep circumference) of popular male action toys (e.g., GI Joe) had become more extreme over three decades, and the physiques of modern action figures exceeded the range of normative muscularity dimensions for men. Exposure to such cultural images and ideas may serve as an “initiating” factor in the development of body image concerns and self-reported dietary restraint in boys, as they learn that a masculine body now has an aesthetic ideal. This view of their bodies and masculinity may play a vital role in boys’ indoctrination into the appearance culture of their peers, family members, and society, which includes extreme and unhealthy body ideals (Jones, Vigfusdottir, & Lee, 2004; Pope et al., 1999).

Researchers (e.g., Halliwell & Harvey, 2006; Ricciardelli & McCabe, 2004; Striegel-Moore & Bulik, 2007) have posited that the socialization process involves the transmission of values and attitudes through three primary social agents: the media, family members, and peers. Each of these sources communicates to boys what is valued in terms of body, physique, appearance, and weight and what are the behaviors and beliefs that characterize being a man (Keery, Boutelle, van den Berg, & Thompson, 2005; Lorber & Martin, 2007; Murnen, 2011). Family members’ reinforce the Western Cultural body ideal through modeling and monitoring boys’ caloric intake and communicate the social value of attaining societal standards of appearance when they praise individuals who look like the ideal and make disparaging remarks concerning the weight and appearance of overweight individuals (Jones, 2011). Such messages from these social agents can become a source of “pressure” to adopt societal body ideals (e.g., to lose weight or increase muscle tone; Ricciardelli & McCabe, 2007) and behave in ways that are considered to be masculine. Sociocultural pressures can be direct, such as when family members

encourage boys to diet (Lunner et al., 2000) or indirect, such as when advertisements use thin, muscular models who are depicted as athletic, popular, and sexually attractive (Field & Kitos, 2009).

Over time, and through repeated exposure, such cultural appearance standards influence how boys interact socially, view their bodies, and evaluate their appearance (Blatt & Blass, 1996; Maccoby & Martin, 1993; Vartanian & Herman, 2006). Because societal appearance standards shape the messages the media, family members, and peers communicate to boys regarding their weight and appearance, such pressures lead boys to believe that (a) masculinity is intimately tied to the mesomorphic physical ideal and social acceptance, (b) physical appearance reflects valued attributes, such as self-discipline, independence, and popularity, and (c) they can achieve societal appearance norms through dietary restraint and exercise (Crocker & Park, 2004; Field et al., 2003; Puhl & Latner, 2007; Levine & Chapman, 2011).

Because early adolescence is a period of identity consolidation (Burke, 1991; Gardner & Knowles, 2008; Leary, 2010) and boys want to be perceived positively by significant others (e.g., peers), they are attuned to their social environments and vulnerable to pressures to conform to gender-role expectations (DeWall, Maner, & Rouby, 2009; Smolak & Stein, 2010), including stereotypic norms of masculinity (e.g., independence, nonemotionality, power; Smolak, Murnen, & Thompson, 2005; Stroot, 2002) and physical appearance (i.e., leanness and muscularity; Cafri, Blevins, & Thompson, 2006; Olivardia, Pope, Borowiecki, & Cohane, 2004). As being socially accepted becomes more important to early adolescent boys, they may be especially concerned about the social costs (e.g., rejection resulting from a lack of ability to be “manly”) associated with not having the desired weight and body shape (Swann & Bosson, 2010); they may be primed to attend to social norms, including information regarding appearance and gender (Cash,

2011; Gardner & Knowles, 2008; Leary, 2010; Thompson & Cafri, 2007). Such messages and pressures regarding appearance would shape their conception of “being a man” to include attributes of independence, competitiveness, strength, and power, as well as a narrow definition of how their bodies should look (i.e., lean and muscular; McCreary, & Sasse, 2000; Schwartz & Brownell, 2004; Levine & Chapman, 2011). Such internalized gender-roles (i.e., shared expectations of behavior; Stets & Burke, 2000) would provide structure and coherence to their self-concepts, and as a result, their role performance (i.e., their ability to achieve gender-stereotyped body ideals) would contribute significantly to their esteem, but only if achieved (Wood, Christensen, Hebl, & Rothgerber, 1997).

Acknowledging the centrality of sociocultural pressures, researchers (e.g., Bardone-Cone, Cass, & Ford, 2008; Cafri et al., 2005; Cafri, van den Berg, & Thompson, 2006; Ricciardelli & McCabe, 2004; Ricciardelli, McCabe, Holt, & Finemore, 2003) have developed “biopsychosocial” models to explain the development of body image concerns, dietary intent, and other disordered eating behaviors in boys and men. In a review of putative risk factors associated with disordered eating (e.g., dietary intent) and the pursuit of muscularity in adolescent boys and men, Cafri et al. (2005) proposed that the combined influence of biological (e.g., pubertal status and timing), psychological (e.g., self-esteem), and social (e.g., parent, peer, and media influences, social body comparison) factors were related to the development of health-risk behaviors (e.g., self-reported dietary restraint). Similarly, Ricciardelli and McCabe (2004) identified key factors, such as BMI, body image concerns, and social weight pressure from parents, peers, and the media, that were related to disordered eating in adolescent boys. They suggested that social pressures (e.g., to lose weight and gain muscle tone) from family members, peers, and the media relates directly and indirectly (through social body comparisons,

internalization of societal appearance norms, body dissatisfaction, and self-esteem) to disordered eating. The basic model proposed by Cafri et al. (2005) and Ricciardelli and McCabe (2004) posits that, because societal appearance standards are unattainable for most to achieve and such standards define boys' social interactions regarding their appearance and perceptions of their bodies, social weight pressures, body comparisons, and internalization will increase boys' vulnerability for becoming dissatisfied with their weight, shape, and appearance and lead to low self-esteem. In turn, boys may attempt to mold their bodies in alignment with social expectations through dieting. Ricciardelli and McCabe (2004) and Cafri et al. (2005) argued for future studies to incorporate a biopsychosocial approach when examining disordered eating and dieting in boys and men.

In a multi-factor study, Halliwell and Harvey (2006) examined the relative influence of sociocultural (e.g., weight pressure) and psychological (e.g., internalization) factors on self-reported dieting and food preoccupation in a combined sample of boys and girls between ages 11 and 16 years. They found that social pressures from family and peers (to be thin) were related directly to social body comparisons with peers, internalization of the thin ideal, body dissatisfaction, and dieting and food preoccupation. Further, the effects of social weight pressure were indirect on disordered eating, operating through the other variables as well. For boys, social body comparison was related directly to higher internalization of the thin ideal, which in turn was associated with higher levels of dissatisfaction with body size and shape. In the final step of their model, body dissatisfaction was related to more reported disordered eating (Halliwell & Harvey, 2006). Overall, their model accounted for 8% of the variance in social body comparisons with peers, 13% of internalization, 13% of body dissatisfaction, and 24% of boys' self-reported dieting and food preoccupation (see Figure 1; Halliwell & Harvey, 2006).

Given early adolescence is a timeframe in which boys become increasingly self-evaluative (Tiggemann, 2004, 2005) and experience extensive physical (e.g., increases in height, weight, and musculature) and social (e.g., emphasis on extrafamilial relationships; Berk, 2009; Jones, 2001) changes, middle school, which covers sixth- to eighth-grades (ages 11 to 14 years, generally), may be a key timeframe to examine the influences of biopsychosocial factors on the dietary intent of boys. In the present study, I will extend the Halliwell and Harvey (2006) study by examining how social (i.e., social weight pressure, social body comparison), psychological (i.e., internalization, body dissatisfaction, and self-esteem), and physical (i.e., cardiorespiratory fitness) factors relate to dietary intent within early adolescents. In the sections that follow, I define and explain how each of these factors—social weight pressure, social body comparison, internalization, cardiorespiratory fitness, body dissatisfaction, and self-esteem—may be associated with boys’ intention to restrict their caloric intake.

Sociocultural Weight Pressures

Social weight pressures are defined as messages from family members, peers, and the media to lose or gain weight, change appearance, and increase muscle tone (McCabe & Ricciardelli, 2001b), and are communicated both directly and indirectly. For example, when parents encourage their son to diet, they are communicating directly that they have specific expectations concerning body size/shape and appearance (Fisher & Birch, 1999, 2000); when parents diet themselves, they indicate indirectly that a certain body type is highly valued (Jones, 2011). In boys aged 9 to 14 years, Field et al. (2001) found that maternal weight loss attempts and the perceived importance of weight and appearance of boys’ fathers predicted weight concerns and self-reported dietary restraint in the boys one year later. Further, restrictive feeding

practices, such as pressuring boys to consume only certain foods and restricting their consumption of high-fat or “forbidden” foods, conveys the message that there are “good” and “bad” foods (Smolak, 2004) and that boys should avoid consuming these bad foods in order to shape their bodies in alignment with the societal ideal (Sira & Ballard, 2011). van Strien and Brazeliers (2007) found that parental restriction of snack foods and pressures to eat healthy foods was related positively to self-reported dietary restraint in boys aged 7 to 12 years. In addition, the positive association between perceived parental restriction of snacks and self-reported dietary restraint was stronger for overweight boys than for average weight boys. Consistent with these findings, restrictive feeding practices (e.g., “If I did not guide or regulate my child’s eating, s/he would eat too much of her favorite foods”) have been associated with disinhibited eating and BMI in boys and girls aged 4 to 8 years (Joyce & Zimmer-Gembeck, 2009). Researchers (e.g., Papias, Stroebe, & Aarts, 2008; Stroebe, 2008; Vartanian, Herman, & Polivy, 2006) have posited that boys and girls who feel pressured to diet may lack skills necessary to self-regulate their dietary intake when given unrestricted access to high-fat foods, setting them up for overeating, weight cycling, and obesity.

Boys who feel pressured to diet may be vulnerable to obesity and at risk for body dissatisfaction as well (Austin, Haines, & Veugelers, 2009; Berge, Wall, Loth, & Neumark-Sztainer, 2010; Spear, 2006). Sira and Ballard (2011) found that perceived maternal control (i.e., “My mother tries to control my life”) was related negatively to body satisfaction among college men aged 18 to 25 years. In addition, the use of food for instrumental purposes (e.g., rewarding behavior with unrestricted access to these forbidden foods) leads boys to associate their social relationships with their dietary habits (Fisher et al., 2009). Because boys are focused on social inclusion (Baumeister & Leary, 1995), social pressures from parents to diet may lead to their

preoccupation with the foods they are attempting to avoid (Hofmann, Rauch, & Gawronski, 2007) and increase their vulnerability for developing dietary intent (Cummings, Davies, & Campbell, 2000; Fisher et al., 2009).

In addition, appearance-focused conversations (e.g., importance of weight, shape, and appearance) amongst peer groups convey the value of being physically attractive (Jones, 2001). Teasing and social exclusion of peers who are overweight or discrepant from the ideal communicate the social value of the physical ideal and indicate that individuals who fall short may be ostracized and excluded (Abrams & Hogg, 2004; Fulkerson, Strauss, Neumark-Sztainer, Story, & Boutelle, 2007; Strauss & Pollack, 2003). Vincent and McCabe (2000) found that boys (ages 11 to 12 years) and male adolescents (ages 13 to 18 years) were more likely to receive negative verbal commentary about their weight and shape from peers in comparison to girls and female adolescents. As early adolescent boys develop their identities, individuate from their parents, and align themselves with their peers, they may seek out activities (e.g., reading fitness magazines) and engage in behaviors (e.g., dieting) that are promoted within their peer groups (Botta, 2003; DeWall, Baumeister, & Vohs, 2008; Schooler, 2011). Thus, their peer groups play an important role in shaping their values and beliefs about their appearance.

The media promotes the social value of attractiveness as well (Menzel et al., 2010). Television and magazine advertisements that contain male models who represent the societal body ideal communicate that masculinity, popularity, sexual appeal, and success are contingent upon their ability to achieve society's standards of appearance (Harrison, 2000; Menzel et al., 2011). Research findings (e.g., Smolak & Stein, 2006, 2010) suggest that repeated exposure to advertisements in the media that espouse the social rewards (e.g., increased popularity and perceived attractiveness) associated with being lean and muscular induces boys to believe that

the physical ideal is both expected and desirable. For seventh- and eighth-grade boys, Smolak and Stein (2006) found that the interaction of exposure to muscular images in magazines and being invested in their physical strength predicted boys' drive for muscularity. In a review of factors associated with body image in boys, men, girls, and women, Grogan (2010) identified social- and gender-identity as factors that influence boys' investment in societal appearance norms. In a related study, Smolak and Stein (2010) found that boys' investment in male physical attributes (e.g., strength) predicted investment in media images of men who have the muscular and lean body ideal seven months later. Researchers (e.g., Choma et al., 2010; Grogan 2010; Pompper, 2010) have suggested that the media's focus on male physical appearance may lead boys and men to feel valued for how they look more so than for who they are or what they can do, leading to a sense of objectification (Strelan & Hargreaves, 2005).

Taken together, the messages and pressures from family members, peers, and the media regarding boys' weight and dietary habits communicate that their social value is contingent upon their ability to achieve societal standards of physical attractiveness (Spear, 2006). Because social pressures to lose weight and diet reinforces boys' investment in socially prescribed standards of physical appearance that are aligned with gender norms of masculinity (Smolak & Stein, 2010), boys may pursue societal appearance standards in order to achieve social expectations for their bodies (Jones, 2011). Thus, these social pressures to lose weight and diet are expected to relate directly to social body comparisons, internalization, body dissatisfaction, and dietary intent.

Social Weight Pressures and Social Body Comparisons

In my model, social pressures to lose weight and diet are hypothesized to relate directly to social body comparisons (i.e., the propensity to compare and evaluate ones' physical appearance relative to peers, models in the media, and family members; Corning & Gondoli,

2012). Social pressures from family members, peers, and the media about body size/shape, appearance, food, and dieting may amplify boys' investment in their appearance (Goldschmidt et al., 2011; Haines, Neumark-Sztainer, Eisenberg, & Hannan, 2006) and lead them to compare themselves to others to determine, in part, their social standing (Neziroglu, Khemlani-Patel, & Veale, 2008).

Researchers (e.g., Smolak & Stein, 2010; van den Berg et al., 2007) have documented the association between social pressures and social body comparisons in boys in cross-sectional and longitudinal research. In a cross-sectional study, Petrie et al. (2010) found that social pressures to lose weight and gain muscle was correlated positively with social body comparisons in middle school boys. Smolak and Stein (2010) found media influences (e.g., looking at athletes on television to determine the adequacy of muscles) was related to social body comparisons with peers and models on television in seventh- and eighth-grade boys. For seventh- and tenth-grade boys, reading articles about dieting and weight loss and weight teasing explained 11% of the social body comparisons variance five years later (van den Berg et al., 2007). Because social pressures to lose weight and diet exacerbate the salience of boys' physical appearance (Flament et al., 2012), boys who endorse higher levels would be expected to engage in more social body comparisons relative to those who experience less of these pressures.

Social Weight Pressures and Internalization

In my model, social weight pressures are expected to relate directly to internalization of the thin ideal (i.e., the active incorporation of societal appearance norms into one's mental framework for appearance or one's self-schema; Cafri et al., 2005). As boys navigate the task of developing an increasingly stable and coherent self-concept, their family members, peer groups, and the media play an important role in shaping their identities and beliefs (Blatt & Blass, 1996;

Maccoby & Martin, 1993; Vartanian & Herman, 2006). Further, boys' investment in their relationships may make them vulnerable to external influences, such as pressures from friends or the media to adopt the physical ideal (Clabaugh, Karpinski, & Griffin, 2008; Crocker, 2002; Vartanian, 2009), and likely to internalize or incorporate the beliefs and values (e.g., characteristics of masculinity) of their peers, family members, and society into their self-schema (Drummond, 2002; Vartanian & Hopkinson, 2010). Because middle school boys spend considerable time at school among their peers (Myers & Crowther, 2009), they would be attentive to the appearance norms that are salient within their friendships and social networks (Grieve, 2007; Grieve & Helmick, 2008), which are likely to include a focus on the thinness and muscle tone of their bodies (Murnen, 2011).

Researchers have demonstrated that social weight pressures are associated with higher levels of internalization in boys (e.g., Knauss, Paxton, & Alsaker, 2008; Rodgers, Ganchou, Franko, & Chabrol, 2012; Tylka, 2011). For Swiss male adolescents in seventh through twelfth grade, Knauss et al. (2008) found that pressures from the media to lose weight was related to increases in internalization of the physical lean and muscular ideal. Amongst male undergraduates, social pressures from family members and the media to have a muscular and lean body were associated with internalization of a lean and muscular physical ideal (Tylka, 2011). Among French male adolescents (aged 15 to 19 years), Rodgers et al. (2012) combined internalization and social body comparisons into a single construct, defined as appearance-related attitudes and cognitions. They found that this new construct fully mediated the relationship between pressures from family members, friends, and the media to gain muscle and the drive for thinness. Thus, pressures that boys and men perceive from family, friends, and the

media regarding body size and shape and physical appearance may lead to the development of a self-schema that is, in part, defined by these societal ideals.

Social Weight Pressures and Body Dissatisfaction

In my model, I hypothesized that there would be a direct relationship between social pressures and body dissatisfaction (i.e., one's attitudes and feelings regarding one's physical appearance; Smolak, 2004) because boys develop their *body image schema* (i.e., mental framework for organizing and perceiving information concerning their physical appearance) within the context of their social relationships (Jones, 2004). Because societal appearance standards determine the messages boys receive from important socializing agents (i.e., family members, peers, and the media), over repeated exposure, boys may come to conclude that the opinions of such socializing agents regarding their physical appearance reflect their self-worth (Krueger, 2002; Neziroglu et al., 2008; Stryker, 1980) and the amount they should value their bodies (Clabaugh et al., 2008; Crocker & Wolfe, 2001). Researchers (e.g., Hill & Lynch 1983; Rose & Rudolph, 2006; Smolak & Stein, 2006), suggest that puberty may intensify pressures from peers and family members for boys to conform to gender-stereotyped behaviors and appearance norms, because they look (and are expected to act) more like men than boys who have not begun puberty. Social weight pressures may heighten the salience and importance boys ascribe to their physical appearance (Agras, Bryson, Hammer, & Kraemer, 2007) and, in turn, these societal messages about body, appearance, and what it means to be a man may become the basis through which boys experience and evaluate their bodies (Cash, 2011; Ruffolo, Phillips, Menard, Fay, & Weisberg, 2006). As a result, boys may interpret pressures, such as to lose to weight and to diet, to mean that their bodies are not consistent with the ideal and lacking (van

den Berg et al., 2007). It is this discrepancy that leads them to become dissatisfied with their weight/shape and appearance (Vartanian & Herman, 2006). Thus, boys who experience high levels of social pressure about weight and dieting would be expected to view their bodies as lacking and be less satisfied with their size, shape, appearance, and physique.

Researchers (e.g., Knauss et al., 2008; McCabe & Ricciardelli, 2005; Ricciardelli & McCabe, 2003b, 2001c) have documented the association between social weight pressures and body dissatisfaction in boys. For example, in a sample of boys and girls in seventh through tenth grades, McCabe and Ricciardelli (2003c) found that boys who reported higher levels of pressures from the media (to lose weight and gain muscle) were more dissatisfied with their body weight than those who reported lower levels of these pressures. Similarly, amongst boys aged 11 to 12 years and 13 to 15 years, the combination of low levels of self-esteem and pressures from the father, male best friend, and the media to lose weight predicted greater dissatisfaction with body size and shape (Ricciardelli & McCabe, 2001c). In a related study, Ricciardelli and McCabe (2003b) found that for boys aged 11 to 15 years, the combination of perceived pressures from mothers and fathers and of peer encouragement to lose weight were associated with increases in being dissatisfied with chest, stomach, and shoulders.

Hargreaves and Tiggemann (2009) found that college men aged 18 to 35 years who viewed television advertisements of men who had the muscular physical ideal were less satisfied with their muscles and physical attractiveness than men who did not view advertisements of muscular male models. In their study, men who were highly invested in their appearance were the most vulnerable to the deleterious effects of these media images on their body satisfaction (Hargreaves & Tiggemann, 2009). Researchers (e.g., Schooler, 2011) have suggested that boys may select the television shows they watch and the magazines they read in order to define their

emerging identities, and exposure to lean and muscular male models in the media leads to greater body dissatisfaction, because viewing such images increases boys' focus on the discrepancy between their bodies and the societal ideal.

In a longitudinal study of boys, ages 8 to 12 years, McCabe and Ricciardelli (2005) found that perceived pressures from mothers to gain muscle predicted weight dissatisfaction eight months later. Further, 16 months later, initial media pressures to lose weight predicted the boys' body dissatisfaction, initial media pressures to gain muscle predicted the higher level of importance the boys put on their current weight, and initial pressures from mothers to gain muscle explained the boys' dissatisfaction with their muscularity. The results of studies on social pressures and body/weight dissatisfaction (Knauss et al., 2008; McCabe & Ricciardelli, 2005; Ricciardelli & McCabe, 2003b, 2001c) indicate that the effects are not only immediate, but accrue over time, suggesting that social pressures are a risk factor for the extent to which boys may become dissatisfied with their body size and shape, weight, muscularity, and appearance.

Social Weight Pressures and Self-Esteem

In my model, I expect social pressures to be related to lower levels of self-esteem. Because boys' self-esteem is shaped by the perceptions of their families and friends, they may believe social pressures (to lose weight and diet) exist because they are lacking socially and physically (van den Berg et al., 2007). Consistent and repeated exposure to such pressures would undermine boys' sense of social competence; boys would likely blame themselves for their failure to meet social expectations for their bodies (Puhl & Latner, 2007) and, in doing so, would develop low self-esteem (Krueger, 2002; Neziroglu et al., 2008; Stryker, 1980). Thus, early adolescent boys who experience high levels of social pressures (to lose weight and diet) would

be expected to have lower self-esteem.

Researchers (e.g., Knauss et al., 2008; McCabe & Ricciardelli, 2005; Ricciardelli & McCabe, 2003b, 2001c) have documented the association between social weight pressures and low self-esteem in boys. For example, Ricciardelli and McCabe (2001) found that, for boys (aged 12 to 15 years old), self-esteem moderated the relationship between social pressures (from female friends to lose weight and fathers to increase muscles) and weight loss strategies (e.g., dieting). Further, pressures from female friends (to lose weight) and from fathers (to gain muscles) predicted boys' body change strategies (e.g., dieting and exercising to lose weight) when self-esteem was low, suggesting that when boys feel pressured (to lose weight and diet), they are likely to also feel negatively about themselves overall. In another study, Fernandez and Pritchard (2012) found that social influences, including pressure from the media to adopt the societal body ideal, explained 14% of the male undergraduates' lower scores on the measure of social self-esteem (i.e., perceived social competence). Because self-esteem is comprised of salient subdomains (e.g., social, physical), boys who feel pressured (to lose weight and diet) are likely to feel socially and physically inept, which in turn would lower their self-esteem. Taken together, these findings suggest that early adolescent boys would look to important socializing agents (e.g., families, peers, and the media) to determine how they should feel about themselves generally. In doing so, social pressures to lose weight and diet would lead boys to believe that are failing to meet the expectations of their family members, peers and society; their perceived failures would undermine their self-confidence and, over time, erode their self-esteem.

Social Weight Pressures and Dietary Restraint

In my model, I expect social pressures to be related to higher levels of dietary restraint.

Given that modeling from family members and peers may be a primary way in which boys develop their knowledge of dieting (Schur, Sanders, & Steiner, 2000) and boys want to have the social approval of their peer groups and generally believe that such acceptance is determined by their physical appearance (de Bruyn, 2010; Falkner et al., 2001; Sinton & Birch, 2005), they may attempt to diet because they believe that dieting will lead them to social approval and a leaner body type (McCabe & McGreevy, 2010). However, the long-term effectiveness of dieting is in question (Stice, Cooper, Schoeller, Tappe, & Lowe, 2007; Stice, Fisher, & Lowe, 2004; Stice et al., 2010) and boys who attempt to diet are unlikely to develop the thin and lean physique or the social approval they desire (Field et al., 2007; Petrie et al., 2010). Their concerns with social acceptance may lead them to diet in order to shape their bodies in alignment with social expectations for their bodies, which include a lean and thin physique (Thøgersen-Ntoumani, Ntoumanis, Barkoukis, & Spray, 2009; Vartanian, Herman, & Polivy, 2007, 2008) and to become preoccupied with their bodies (Agras et al., 2007) and the foods they are attempting to avoid (Lowe & Levine, 2005; Quick & Byrd-Bredbenner, 2012). They would be vulnerable to obesity and weight cycling (i.e., binge eating follow by dieting; Calogero, Davis, & Thompson, 2004; Drummond, 2002; Neumark-Sztainer, Wall, Haines, Story, & Eisenberg, 2007).

The association between social weight pressures and self-reported dietary restraint has been demonstrated in both cross-sectional and longitudinal research (e.g., McCabe and Ricciardelli, 2003a; Ricciardelli, McCabe, Lillis, and Thomas, 2006; Vincent and McCabe, 2000). In a sample of boys aged 11 to 12 years and male adolescents aged 13 to 18 years, Vincent and McCabe (2000) found that maternal encouragement to lose weight was related to increases in self-reported dietary restraint, and the combination of higher BMI and more social pressures from parents and peers to lose weight was associated with higher levels of bulimic

symptoms. In a longitudinal study of boys aged 11 to 12 years and male adolescents aged 13 to 16 years, McCabe and Ricciardelli (2003a) found that perceived pressures from parents and peers to lose weight predicted strategies to lose weight (e.g., self-reported dieting and exercising to lose weight) eight months later. Further, initial pressures from parents and peers to increase weight explained the adolescents' use of strategies to increase weight (e.g., self-reported dieting and exercise to gain muscle); and initial pressures from parents and peers to lose weight, increase weight, and increase muscle predicted the use of food supplements in boys eight months later. In another study, Ricciardelli et al. (2006) found that perceived pressures from the media to lose weight and to gain muscles predicted self-reported dietary restraint eight months later in boys aged 8 to 11 years; similarly, the media pressures to lose weight that boys aged 8 to 12 years experienced explained their increased level of caloric restriction eight and 16 months later.

Summary

Social weight pressures from family members, peers, and the media increases boys' (a) awareness of their appearance as it relates to gender-norms of masculinity (McCreary, Saucier, & Courtenay, 2005), (b) investment in societal appearance norms (Gulas & McKeage 2000), (c) concerns about the adequacy of their bodies (Didie, Kuniega-Pietrazak, & Phillips, 2010), and (d) motivation to reduce discrepancies between their appearance and the societal ideal (Higgins, 1987; Maner, DeWall, Baumeister, & Schaller, 2007). These messages and pressures shape boys' views of their bodies, increase the likelihood of their internalizing societal appearance standards and becoming dissatisfied with their body size and shape, and elevate their risk for restricting their caloric intake in hopes of achieving the lean body ideal (McCabe & Ricciardelli, 2001a). Thus, boys who experience considerable social pressures to lose weight and to diet from

the social agents in their lives are expected to engage in social body comparisons; internalize the thin ideal; be dissatisfied with their weight, bodies, and appearance; and restrict their caloric intake.

Social Body Comparisons and Internalization

Social body comparison is defined as an evaluative process that includes information gathering to determine the adequacy of one's physical appearance relative to salient others (Corning, Krumm, & Smitham, 2006; Festinger, 1954) and has been associated with social anxiety and self-uncertainty in college women (Corning et al., 2006). Three target groups have been identified—same sex individuals in the media, family members, and friends (Jones, 2004)—with whom boys may compare their physical selves. Because early adolescent boys' identities are unstable (McConnell, 2011; Tesser, 2000), they may feel socially uncertain and, thus, will compare themselves to others in these target groups to determine what is expected of them and whether they approximate societal and peer-group ideals. Because physical appearance is a central component of boys' identities, particularly as they transition through puberty, they will make bodily comparisons between themselves and others in hopes of reducing their social unease (Boutelle, Eisenberg, Gregory, & Neumark-Sztainer, 2009; Brown & Ross, 2010; Heatherton & Vohs, 2000).

In my model, I hypothesized that social body comparisons would be associated with greater internalization of societal appearance ideals. Boys are expected to integrate societal appearance norms into their self-schema or belief system because they are invested in their relationships and are thus likely to adopt the values (e.g., the thin deal) of their peers and family members (Myers & Crowther, 2007). As boys expand their social networks by including more

peers (Labre, 2005), they become highly motivated to enhance their social connection with and standing within this group (Knowles & Gardner, 2008). Through their body comparisons, they become increasingly aware of the social benefits associated with physical attractiveness (e.g., social inclusion; Jones, 2004) and come to understand that social approval often is contingent upon their physical appearance (Harter, Stocker, & Robinson, 1996; van den Berg & Thompson, 2007). This understanding would be expected to contribute to their viewing themselves as an aesthetic object to be socially judged (Morry & Staska, 2001; Slater & Tiggemann, 2010; Veale, 2004) and to focus their attention on the appearance norms that are most salient amongst boys and men, that is, being thin and toned (Flament et al., 2012; van den Berg & Thompson, 2007). In support of this idea, Jones (2001) found that ninth- and tenth-grade boys were more likely to make comparisons about height and weight with each other than they were to compare other general physical features, such as overall appearance and facial features.

Although few studies have examined social body comparisons in boys using multivariate models (Grogan, 2010; Ricciardelli & McCabe, 2011), researchers have documented its association with internalization. Among male undergraduates, Karazsia and Crowther (2009) found that social body comparisons was related to internalization of the lean and muscular (or athletic) body ideal; the men said that they most frequently compared their bodies with friends, same-sex peers at school, and sports athletes. In related studies, significant positive correlations between social body comparisons and internalization of the thin ideal (r 's = .35 and .45, respectively) have been documented in French male adolescents, ranging in age from 15 to 19 years (Rodgers et al., 2012), and U.S. middle school boys (grades six through eight; Petrie et al., 2010).

Recent research findings (e.g., Grogan, 2010; Ricciardelli & McCabe, 2011) have

suggested that boys do engage in social body comparisons, and such comparisons are indirectly associated with body dissatisfaction through internalization of societal appearance standards.

Hargreaves and Tiggemann (2004) posited that social body comparisons is related to internalization because such comparisons define boys' appearance schema by determining the meaning and importance they ascribe to physical appearance (e.g., the social benefits of being physically attractive). Because social body comparisons increase the salience of appearance-related information (e.g., gender-stereotyped body ideals), social comparisons would strengthen the association between boys' appearance schemas and their social identities (Hargreaves & Tiggemann, 2002, 2003, 2004).

Boys who engage in social body comparisons may adopt societal standards of appearance as a self-standard and internalize the physical ideal, because their appearance defines their social and gender identities (Hargreaves & Tiggemann, 2004; Serpe & Stryker, 1987). Because early adolescent boys are concerned about standing out from their peer groups (Halliwell & Harvey, 2006) and about being different from social appearance norms (Smolak & Stein, 2010), when social comparisons reveal discrepancies between their real and ideal bodies, boys become dissatisfied with their weight, shape, and appearance. Taken together, research suggests (Grogan, 2010; Halliwell & Harvey, 2006; Karazsia & Crowther, 2008, 2009, 2010; Rodgers et al., 2012) that middle school boys who endorse higher levels of social body comparisons would report higher levels of internalization of the thin ideal relative to boys who engage in fewer social body comparisons.

Internalization of Societal Body Ideals and Body Dissatisfaction

Internalization of the thin ideal involves the active incorporation of societal appearance standards into one's internal cognitive system and appearance schema (i.e., a cognitive structure

that guides the interpretation of and meaning attributed to information regarding weight, shape, and appearance; Cash & Labarge, 1996). For individuals who believe that their physical appearance determines their social value, their weight, shape, and appearance would be highly salient in their self-schema. Thus, how boys' evaluate their bodies would be strongly influenced by how closely they approximate these internalized ideals, and they would be highly motivated to engage in behaviors that would decrease real-ideal discrepancies. Achieving (or not) their internalized ideals would influence their self-perceptions and identities (Crocker, 2002; Smolak, Levine, & Thompson, 2001; Leary, 2010; Vartanian, Herman, & Polivy, 2007, 2008).

In my model, I hypothesized that internalization of the thin ideal would be related to body dissatisfaction. As middle school boys expand their peer groups and give more importance to their identities, they align their beliefs and behaviors with these important groups. Because boys' physical appearance and social relationships are important to them, they become invested in the norms and values of their family members, peers, and society (Lawler & Nixon, 2011). As societal appearance standards are internalized and integrated into their belief systems (Cafri, Yamamiya, Brannick, & Thompson, 2005; Smolak, 2004), these standards become the lens through which boys view and evaluate their bodies (Wheeler, Adams, & Keating, 2001). When self-evaluation and social comparison reveal a discrepancy between the muscularity and leanness of boys' bodies and their internalized ideals, they are likely to experience dissatisfaction (Smolak, 2009).

Research findings (e.g., Flament et al., 2012; Jones, Bain, & King, 2008; Mendelson, White, & Mendelson, 1996) have suggested that as middle school boys undergo changes associated with pubertal development (e.g., increased body fat), they primarily focus on their weight and the tone of their bodies (McCabe, Ricciardelli, & Finemore, 2002). As puberty

begins, boys will be primarily focused on their body weight; concerns about muscularity may emerge later, such as in high school, when being strong and muscular are developmentally relevant (Jones, 2004, 2001; O’Dea & Abraham, 1999). Jones and Crawford (2006) found that both weight (i.e., fear of gaining weight and motivation for dieting) and muscularity concerns (i.e., the general motivation to build up one’s muscles) were related to body dissatisfaction in eighth- and eleventh-grade male adolescents. In their model, muscularity concerns and weight concerns represented distinct dual pathways to body dissatisfaction for boys. That is, boys who had higher BMIs were more preoccupied with their weight and, in turn, had higher body dissatisfaction, whereas boys who had lower BMIs were more concerned about their muscularity and had higher levels of body dissatisfaction. Further, weight and muscularity concerns mediated the relationship between appearance- and muscularity-related pressures and body dissatisfaction. Their results suggest that the interaction of biological (e.g., BMI) and social (e.g., peer groups) factors may increase boys’ concerns about the discrepancy between the thinness and leanness of their bodies and their internalized ideal (Chittester & Hausenblas, 2009; Stanford & McCabe, 2005), which would increase their body dissatisfaction.

Internalization of thin and muscular body ideals has been associated with concerns about muscle tone (Jones, 2004) and drive for thinness in boys (Stanford & McCabe, 2005). In a sample of seventh- to twelfth-grade boys, Flament et al. (2012) found that internalization was related to low levels of weight-esteem (i.e., body dissatisfaction). Jones (2004) found that internalization of a muscular physique predicted body dissatisfaction in seventh- and tenth-grade boys one year later, suggesting that internalization is a risk factor. In two different studies, internalization was associated with dissatisfaction with weight and appearance and the belief that others’ do not perceive their bodies and appearance positively amongst 16-year-old Swedish

male adolescents (Frisén & Holmqvist, 2010) and with body dissatisfaction in male and female adolescents between the ages of 12 and 18 years (Lawler & Nixon, 2011).

Consistent with research on adolescent girls (e.g., Shroff & Thompson 2006), Karazsia and Crowther (2010) found that internalization of the general and athletic body ideals mediated the relationship between social pressures from family members and peers to diet to improve appearance and body dissatisfaction in college men; that is, pressures were associated with more internalization, which in turn was related to increased body dissatisfaction. Similarly, in a sample of college men, Menzel et al. (2011) reported a relationship between internalization of general and athletic ideals and decreased body satisfaction. As boys navigate the developmental task of constructing a coherent and stable self-concept, they are highly attentive to the attitudes and beliefs of friends and family members (Swann & Bosson, 2010). In addition, as they align their beliefs with the opinions and appraisals of significant others (e.g., family members and peers), societal standards of appearance are internalized and become their self-standard (Baumeister, 2011; Sameroff, 2000, 2010). And, because appearance standards are unrealistic, most boys will fall short of their internalized ideal and become dissatisfied with their bodies.

Body Dissatisfaction

Body satisfaction encapsulates perceptions, appraisals, and feelings about one's physical appearance, weight, and shape (Cash, 2011). Body satisfaction is an attitudinal dimension of body image that is continually modified by new information about and experiences with ones body. Theoretically, body dissatisfaction ensues when individuals perceive that their weight, shape, and appearance are discrepant from their self-standard (i.e., internalized societal ideal) and evaluate their bodies negatively (Cash, 2011). Numerous studies have documented the role

of body dissatisfaction in biopsychosocial models of disordered eating and dieting in boys and men (Bardone-Cone et al., 2008; Barlett et al., 2008; Ricciardelli & McCabe, 2004, 2011).

Paxton, Eisenberg, and Neumark-Sztainer (2006) found that body dissatisfaction was associated with higher BMIs, parenting and friend dieting, weight teasing, and depression and inversely with self-esteem in male adolescents five years later. Similarly, when BMI, age, SES, and Time 1 behaviors were statistically controlled, male adolescents who were dissatisfied with their bodies reported significantly more dieting, binge eating, and unhealthy weight control behaviors (e.g., took diet pills, used laxatives) than male adolescents who were satisfied with their bodies five years later (Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006).

Body Dissatisfaction and Self-Esteem

In my model, body satisfaction is hypothesized to relate directly to self-esteem. Global self-esteem is influenced (or determined) by subdomains of esteem, such as physical appearance, academic competence, and social relationships (Cole et al., 2001; Harter, 1999; Phares, Steinberg, & Thompson, 2004; Robins, Trzesniewski, Tracy, Gosling, & Potter, 2002). During early adolescence, when boys become more aware of and sensitive to their physical appearance, their satisfaction with their bodies may play an increasingly central role in determining their global self-esteem (Davison & Birch, 2002; Levine & Smolak, 2001; Mellor, Fuller-Tyszkiewicz, McCabe, & Ricciardelli, 2010). Early adolescent boys' increased focus on opposite sex relationships may enhance the centrality of body satisfaction in their self-esteem, because boys' would determine their social value and worth based on their physical appearance (van den Berg, Mond, Eisenberg, Ackard, & Neumark-Sztainer, 2010). When physical

appearance becomes so central, body satisfaction will strongly influence how boys feel about themselves overall, perhaps overshadowing other aspects of their selves (Neziroglu et al., 2008).

In support of this relationship, Tiggemann and Wilson-Barrett (1998) found that, for boys aged 8 to 12 years, body dissatisfaction was related significantly to low self-esteem. Similarly, Phares et al. (2004) documented a significant inverse relationship between body dissatisfaction and global self-esteem in boys and girls between the ages of 8 to 11 years. In a longitudinal study of boys aged 11 to 18 years, body dissatisfaction predicted lower levels of self-esteem five years later (van den Berg et al., 2010). In another longitudinal study of adolescent boys and girls, when level of body dissatisfaction was controlled, obesity levels were unrelated to self-esteem five years later (Mond, van den Berg, Boutelle, Hannan, & Neumark-Sztainer, 2011). These results suggest that low self-esteem is determined not by weight status per se, but rather by how dissatisfied boys are with their bodies.

Body satisfaction appears to have positive effects on self-esteem as well. Davison and McCabe (2006) found that body image satisfaction was associated with high self-esteem in a sample of Australian boys aged 12 to 15 years. Similarly, amongst Australian men aged 50 to 86 years, body satisfaction (in addition to low social body comparisons) was related to higher levels of self-esteem (Davison & McCabe, 2005). Although men generally report higher mean levels of body satisfaction than women, the strength of the body satisfaction–self-esteem relationship is consistent across the sexes, suggesting that when men are highly satisfied with their bodies, they are as likely as women to report high self-esteem because their bodies are consistent with the ideal they have internalized (Davison & McCabe, 2005).

In fifth- to eighth-grade girls and boys, DuBois, Tevendale, Burk-Braxton, Swenson, and Hardesty (2000) found that a high discrepancy between boys' and girls' self-standards and their

self-description contributed significantly and uniquely to their body dissatisfaction. In turn, their body dissatisfaction was the strongest predictor of low self-esteem two years later in comparison to the influence of other self-concept domains, such as academics. In sum, research (e.g., Davison & McCabe, 2005, 2006; DuBois et al., 2000) suggests that boys who are highly invested in their appearance and dissatisfied with their bodies report lower levels of self-esteem than boys who are not dissatisfied with their weight, shape, and appearance.

Body Dissatisfaction and Dietary Restraint

In my model, body dissatisfaction is expected to relate directly to self-reported dietary restraint. Middle school boys who are dissatisfied with their bodies may become preoccupied with the discrepancies between the desired shape of their physique and their actual body size and weight (Canpolat, Orsel, Akdemir, & Ozbay, 2005; Neziroglu et al., 2008; Smolak, 2009). Their intention to diet is based on the belief that caloric restriction may reduce the discrepancy between their real and ideal bodies and they will gain social approval by achieving social expectations for their bodies (Lindwall, 2002). Research findings have indicated that individuals who are highly discrepant from social appearance norms (e.g., overweight boys) tend to be socially excluded from their peer groups (Jones & Crawford, 2006) and may become focused on weight loss and dieting because they believe that dieting will lead to social inclusion (Baumeister, DeWall, Ciarocco, & Twenge, 2005; McCabe, Ricciardelli, & Holt, 2010; Vartanian, & Shaprow, 2008). For instance, McCabe et al. (2010) found that, for overweight boys aged 11 to 15 years, body dissatisfaction (in addition to pressures to lose weight from peers and the media) was associated with increased use of weight loss strategies (e.g., self-reported meal skipping to lose weight). When boys believe that they can mold their bodies to align with

societal standards of appearance through restricting what they eat (Paxton et al., 1991) and that such bodily changes will result in increased social- and self-acceptance (Boyes, Fletcher, & Latner, 2007; Lindwall, 2002), their risk of engaging in dietary restriction is likely to be elevated (Smolak, 2009).

Middle school boys may attempt to reduce their body fat and enhance the appearance of their muscle tone simultaneously through dieting. Approximately 40% of boys aged 8 to 11 years reported that they changed their eating habits to lose weight, whereas 76.2% indicated that they dieted to increase their muscles (Ricciardelli & McCabe, 2003a). In a sample of U.S. boys aged 8 to 11 years, Phares et al. (2004) found that body dissatisfaction related to higher levels of drive for thinness, whereas Ricciardelli and McCabe (2001b) reported a similar relationship in a sample of boys and girls ages 12 to 16 years. In seventh- to twelfth-grade students, boys' weight-esteem (i.e., satisfaction with one's weight) mediated the relationship between internalization of the muscular ideal and self-reported dietary restraint (Flament et al., 2012). For boys, internalization was related to lower weight-esteem, and in turn, weight-esteem was associated with higher self-reported dietary restraint. In a longitudinal study of fifth- and sixth-grade boys, Keel et al. (1997) found that their level of dissatisfaction with their bodies predicted higher levels of disordered eating, including self-reported dietary restraint one year later. Overall, the results of these studies (e.g., Keel et al., 1997; Phares et al., 2004; Ricciardelli and McCabe, 2001b, 2003a) support a strong association between how boys feel about their bodies and their intention to diet and restrict their food intake.

Self-Esteem and Dietary Restraint

Self-esteem encompasses feelings of self-worth, value, and self-regard (Mruk, 2006) and

is an integral component of ones' overarching self-concept; how one feels about themselves on salient domains (e.g., physical appearance, interpersonal relationships) defines their self-worth and, in turn, is incorporated into their self-concept (Craven, Marsh, & Burnett, 2003; Leary & Baumeister, 2000). High self-esteem has been associated with numerous positive outcomes, such as overall psychosocial adjustment (Griffiths, Parsons, & Hill, 2010). Researchers (e.g., Baumeister, 2011; Bois et al., 2000; Crocker & Luhtanen, 2003; Turner, 2010) have posited that individuals determine their self-esteem by comparing their attributes (e.g., physical appearance) to their self-standards (e.g., internalized societal appearance norms). For instance, boys who believe that it is important to be physically strong would be compare their real and internalized ideal bodies to determine the adequacy of their physical strength and abilities. The more importance they ascribe to looking physically strong, the more central their appearance becomes in determining their self-worth (Crocker & Park, 2004; Crocker & Wolfe, 2001) and defining their identities (Vartanian, 2009).

In my model, I hypothesize that self-esteem would be associated with a decreased level of dietary restraint. Boys with high positive regard and high levels of esteem generally base their worth on successes and positive feelings across multiple domains (e.g., social, academic, athletic, familial, etc.). Because their esteem is multiply determined and thus more stable than if only based on success in one dimension (e.g., body image; Murk, 2006), boys who have high self-esteem may be less concerned about the social costs (e.g., social rejection) associated with not adhering to the social body ideal. As a result, they would experience less internal pressures to diet or change their body weight (Eddy et al., 2010; Lawrence & Thelen, 1995).

Cross-sectional research (e.g., Furnham, Badman, & Sneade, 2002; Ricciardelli et al., 2009; Ricciardelli et al., 2006) has demonstrated an inverse association between self-esteem and

self-reported dietary restraint in U.S. and Australian boys and girls. For instance, Furnham et al. (2002) found that self-esteem was related to lower levels of disordered eating, as measured by the EAT, in a sample of English boys ages 12 to 13 years of age. In third and sixth-grade boys and girls, Lawrence and Thelen (1995) found that, for Caucasian boys, global self-esteem had an inverse relationship to self-reported dieting to lose weight or to avoid gaining weight. Further, in a longitudinal study of boys in third- to fifth-grade, boys' global self-esteem predicted strategies to decrease weight (e.g., thinking about consuming low calorie foods) eight months later (Ricciardelli, McCabe, Lillis, & Thomas, 2006), suggesting that how boys feel about themselves generally is a risk factor for whether or not they engage in dietary restraint. Croll, Neumark-Sztainer, Story, and Ireland (2002) identified positive self-esteem (in addition to emotional well-being, school achievement, and family connectedness) as protective against the development of disordered eating (e.g., self-reported dietary restraint) in ninth- and twelfth-grade male adolescents. Overall, the results of these studies (e.g., Ricciardelli et al., 2006; Ricciardelli et al., 2009; Ricciardelli et al., 2006; Lawrence & Thelen, 1995) suggest that high levels of esteem may lower the likelihood that boys will engage in dietary restraint.

Cardiorespiratory Fitness

Cardiorespiratory fitness (CRF) is defined as ones' aerobic capacity or ability to transport oxygen to muscles during sustained physical activity (i.e., general physical movement and energy expenditure; Caspersen, Powell, & Christenson, 1985) and exercise (i.e., planned, goal-focused physical activity; Carnethon, Gulati, & Greenland, 2005). CRF is related positively to academic performance (Ruiz et al., 2010), sport participation (Renfrow, Caputo, Otto, Farley, & Eveland-Sayers, 2010), and athletic ability (e.g., motor competence; Hands, Larkin, Parker,

Straker, & Perry, 2009), and has been associated with lower levels of depression and anxiety (Ruiz et al., 2010), and adiposity (Caballero, 2007; Dunton, Schneider, & Cooper, 2007; Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). Across many domains of physical, psychological, and academic well-being, CRF has been shown to contribute significantly to positive outcomes (Ortega, Ruiz, Castillo, & Sjostrom, 2008). In a longitudinal study, Kelly, et al. (2011) found that CRF led to decreases in depression and improvements in academic performance and social functioning in male adolescents (ages 11 to 18 years) six months later; BMI and body fat were unrelated to these positive health outcomes.

Cardiorespiratory Fitness and Body Dissatisfaction

In my model, I expect CRF to be associated with lower levels of body dissatisfaction. Boys with a high level of CRF are likely to have engaged in prolonged vigorous physical activities to achieve this state, which would likely contribute to reductions in body fat and increases in muscle tone and definition (Campbell & Hausenblas, 2009; Hausenblas & Fallon, 2006; Martin & Lichtenberger, 2002). As a result, high CRF boys are likely to be less discrepant from their internalized body ideal and be happier with how they look than those who are less physically fit (Carnethon et al., 2005; Dishman et al., 2006; Petrie et al., 2010). Because high CRF boys' bodies are likely to have low levels of body fat, these boys would not feel either a psychological or a physical press to restrict their caloric intake in order to change their physiques like boys who are less physically fit might experience. Even if boys who are fit were highly invested in their body image, they would not be concerned about the discrepancies between their bodies and the societal ideal, because their focus would be primarily on their fitness and health (Colella, Morano, Robazza, & Bortol, 2009; Vartanian, Wharton & Green, 2012). And, because

boys who are fit would be focused on their physical abilities (e.g., cardiorespiratory fitness), they are not as prone to worry about what their bodies look like (Didie et al., 2010).

Quaresma et al. (2009) compared the relative influence of CRF and BMI on psychological well-being using a combined sample of adolescent boys and girls. They found that CRF, as measured by a 20-meter shuttle run test, partially mediated the inverse relationship between BMI and body satisfaction (i.e., corporal self-esteem). Boys and girls who were overweight had lower CRF than those who were average weight. In addition, CRF was related positively with corporal self-esteem. That is, CRF attenuated the adverse influence of BMI on corporal self-esteem in boys and girls. When both BMI and CRF were entered into their model, CRF accounted for more variance in boys' and girls' self-esteem than did BMI. Petrie et al. (2010) documented the positive association between fitness and body satisfaction in middle school boys as well. They found that, for boys in sixth- to eighth-grade, high levels of CRF (as measured by the PACER test; Cooper Institute, 2007) was related positively to their satisfaction with the leanness and muscularity of their bodies. In a longitudinal study of men, Reboussin et al. (2000) found that CRF (as assessed by a graded exercise treadmill test to exhaustion) predicted lower levels of appearance dissatisfaction over the proceeding four weeks. Kuk et al. (2009) found that men's CRF (as assessed by an objective measure of VO_{2max}) was related positively to weight satisfaction and inversely correlated with mens' weight discrepancy (i.e., the difference between self-reported ideal and actual weight) 14 years later. Overall, middle school boys who are fit would likely feel instrumental in terms of their physical abilities and what their bodies can do (Lindwall, 2002; Marsh & Redmayne, 1994; Ricciardelli, McCabe, & Ridge, 2006). In a sample of French girls and boys, ages 14 to 19 years, Guérin, Marsh, and Famose (2004) found that CRF was related significantly and positively to perceived sport competence

(PSDQ; Marsh, Richards, Johnson, Roche, & Tremayne, 1994). Their successes and positive feelings would contribute to feelings of physical competence (Craft, Pfeiffer, & Pivarnik, 2003) and enhance their body satisfaction (Williams & Galliher, 2006).

Cardiorespiratory Fitness and Self-Esteem

In my model, I expect CRF to be associated with higher levels of self-esteem. In their review of the CRF literature, Ortega et al. (2008) documented the positive association between CRF and psychological well-being, including self-esteem in girls and boys (ages 9 to 10 years) and in male and female adolescents (ages 15 to 16 years). They proposed two possible mechanisms to explain the association between CRF and psychological well-being (e.g., self-esteem). First, they suggest that individuals who are fit would have lower adiposity and increased muscle definition, leading to a more positive body image. Second, because CRF is associated positively with serotonin, individuals who are fit would have an elevated mood and, thus, experience an enhanced sense of well-being. This assertion is consistent with research that has documented the inverse relationship between CRF and depression in male adolescents (ages 11 and 18 years; Kelly et al., 2011) and between depression and global self-esteem in middle school boys (Petrie et al., 2010).

Further, boys who are fit are more likely to be socially included by their peers than those who are not fit (Armstrong & Omen-Early, 2009) and may have a sense of social competence with peers and family members that would contribute positively to their global self-esteem (van den Berg et al., 2010). CRF (as measured by the PACER test of aerobic endurance; Cooper Institute, 2007), has been related positively to perceived social support from classmates in boys and girls ages 10 to 14 years (Flory, Martin, McCaughy, Murphy, & Wisdom, 2011) and social

alienation has been related inversely to CRF in boys and girls (Burkhalter & Wendt, 2001).

Researchers (e.g., Cararro, Scarpa, & Ventura, 2010; Trautwein, Gerlach, & Ludke, 2008) have documented the positive association between CRF and self-esteem as well. For Italian boys and girls (ages 12 to 15 years), Cararro et al. (2010) found that overall CRF, as measured by an endurance shuttle run, related to higher levels of global self-esteem and physical self-concept. In third-grade German girls and boys, Trautwein et al. (2008) found that fitness (as measured by the combination of students' coordination, balance, and speed) predicted their physical self-concepts 15 months later; BMI and physical activity, however, were not significant predictors of physical self-concept. Although this study did not include a measure of self-esteem, physical self-concept (i.e., "I am a physically strong person" and "I can run a long way without stopping") has been positively correlated with global self-esteem in boys (Petrie et al., 2010). The findings from Trautwein et al.'s (2008) study are consistent with previous research (e.g., Ortega et al., 2008) that suggests CRF, as opposed to physical activity, leads to higher self-esteem (Neumark-Sztainer et al., 2010).

In sum, middle school boys who are fit would receive positive feedback regarding their accomplishments and abilities from coaches, peers, and family members (Neumark-Sztainer, Goeden, Story, & Wall, 2004). Their successes and positive feelings would contribute to feelings of physical and social competence (Craft, Pfeiffer, & Pivarnik, 2003; Mruk, 2006) and they would draw on their satisfaction in these different domains when evaluating their overall self-worth (Bowker, 2006; Ekeland, Heian, Hagen, & Coren, 2005; Verstuyf, Patrick, Vansteenkiste, & Teixeira, 2012; Verstuyf, Vansteenkiste, & Soenens, 2012). When they feel competent and positive about themselves in many areas, societal appearance standards would be

less central in determining their self-esteem (Crocker & Wolfe, 2001; Marsh, & Shavelson, 1985).

Cardiorespiratory Fitness and Dietary Restraint

In my model, I hypothesized that CRF would be related to lower levels of self-reported dietary restraint. Boys who are fit generally have lower BMIs (Petrie et al., 2010) and would not be as focused on dieting as boys who are not fit because their bodies are less discrepant from the societal ideal (Wilson, 2005). Because boys who are fit would have a sense of physical mastery and develop a sense of self-determination in developing their physical fitness (Deci & Ryan, 2000; Hausenblas, Cook, & Chittester, 2008; Ryan & Deci, 2000), they would be less influenced by social pressures to change their bodies through dieting (Bers & Quinlan, 1992; Gilbert, & Meyers, 2005; Lundgren, Anderson, & Thompson, 2004). In a sample of men and women, Kuk et al. (2009) found that men's CRF (i.e., an objective measure of VO_{2max}) was related inversely to self-reported dietary restraint and an objective measure of BMI and positively to consumption of fruits and vegetables, and lower levels of lifetime weight loss, which is indicative of weight cycling, 14 years later.

Taken together, middle school boys who are fit would have lower BMIs (Ortega et al., 2008) and would be less discrepant from the physical ideal than boys who are less fit (Petrie et al., 2010; Wilson, 2005). CRF would be expected to lower boys' intention to diet. Because boys who are fit would feel positively about their appearance and have a sense of mastery concerning their physical abilities, they would feel empowered (i.e., have an internal locus of control) and be self-determined concerning their physical fitness (Bas, & Donmez, 2009; Hands et al., 2009). Thus, they would be motivated (and reinforced by) mastery-based achievements (e.g., improving

fitness and athletic skills), rather than by weight loss and societal appearance norms (Hagger, Hein, & Chstzisarantis, 2011; Wilson, Markey, & Markey, 2012). Because they would be focused on their physical capabilities, they would not be as easily influenced by external sources (e.g., pressures to adopt societal body ideals) and less vulnerable to developing dietary intent (Cook, Hausenblas, Tuccitto, & Giacobbi, 2011).

Overview of the Proposed Biopsychosocial Model of Dietary Restraint

Based on previous research and theoretical models (e.g., Cafri et al., 2005; Halliwell & Harvey, 2006; Ricciardelli & McCabe, 2004), sociocultural (i.e., social pressures to lose weight and diet and social body comparisons), psychological (i.e., internalization, body satisfaction, and self-esteem), and physical (i.e., cardiorespiratory fitness) factors are expected to have both direct and indirect effects on boys' self-reported dietary restraint. Specifically, when boys feel socially pressured to conform to societal appearance standards they may engage in social body comparisons as a means of identifying social norms and evaluating their appearance relative to the bodies of their peers, family members, and society (Smolak & Stein, 2006). Social body comparisons may enhance boys' investment in the leanness and muscle tone of their bodies, increasing their likelihood of internalizing the societal ideal (French et al., 2001).

When boys internalize the physical ideal, they integrate societal appearance norms into personal expectations and construct a rigid, internal framework for understanding their bodies (van den Berg & Thompson, 2007; Vartanian, 2009). And when they compare their bodies to the societal ideal, they would be dissatisfied (Labre, 2002). Because their body image is a salient dimension of their sense of who they are (Neumark-Sztainer et al., 2010), those who are highly dissatisfied with their bodies would be more likely to have low self-esteem. Because weight is

central to body satisfaction, when boys are dissatisfied with their physiques they may attempt to diet to reduce the disparity between their bodies and the societal body ideal (Janssen, 2005).

Conversely, being physically fit would contribute to lower levels of dissatisfaction with the size, shape, and appearance of one's body. Physically fit boys are likely to have bodies that closely approximate societal ideals (Lowry, 2007), which contributes to their satisfaction with their appearance. Further, boys who are fit may feel more socially accepted and physically instrumental, which would contribute to stronger physical and social self-concepts and, in turn, their global self-esteem (Armstrong & Omen-Early, 2009; Baumeister, 2011; Cain, Bardone-Cone, Abramson, Vohs, & Joiner, 2008; Hands et al., 2009). Amongst male and female college undergraduates, Rovniak, Anderson, Winett, and Stephens (2002) found that social support led directly to higher levels of exercise self-efficacy (i.e., the belief that one can achieve his/her exercise goals) and, in turn, exercise self-efficacy led directly to higher self-regulation (i.e., exercise goal setting, self-monitoring, and problem solving).

Researchers (e.g., Ajzen, 2002; Deci & Ryan, 2000; Gadbois & Bowker, 2007; Muraven & Baumeister, 2000) have posited that individuals are driven by a need to feel competent and to develop a sense of mastery over domains they value (e.g., fitness, sport, and social relationships). When their efforts satisfy their need to feel competent, they develop a sense of self-efficacy that is motivating and reinforcing. The self-efficacy boys derive from their CRF would enhance the salience and value boys ascribe to their CRF (Oaten, & Cheng, 2006). Their investment in their physical abilities would increase the centrality of their CRF in determining their self-esteem. Moreover, boys who are fit would be resilient to social weight pressures (Di Paula, & Campbell, 2002; Lubans, Foster, & Biddle, 2008) and less vulnerable to developing dietary intent, because

they would be more focused on their physical abilities and fitness than on how they appear to others or what others expect of them (Ryan & Deci, 2000; Hagger, Biddle, & Wang, 2005).

In their study, Halliwell and Harvey (2006) documented the primary influence of sociocultural factors (e.g., social pressures to be thin) on disordered eating in early adolescent boys. Social pressures to be thin from family members and peers both directly and indirectly (through social body comparisons, internalization, and body dissatisfaction) was related to disordered eating and self-reported dietary restraint in boys. Consistent with previous research (e.g., Cafri et al., 2005; Corning et al., 2006; McCabe & Ricciardelli, 2003, 2004; Ricciardelli et al., 2006; Keery et al., 2004), Halliwell and Harvey (2006) identified social pressures as the “initiating” sociocultural factor in development of disordered eating. Their findings highlight the formative role boys’ social relationships have in defining their view of their bodies and whether or not they engage in caloric restriction (Jones, 2001). Their study contributes to extant research by documenting the interactive effects of social and psychological factors in the development of disordered eating in early adolescent boys.

Although the sociocultural model proposed by Halliwell and Harvey (2006) provided a useful framework for understanding how social weight pressures may set the stage for dietary restraint in boys, they omitted other potentially important variables (e.g., self-esteem and cardiorespiratory fitness) that have been identified in biopsychosocial models for boys and men (e.g., Cafri et al., 2005; Ricciardelli & McCabe, 2004). Based on extant cross-sectional and longitudinal research, which supports a biopsychosocial model of dietary intent (Cafri et al., 2005; Halliwell & Harvey, 2006; Ricciardelli & McCabe, 2004), the development of dietary intent is likely multidetermined. However, to date, no other study has examined empirically the combined effects of social (e.g., social weight pressures), psychological (e.g., internalization),

and physical (i.e., cardiorespiratory fitness) factors on dietary intent in boys (Cafri et al., 2005; Ricciardelli & McCabe, 2004). And, researchers (e.g., Halliwell & Harvey, 2006) that have examined empirically this issue in boys have focused primarily on social and psychological variables. Given that the development of dietary intent is likely to be influenced by multiple variables from different domains (e.g., social, psychological, and physical) and an insufficient number of studies have been conducted to examine dietary intent in boys (Halliwell & Harvey, 2006), research is needed to empirically test the biopsychosocial model proposed by Cafri et al. (2005) and Ricciardelli and McCabe (2004). The current study represents an important extension of research concerning dietary intent in boys by replicating and extending Halliwell and Harvey's (2006) examination of a sociocultural model of disordered eating in boys, including the social and psychological variables that were supported and extending it to address the potential influences of physical fitness.

CHAPTER 3

METHOD

Participants

Early adolescent boys ($n = 663$) drawn from the six middle schools in the Denton Independent School District (DISD) during the 2009-2010 school year participated. M_{age} was 12.49 years ($SD = .99$); 37.7% ($n = 250$) were in 6th grade, 37.4% ($n = 248$) in 7th grade, and 24.9% ($n = 165$) in 8th grade. In terms of race/ethnicity, 59.1% ($n = 392$) were White/NonHispanic, 26.2% ($n = 174$) Hispanic/Latino, 11.2% ($n = 74$) Black/African American, 2.6% ($n = 17$) Asian/Pacific Islander, and 0.9% ($n = 6$) American Indian/Alaskan Native. For socioeconomic status (SES), which was based on federal guidelines for who qualified for free or reduced lunch, 26.2% ($n = 174$) of the participants received free lunch and 5.9% ($n = 39$) received reduced-cost lunch; 67.9% ($n = 450$) did not qualify. Participants' M_{BMI} was 21.39 kg/m^2 ($SD = 4.95$). Based on percentiles, as defined by the Centers for Disease Control and Prevention (CDC), 2% ($n = 13$) were underweight ($< 5^{\text{th}}$ percentile in BMI), 54.1% ($n = 359$) were in the healthy weight range (5th to the 84th percentiles), 24.3% ($n = 161$) were overweight (85th to the 94th percentiles), and 19.6% ($n = 130$) were obese ($> 95^{\text{th}}$ percentile).

Instruments

Demographics

Information regarding participant race and ethnicity, age, and grade level, social economic status (SES), defined by federal guidelines for need-based free or reduced lunch, was provided directly by the school district. Participants' height and weight were objectively

measured by physical education teachers at each school during the annual fitness testing and were used to compute their body mass index (BMI; kg/m²).

Sociocultural Pressures

Eight items from the Perceived Sociocultural Pressure Scale (PSPS; see Anderson, Petrie, & Neumann, 2011; Stice & Agras, 1998) assess perceived pressure to “lose weight” and to “diet” from each of four different sources – family, friends who are boys, friends who are girls, and TV/magazines. For each item, such as “I have felt pressure from my friends who are boys to lose weight,” the boys rated it on a 5-point scale from 1, *none*, to 5, *A lot*. Total score for each type of pressure is the mean across the four sources; higher score indicates greater perceived pressure in that area. Petrie et al. (2010) reported Cronbach’s alphas that ranged from .78 to .79 in a sample of middle-school boys; alphas for the current study were .74 to .79 (lose weight) and .74 to .84 (diet). Perceived pressure to lose weight and diet, respectively, were related significantly to body satisfaction ($r = -.15$ to $-.18$) and internalization of societal ideals about appearance ($r = .32$ to $.52$; Petrie et al, 2010). Anderson et al. (2011) found perceived pressure to lose weight associated significantly to dietary intent ($r = .52$ to $.65$) in a sample of female collegiate athletes.

Physical Appearance Comparisons

The 5-item Physical Appearance Comparison Scale (PACS; Heinberg, Thompson, & Stormer, 1995; Thompson, Heinberg, & Tantleff-Dunn, 1991; Thompson & Heinberg, 1993) assesses the extent to which individuals compare their physical appearance, shape, and size to others. Wording on items was changed to fit the age-specific experiences of the sample (e.g., the item “At parties or at social situations, I compare how I am dressed to how others are dressed”

was changed to “I compare how I am dressed to how other people are dressed.”). For each item, the boys responded using a 5-point scale that ranged from 1, *never*, to 5, *always*. Total score is the mean; higher scores indicate a greater tendency to compare oneself physically to others. Petrie et al. (2010) reported a Cronbach’s alpha of .88 in a sample of adolescent boys; 2-week test retest reliabilities of .78 and .72 were found in a sample of female undergraduates (Thompson & Heinberg, 1993). Cronbach’s alphas for the current study ranged from .82 to .85. The PACS was related significantly to perceived weight pressure ($r = .51$), body satisfaction ($r = -.21$), and internalization ($r = .45$) in a sample of 11- to 16-year-old boys and girls (Halliwell & Harvey, 2006). Among middle school boys, the PACS correlated significantly with body satisfaction ($r = -.46$; Petrie et al., 2010), providing additional support for the scale’s validity.

Internalization

The 9-item internalization subscale of the Sociocultural Attitudes Toward Appearance Questionnaire-3 (SATAQ-III; Thompson et al., 2004) measures the extent to which individuals have internalized U.S. societal ideals concerning appearance, body size/shape, and weight. On items such as “I compare my body to the bodies of TV and movie stars,” the boys responded on a 5-point scale that ranged from 1, *definitely disagree*, to 5, *definitely agree*. Total score is the mean; higher scores indicate greater internalization. Petrie et al. (2010) reported a Cronbach’s alpha of .95 in a sample of in a sample of boys and girls (sixth- to eighth-grades). Cronbach’s alphas for the current study ranged from .88 to .91. The internalization scale related significantly to social body comparisons ($r = .45$) and body satisfaction ($r = -.36$) amongst young adolescents (Petrie et al., 2010), and to dietary intent ($r = .33$ to $.34$) in female collegiate athletes (Anderson et al., 2011), providing support for its validity.

Body Satisfaction

Eighteen items from the Body Parts Satisfaction Scale-Male (BPSS-M; McFarland & Petrie, 2012) were used to assess the boys' satisfaction with the leanness, muscularity, and shape/size of their upper bodies and legs. For this study, two factors were used: Legs (4 items; leanness and muscularity of upper and lower legs) and Upper Body (14 items; leanness and muscularity of six body parts, such as chest and arms, and three items focused on overall body). The boys responded to each item using a 6-point scale that ranged from 1, *extremely dissatisfied*, to 6, *extremely satisfied*. Total score for each factor is the mean of those items; higher scores indicate greater satisfaction. McFarland and Petrie reported Cronbach's alphas and six-month test-retest reliabilities, respectively, of .97 and .72 (Upper Body) and .94 and .70 (Legs) in a sample of male undergraduates. Cronbach's alphas for the current study were .91 to .92 (Upper Body) and .92 (Legs). Further, McFarland and Petrie reported that upper body satisfaction related negatively ($r = -.26$) with self-reported dietary restraint and accounted for variance in other measures of disordered eating and mental health (e.g., self-esteem) beyond the variance explained by drive for muscularity.

Self-Esteem

The 10-item global self-esteem scale from the Self-Description Questionnaire II (SDQ-II-GSE; Marsh 1992) measures adolescents' overall self-image and self-worth. On items such as "Overall, I have a lot to be proud of," the boys responded using a 6-point scale that ranges from 1, *False*, to 6, *True*. Total score is the mean; higher scores represent greater self-esteem. Petrie et al. (2010) reported a Cronbach's alpha of .86 in a sample of boys and girls (sixth- to eighth-grades), and found that the scale correlated significantly with boys' body satisfaction ($r = .37$).

Cronbach's alphas for the current study ranged from .72 to .76. In a sample of boys and girls, Marsh, Prada, and Ayotte (2004) reported inverse correlations between the scale and several mental health outcomes (i.e., somatic complaints, anxiety/depression, social problems, thought problems, attention problems, delinquent behavior, and aggressive behavior), providing support for its validity.

Cardiorespiratory Fitness

An objective measure of physical fitness was obtained using the FITNESSGRAM® Progressive Aerobic Cardiovascular Endurance Run (PACER), which is the number of 20-meter laps completed within a specific timeframe. Petrie et al. (2010) reported significant correlations between the PACER and body satisfaction ($r = .14$) and global self-esteem ($r = .37$) in middle school boys. The Cooper Institute (2007) has provided extensive information regarding the criterion-referenced validity and reliability of the PACER as a measure of cardiorespiratory fitness.

Dietary Restraint

The 9-item Dietary Intent Scale (DIS; Stice, 1998) assesses intention to restrain eating and reduce caloric intake. On items such as "I take small helpings in an effort to control my weight," the boys responded on a 5-point scale that ranged from 1, *never*, to 5, *always*. Total score is the mean; higher scores indicate greater intention to restrict food intake. Stice (1998) reported Cronbach's alphas that ranged from .93 to .94, a 9-month test-retest reliability coefficient of .92, and a positive correlation with the Dutch Restrained Eating Scale ($r = .92$) in a

sample of 16- to 18-year-old male and female adolescents. Cronbach's alphas for the current study ranged from .77 to .84.

Procedure

Approval for the study was obtained from the university's IRB for Human Subjects Research, the school district, and the principals at each of the six middle schools in the DISD. Participation was voluntary, and only those students from whom parental consent (and child assent) had been received actually completed the questionnaires. During the state-mandated FITNESSGRAM® testing that was implemented during six different week-long periods across the 2010-2011 academic year, the consented students completed the questionnaires as part of a larger study on the relationship between physical fitness/activity, psychological well being, and academic performance. Packets were completed during regularly scheduled physical education classes under the supervision of the research team and took approximately 30 minutes to finish. Participants did not provide their names on the questionnaire packets; instead, questionnaires were coded by their district student ID# so data from the questionnaires could be matched with FITNESSGRAM® testing data as well as information provided from the school district. Following completion of the questionnaires, students were entered to win one of several cash prizes in a random drawing that was held at each school.

Data Analysis

Prior to examining the proposed model, missing data were examined and found to be missing either completely at random or at random. Across the items that comprised the measures in the study, missing data ranged from 0% to 3.4%. Consistent with current recommendations

(e.g., Enders & Bandalos, 2001; Schlomer, Bauman, & Card, 2010), expectation maximization procedures were used to replace missing values. A total score then was calculated for each measure— PSPS (pressures to lose weight and diet subscales), PACS, SATAQ-III, BPSS-M (legs and upper body factors), SDQ-II-GSE, and the DIS.

Next, distributional properties (e.g., skewness, kurtosis) were examined (Tabachnick & Fidell, 2007), and because skewness and kurtosis were within acceptable limits no transformations were made. Non-standardized means, standard deviations, bivariate correlations, and internal consistencies then were computed. Because the purpose of this study was to test and confirm a biopsychosocial model of dietary restraint with early adolescent boys, the overall sample ($N = 663$) was divided into separate, random samples using the SPSS procedure for selecting cases (Sample A and Sample B).

The proposed model was examined using structural equation modeling (SEM; Martens & Haase, 2006; Tabachnick & Fidell, 2007; Weston & Gore, 2006), which is a statistical method that compares theoretically derived relationships of latent constructs against the relationships of a series of measured variables used to represent them. The goal is to determine the extent to which the hypothesized model fits the sample or measurement data (Martens & Haase, 2006).

SEMs are comprised of a measurement model (i.e., the relationships between measured variables and theoretical constructs) and a structural or conceptual model (i.e., series of hypothesized factors that interact in a specified direction to lead to a specified outcome; Martens, 2005; Skrondal & Rabe-Hesketh, 2005). As such, SEM involves a two-part process. First, the measurement model was tested using confirmatory factor analysis (CFA) and the relationship of the measured variables to the constructs was established (Kline, 2005; Tabachnick & Fidell, 2007). Any measured variable that failed to have a t -value < 1.96 or adequate standardized

residuals was excluded. After the measurement model was confirmed, the structural model was tested to determine the strength and significance of the proposed pathways between the factors. It was tested first with Sample A ($n = 331$) and then confirmed with Sample B ($n = 332$).

Structural Equation Modeling Multivariate Statistics Program (EQS; Bentler, 1990, 1995), including the maximum likelihood (ML) procedure, was used estimate the model parameters and fit indices, because both Sample A and Sample B demonstrated acceptable univariate and multivariate normality (Weston & Gore, 2006). Fit was determined using the Satorra-Bentler Chi-square (X^2) Goodness of fit, the comparative fit index (CFI), the standardized root mean square residual (SRMR), and the root mean-square error of approximation with a 90% confidence interval (RMSEA; Hu & Bentler, 1999; Weston & Gore, 2006).

In the proposed model, social weight pressures were expected to be represented by the two indicators of pressures to lose weight (4 items) and pressure to diet (4 items) and Body Satisfaction by the Upper Body (14 items) and Leg (4 items) factors. Because social body comparisons, internalization, self-esteem, and dietary restraint were represented by only one measure variable, they were parceled (i.e., item scale composites) into two separate indicators of each construct (Little, Cunningham, Shahar, & Widaman, 2002; Wupperman & Neumann, 2006; Russell, Kahn, Spoth, & Altmaier, 1998). Parceling was not used for the measure of cardiorespiratory fitness because it was represented solely by the number of laps run during the PACER and it would have been inappropriate. The items identified within each measured variable were rank-ordered according to the magnitude of their factor loading. To equalize the loadings across the two parcels, the two items with the highest and lowest loadings were assigned to the first parcel, the two items with the second highest and lowest loadings to the

second parcel, and so on until all items were assigned. For each parcel, the total scores were represented by the mean of the assigned items (see Figure 1).

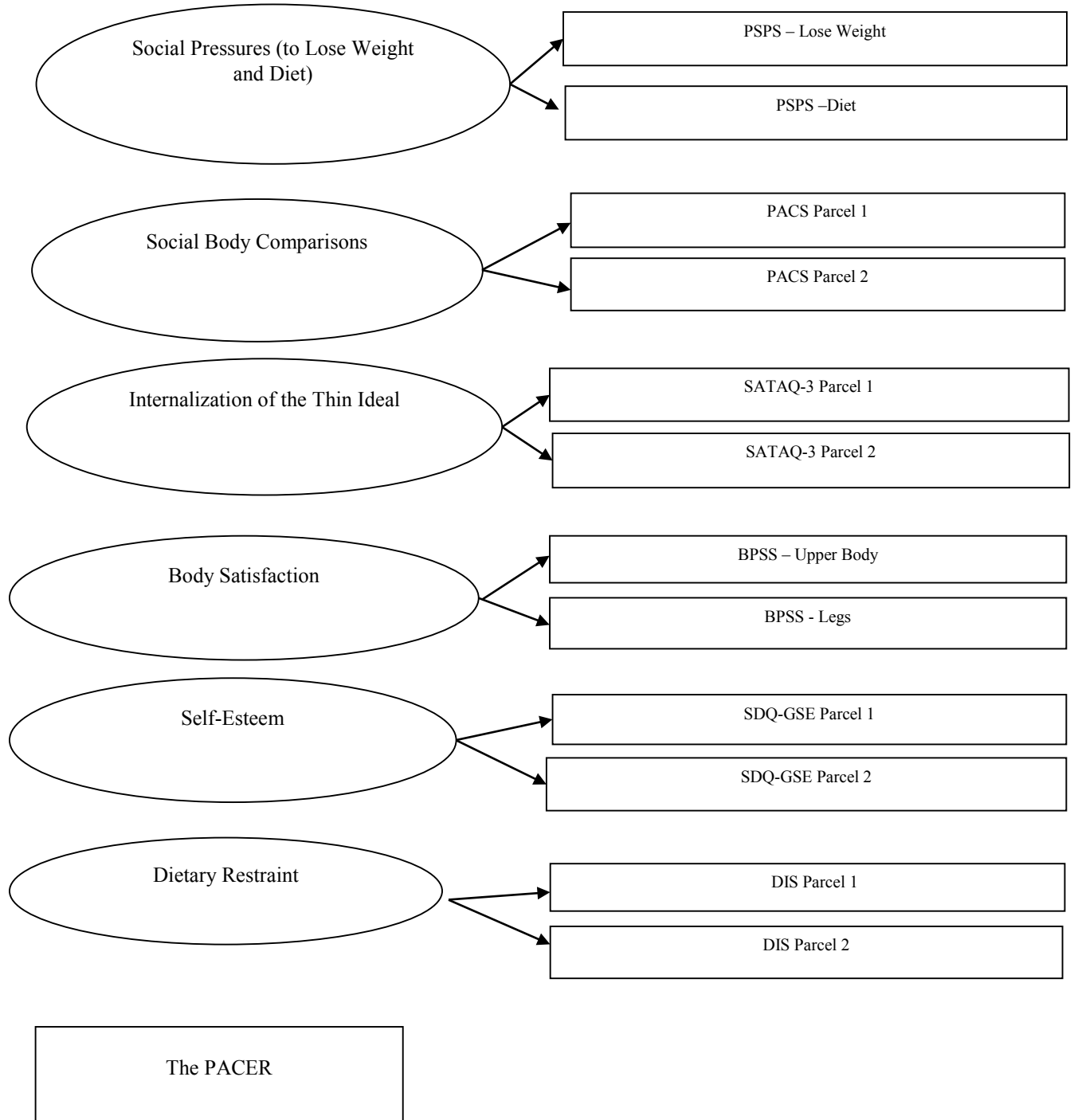


Figure 1. Diagram of the measurement model for all factors.

Parceling of measures is appropriate when the items that comprise the parcels represent are unidimensional (Bandalos, 2002). Parceling is acceptable because they are (a) reliable and valid indicators of the latent construct (b) provide efficient parameter estimates (c) have high communalities, and (d) reduce the number of parameters estimated to improve the ratio of subjects to parameters (Little et al., 2002; Weston & Gore, 2006).

CHAPTER 4

RESULTS

Data Overview

Correlations, means, and standard deviations of Sample's A and B for all variables included in the model are reported in Table 1.

Measurement Model—Sample A

As expected, pressures to lose weight and pressures to diet loaded positively on the social weight pressures latent variable; social body comparisons were represented by two parceled measures from the PACS, which loaded positively; internalization was represented by the two parceled measures from the SATAQ-3; body satisfaction was represented by the legs and upper body factors from the BPSS-M; cardiorespiratory fitness was represented by the PACER as expected; self-esteem was represented by the two parceled measures from the SDQ-GSE-II; and dietary restraint was represented by the two parceled measures from the DIS. All latent factors were allowed to correlate, and all correlations amongst the factors were significant ($p < .001$), ranging from $-.10$ to $-.44$ and $.25$ to $.59$, except for the association between cardiorespiratory fitness and social body comparisons ($r = .05$) and cardiorespiratory fitness and internalization ($r = .07$). The standardized factor loadings and standard errors of the measured variables are reported in Table 2; the overall fit of the measurement model was excellent (see Table 3).

Table 1

Descriptive Statistics and Correlations and of Measured Variables in Sample A (n = 331) and Sample B (n = 332)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. PSPS- Lose weight	1	.84	.30**	.23**	.33**	.31**	-.21**	-.26**	-.24**	-.36**	-.39**	.46**	.49**
2. PSPS- Diet	.84**	1	.26**	.21**	.34**	.32**	-.22**	-.24**	-.22**	-.37**	-.38**	.46**	.50**
3. PACS- Parcel 1	.30**	.26**	1	.70**	.50	.49**	-.12**	-.17**	.02	-.22**	-.26**	-.21**	-.22**
4. PACS- Parcel 2	.23**	.21**	.70**	1	.47**	.46**	-.09*	-.10*	.05	-.17**	-.20**	.15**	.17**
5. SATAQ Parcel 1	.33**	.34**	.50**	.47**	1	.89**	-.07	-.09*	.04	-.19**	-.19**	.24**	.21**
6. SATAQ Parcel 2	.31**	.32**	.49**	.46**	.89**	1	-.05	-.08	.06	-.18**	-.19**	.21**	.21**
7. BPSS- Legs	-.21**	-.22**	-.12**	-.09*	-.07	-.05	1	.85**	.23**	.46**	.40**	-.13**	-.12**
8. BPSS- Body	-.26**	-.23**	-.17**	-.10*	-.09*	-.08*	.85**	1	.24**	.50**	.42**	-.16**	-.17**
9. PACER	-.24**	-.22**	.02	.05	.04	.06	.23**	.24**	1	.28**	.24**	-.26**	-.22**
10. SDQ-GSE-Parcel 1	-.36**	-.37**	-.22**	-.17**	-.19**	-.18**	.46**	.50**	.28**	1	.80**	-.21**	-.21**
11. SDQ-GSE-Parcel 2	-.39**	-.38**	-.26	-.20**	-.20**	-.19**	.40**	.42**	.24**	.80**	1	-.21**	-.22**
12. DIS- Parcel 1	.46**	.46**	.21**	.15**	.24**	.21**	-.13	-.16**	-.26**	-.21**	-.21**	1	.82**
13. DIS- Parcel 2	.49**	.50**	.21**	.17**	.21**	.21**	-.12**	-.17**	-.22**	-.21**	-.22**	.82**	1
Sample A – <i>M</i>	1.40	1.34	2.07	1.99	1.61	1.63	4.27	4.03	37.46	4.95	5.10	1.79	1.64
Sample A – <i>SD</i>	.65	.63	1.03	1.12	.88	0.92	1.41	1.31	18.30	0.89	.90	.81	0.79
Sample B – <i>M</i>	1.38	1.32	2.03	2.01	1.59	1.63	4.28	4.09	37.24	4.95	5.11	1.79	1.65
Sample B- <i>SD</i>	.61	.57	.99	1.12	.84	.93	1.40	1.27	18.32	.92	.92	.78	.77

Note. PSPS = Perceived Sociocultural Pressures Scale (Lose Weight and Diet subscales), range 1 to 5; PACS = Social Body Comparisons (parcel 1 and 2), range 1 to 5; SATAQ-III = Sociocultural Attitudes Towards Appearance Scale-III (parcel 1 and 2), range 1 to 5; BPSS-R = Body Parts Satisfaction Scale-Revised (Legs and Body factor), range 1 to 6; PACER = Progressive Aerobic Cardiovascular Endurance Run, range 6 to 94; SDQ-GSE = Self-Description Questionnaire II (parcel 1 and 2), range 1 to 6; DIS = Dietary Intent Scale (parcel 1 and 2), range 1 to 5. The ranges reflect the potential scores for each measure, with the exception of the PACER, which reflects the actual range of scores for this sample. For all measures, lower scores reflect lower levels of each construct. Percentage above neutral reflects the percentage of the girls whose scores were above the midpoint (or neutral point) of that measure's range of possible scores. ** $p < .001$ * $p < .01$

Table 2

Standardized Parameter Estimates for the Measurement Model in Sample A (n = 331) and Sample B (n = 332)

Latent Variable	Observed Variable	Sample A		Sample B	
		Standardized Factor Loadings	Standard Error	Standardized Factor Loadings	Standard Error
Social Weight Pressures	PSPS- Lose Weight	.900	.028	.901	.028
	PSPS- Diet	.950	.025	.950	.025
Social body comparisons	PACS Parcel 1	.815	.053	.819	.053
	PACS Parcel 2	.859	.059	.851	.060
Internalization	SATAQ Parcel 1	.951	.034	.954	.034
	SATAQ Parcel 2	.937	.039	.933	.039
Body Satisfaction	BPSS- Legs	.909	.066	.908	.066
	BPSS- Body	.938	.059	.939	.059
Cardiorespiratory Fitness	PACER	.974	.733	.974	.731
Self-Esteem	SDQ-GSE Parcel 1	.950	.042	.950	.042
	SDQ- GSE Parcel 2	.878	.043	.878	.043
Dietary Restraint	DIS Parcel 1	.895	.038	.895	.038
	DIS Parcel 2	.906	.037	.906	.037

Note. PSPS = Perceived Sociocultural Pressures Scale (Lose Weight and Diet subscales); PACS = Social body comparisons (parcel 1 and 2); SATAQ-III = Sociocultural Attitudes Towards Appearance Scale-III (parcel 1 and 2); BPSS-R = Body Parts Satisfaction Scale-Revised (Legs and Body factor); PACER = Progressive Aerobic Cardiovascular Endurance Run; SDQ-GSE = Self-Description Questionnaire II (parcel 1 and 2); DIS = Dietary Intent Scale (parcel 1 and 2).

Table 3

Model Fit in Sample A (n = 331) and Sample B (n = 332)

Model	df	Satorra-Bentler X^2	CFI	SRMR	RMSEA (90% CI)
Sample A					
Measurement Model	285	40.553	1.000	.014	.001 (.000 - .036)
Structural Model	277	80.938	.996	.062	.046 (.029 - .062)
Sample B					
Measurement Model	286	41.246	1.000	.014	.007 (.000 - .037)
Structural Model	278	80.718	.996	.061	.046 (.029 - .061)

Note. df= degrees of freedom; CFI = comparative fit index (> .95 indicates good fit); SRMR = standardized root mean squared residual (< .08 indicates good fit); RMSEA = root mean square error of approximation (90% Confidence Interval; < .06 indicates good fit).

Structural Model—Sample A

The hypothesized structural model fit well with the data (see Table 3), though not all of the proposed pathways were significant. Social Body Comparisons were explained by the direct effect of social pressures to lose weight and diet ($\beta = .29$), which accounted for 9% of this factor's variance. Higher levels of social body comparisons ($\beta = .53$) and social pressures to lose weight and diet ($\beta = .19$) were associated with more internalization; these variables accounted for 38% of its variance. Social pressures to lose weight and diet ($\beta = -.27$) and cardiorespiratory fitness ($\beta = .19$), but not internalization ($\beta = -.03$, *ns*), were related to body satisfaction; these variables accounted for 12% of the variance in body satisfaction. Self-esteem was determined through higher levels of body satisfaction ($\beta = .51$) and greater cardiorespiratory fitness ($\beta = .10$), and lower levels of social pressures to lose weight and diet ($\beta = -.27$); together, these variables accounted for 43% of the self-esteem variance. Finally, social pressures to lose weight and diet ($\beta = .59$) and lower levels of cardiorespiratory fitness ($\beta = -.12$), but neither body satisfaction ($\beta = -.03$, *ns*) nor self-esteem ($\beta = .04$, *ns*), were associated with the boys' dietary restraint. Overall, 35% of the dietary restraint variance was explained (see Figure 2).

Measurement Model—Sample B

The measurement model confirmed in Sample A was tested again in Sample B. Consistent with Sample A, all latent factors were allowed to correlate, and all factor correlations were significant ($p < .001$), ranging from $-.10$ to $-.45$ and $.25$ to $.61$, except for the relationship between cardiorespiratory fitness and social body comparisons ($r = .04$) and cardiorespiratory fitness and internalization ($r = .07$). The standardized factor loadings and standard errors of each measured variable associated with its latent factor are reported in Table 2; the overall fit of the model was excellent (see Table 3).

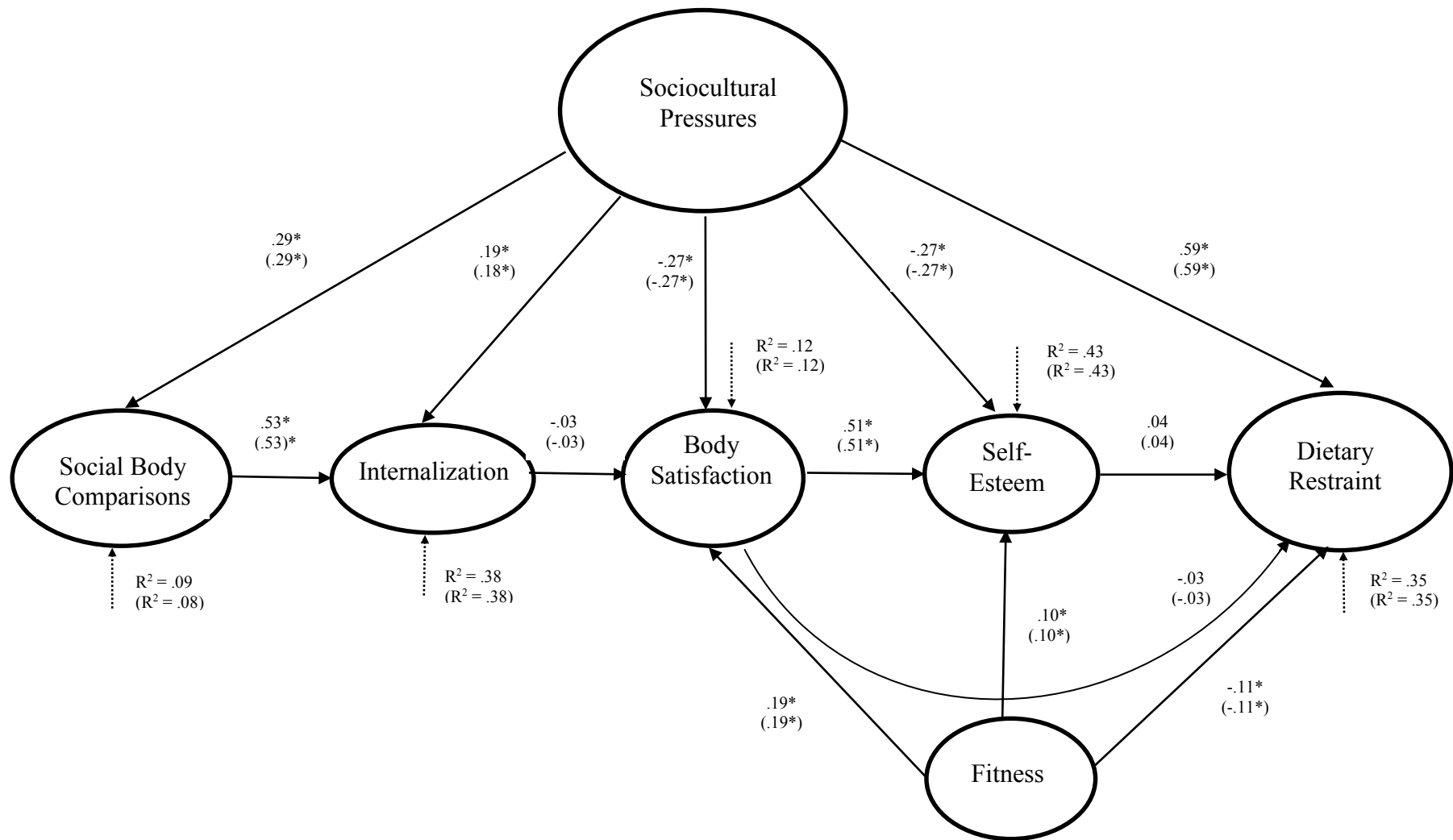


Figure 2. Structural model with standardized parameter estimates and R^2 values for Sample A and Sample B. Sample B values are provided in parentheses. * $p < .05$.

Structural Model—Sample B

Consistent with Sample A, the hypothesized model fit well with the data (see Table 3). Again, social body comparisons were explained by the direct effect of social pressure to lose Weight and Diet ($\beta = .29$), which accounted for 8% of this factor's variance. Social body comparisons ($\beta = .53$) and social pressures to lose weight and diet ($\beta = .19$) were associated with more Internalization; these variables accounted for 38% of its variance. Although internalization was not significant ($\beta = -.03$, *ns*), social pressures to lose weight and diet ($\beta = -.27$) and cardiorespiratory fitness ($\beta = -.19$) were related to body satisfaction; these variables accounted for 12% of the variance. Body satisfaction ($\beta = .51$), cardiorespiratory fitness ($\beta = -.10$), and social pressures to lose weight and diet ($\beta = -.27$) explained the boys' self-esteem; together, these variables accounted for 43% of the variance. Similar to Sample A, dietary restraint was explained through social pressures to lose weight and diet ($\beta = .59$) and cardiorespiratory fitness ($\beta = -.11$), but not body satisfaction ($\beta = -.03$, *ns*) nor self-esteem ($\beta = .04$, *ns*). Overall, 35% of the dietary restraint variance was explained (see Figure 2).

Indirect Effects—Samples A and B

For both Sample A and Sample B, respectively, similar indirect effects emerged. Social pressures to lose weight and diet was indirectly related to Internalization through social body comparisons (β 's = .19 and .19; 95% CI [.13, .25]). Social pressures to lose weight and diet (β 's = -.27 and -.27), 95% CI [-.32, -.22] and cardiorespiratory fitness (β 's = .10 and .10), 95% CI [.05, .15] were indirectly related to self-esteem through their effects on body satisfaction. There were no other significant indirect effects.

CHAPTER 5

DISCUSSION

Overview of Direct and Indirect Effects

In the present study, Halliwell and Harvey's (2006) sociocultural model of disordered eating was replicated and extended by including additional physical (i.e., cardiorespiratory fitness) and psychological (i.e., self-esteem) factors that had been proposed as risk factors for boys and men (Cafri et al., 2005; Ricciardelli & McCabe, 2004), but not previously tested in a multivariate model. The structural model revealed a good overall fit with the data across the two independent samples of early adolescent boys. All pathways among the variables were in the hypothesized directions and significant, with the exception of the relations between Internalization and Body Satisfaction, Body Satisfaction and Dietary Restraint, and Self-Esteem and Dietary Restraint (see Figure 2). Overall, the physical and psychosocial variables explained 35.0% (Sample A) and 35.2% (Sample B) of the variance in the boys' self-reported intentions to restrict what they ate, which is consistent with past research that has found psychosocial variables (i.e., social weight pressures, social body comparisons, internalization, and body dissatisfaction) to explain 24% of the variance in 11 to 16 year old male adolescents' disordered eating (i.e., Children's Eating Attitudes Test; Halliwell & Harvey, 2006).

In the model, Social Pressures to Lose Weight and Diet were associated with higher levels of Social Body Comparisons, as expected, and accounted for 9% of its variance. Boys who felt pressured from friends, families, and the media to lose weight and diet reported comparing themselves and their bodies more often with others, which is consistent with social learning theory (Bandura, 2004) as well as with cross-sectional and longitudinal research (e.g., Smolak & Stein, 2010; van den Berg et al., 2007). For example, Halliwell and Harvey (2006) found that

boys and girls, ages 11 to 16 years, who reported pressures from families and friends to be thin also made social body comparisons, with 8% of its variance being explained. Similarly, reading articles about dieting and weight loss, in combination with weight teasing, accounted for 11% of social body comparisons that 7th- and 10th-grade boys made 5 years later (van den Berg et al., 2007). Societal appearance standards shape the messages boys receive from family members, peers, and the media regarding their dietary habits, the size and shape of their bodies, and their physical appearances (Spear, 2006). Because these pressures communicate that boys' social value is determined in large part by their appearance, it follows that boys would compare themselves physically with peers to determine their social standing and relative attractiveness (Neziroglu, Khemlani-Patel, & Veale, 2008).

As hypothesized, Social Pressures to Lose Weight and Diet, in combination with Social Body Comparisons, were associated with a stronger internalization of societal standards about appearance and physical attractiveness ($R^2 = .38$). These relationships are consistent with previous research (e.g., Halliwell & Harvey, 2006; Karazsia & Crowther, 2009), though our findings represent a larger effect. For example, pressures to be thin from family and friends and social body comparisons explained only 13% of the variance in adolescent boys' and girls' internalization scores (Halliwell & Harvey, 2006). In a sample of undergraduate men, Karazsia and Crowther (2009) found that social body comparisons were associated with higher levels of internalization of the general, as well as the lean and muscular, body ideals, accounting for 15% to 25% of the variance. To a certain extent, boys who feel pressured may adopt the appearance standards of their peers, families, and the media to increase their likelihood of being socially accepted (Clabaugh et al., 2008; Crocker, 2002; Vartanian, 2009). Boys also reduce their social uncertainty and identify social expectations for their bodies by comparing themselves with their

peers (Jones, 2001). Over time, and through consistent exposure to societal appearance standards and repeated comparisons to others, boys may develop cognitive schemas about how they should look and possibly what they should eat (Blatt & Blass, 1996; Vartanian & Herman, 2006). The effects of boys' exposure to societal appearance standards and comparisons to others may be cumulative, such that the effects on internalization would grow throughout adolescence and into early adulthood (Petrie et al., 2010).

Although Internalization was not related significantly to Body Satisfaction, Social Pressures to Lose Weight and Diet and Cardiorespiratory Fitness were, explaining 12% of its variance. In U.S. society, messages and pressures about appearance, body type, and eating are ubiquitous; there is no escape from them. Under the constant presence of such messages, boys may come to believe that they have failed to meet the expectations of their friends, families, and society as a whole about how they should look (Clabaugh et al., 2008; Crocker & Wolfe, 2001; van den Berg et al., 2007), and thus feel disappointed in their physical size and shape. Consistent with the findings in the present study, previous research (e.g., McCabe & Ricciardelli, 2003c, 2005; Ricciardelli & McCabe, 2003b, 2001c) has documented the direct and negative association between social weight pressures and body satisfaction in boys. For example, McCabe and Ricciardelli (2003c) found that for 7th to 10th grade boys, social influences (e.g., pressures from boys' fathers, male best friends, and the media to lose weight) accounted for 14% of boys' dissatisfaction with their body size.

In contrast, cardiorespiratory fitness' effects may be salutary. Because physically fit boys are likely to have low levels of body fat and increased muscle tone (Campbell & Hausenblas, 2009; Hausenblas & Fallon, 2006; Martin & Lichtenberger, 2002), they would be less discrepant from societal body ideals, and thus more satisfied with their bodies than boys who are less fit and

likely are heavier and less defined in their muscularity (Carnethon et al., 2005; Dishman et al., 2006; Petrie et al., 2010). This finding is consistent with previous research (e.g., Petrie et al., 2010) that found cardiorespiratory fitness (in combination with physical self-concept) explained 10% of the variance in 6th to 8th grade boys' body satisfaction. Although social message about weight loss and dieting generally are perceived as negative and likely contribute to boys becoming dissatisfied with their bodies, the positive effects of being physically fit (e.g., a sense of physical mastery, higher self-esteem, leaner body) (Ortega et al., 2008; Petrie et al., 2010; Wilson, 2005), provide a positive lens through which boys may view and evaluate their bodies, helping them feel more satisfied with their appearance.

The lack of association between Internalization and Body Satisfaction was unexpected given the findings of previous studies that incorporated female or mixed-sex samples (e.g., Halliwell & Harvey, 2006). Although boys do internalize societal ideals through the experience of social pressures about weight and appearance comparison processes, the influence of internalization on body dissatisfaction may be diminished when considered in conjunction with social pressures. That is, for boys at this age, internalized beliefs about weight and dieting appear to be less important than the experience of external messages from important agents in their social environment (e.g., parents, peers) in determining how they feel about their bodies. During the middle school years, internalization may be more salient for girls than boys because girls mature physically (e.g., begin pubertal development) at a younger age and their bodies look more like adult models seen across different media outlets. Further, researchers (e.g., Lenroot & Giedd, 2010) that have reported girls' brains reach peak volume (e.g., increased hippocampus development) at an earlier age than boys, suggest that girls' social cognitive abilities (e.g., attunement with societal norms and expectations) may be more highly developed at an earlier

age than boys. Early adolescent girls' abilities to encode and synthesize information efficiently (Choudhury, Blakemore, & Charman, 2006) would make them more likely to internalize socially salient stimuli (e.g., societal body ideals) at an earlier age in comparison to boys. Thus, girls would have the cognitive capacity to internalize societal appearance standards more deeply, creating well-developed schemas about body, weight, and appearance. Research supports this explanation (Knauss, Paxton, & Alsaker, 2007; Petrie et al., 2010). For example, Knauss et al. found that adolescent girls had significantly higher internalization scores than adolescent boys, and the strength of the relationship between internalization and body dissatisfaction was significantly stronger for girls than boys. In their study, internalization was the strongest predictor of girls' body dissatisfaction; social pressures were the strongest predictor for boys. They suggested that adolescent boys would not internalize the societal ideal to the same depth as girls, and subsequently, internalization would not shape boys' view of their bodies. Instead, boys' focus would be on pressures and messages regarding social expectations for their bodies. However, as boys age (e.g., during the timeframe of high school and college) and mature physically (i.e., become more masculine in appearance), their bodies would become more closely aligned with male societal body-ideals and societal appearance standards would then become personally meaningful and influential in their self-evaluations. As boys' age, they also mature cognitively, making it more possible (and likely) that they would engage in the internalization process and create complex self-schemas about weight, appearance, and body shape. In support of this assertion, middle school boys' internalization scores from my study ($M = 14.53$, $SD = 7.84$) were significantly lower ($M = 21.85$, $SD = 7.57$; $t(865) = -11.05$, $p < .001$) than found among college men (Karazsia & Crowther, 2009). Longitudinal research could test this assertion

directly by examining how internalization changes across time, such as from boyhood to adolescent to early adulthood.

Social Pressures to Lose Weight and Diet, Body Satisfaction, and Cardiorespiratory Fitness were related to Self-Esteem as hypothesized and accounted for 43% of its variance. Boys who felt pressure from family, friends, and the media to lose weight and to diet had a diminished sense of self-worth, whereas boys who were satisfied with the size and shape of their bodies and were physically fit felt more positively about themselves overall. Because boys' worth, in general, is influenced by the perceptions of their families and friends, those who feel pressured to change their appearance are likely to think, at some level, that something is wrong with them and thus feel less positively about themselves overall (Krueger, 2002; Neziroglu et al., 2008; Stryker, 1980). Several studies (e.g., Hobza & Rochlen, 2009; Hobza, Walker, Yakushko, & Peugh, 2007) empirically support the association between social pressures and self-esteem. For example, Fernandez and Pritchard (2012) found that social influences, including pressure from the media to adopt the societal body ideal, explained 14% of male undergraduates' low scores on a measure of perceived social competence. In another study, Ricciardelli and McCabe (2001) found that self-esteem moderated the relationship between social pressures from the media to lose weight and body dissatisfaction in 11 to 15 year old male adolescents. Pressures from the media only influenced the boys' body satisfaction negatively when self-esteem was low. It may be that the messages and pressures boys receive about their bodies and appearance, over time, erodes their self-esteem by reducing their sense of interpersonal self-efficacy (Lampard, Byrne, & McLean, 2011) and perceived social support (Murk, 2006).

Self-esteem is hierarchical and multidimensional (Harter, 1999), and when its subdomains (e.g., physical self-concept and body image) are high, overall feelings about the self

are expected to be positive as well (Davison & Birch, 2002; Levine & Smolak, 2001; Phares et al., 2004; Mellor et al., 2010). Physically fit boys are more likely to be included socially by their peers (Armstrong & Omen-Early, 2009), leading them to feel more interpersonally competent (Craft et al., 2003; Mruk, 2006), more interpersonally supported (Flory et al., 2011), and less interpersonally alienated (Burkhalter & Wendt, 2001). Further, physically fit boys are more active and have higher levels of physical self-concept, such as believing they are strong and have high levels of endurance (Petrie et al., 2010), which may result in positive feedback from important people in their lives, such as coaches, peers, and family members (Neumark-Sztainer et al., 2004), and stronger feelings of physical and social competence (Greenleaf, Boyer, & Petrie, 2009). All of these factors would be associated with higher levels of self-esteem (Bowker, 2006; Ekeland et al., 2005; Kelly et al., 2011; Verstuyf et al., 2012).

Although neither Body Satisfaction nor Self-Esteem was associated with Dietary Restraint as initially hypothesized, Social Pressures and Cardiorespiratory Fitness were and accounted for 35% of its variance. Boys who felt pressured to lose weight and diet reported higher levels of dietary restraint; however, greater cardiorespiratory fitness was associated with a lower self-reported need to restrict caloric intake. When important socializing agents (e.g., families) pressure boys to diet and lose weight, boys may come to believe that social approval is linked to their dietary habits and appearance (Fisher et al., 2009). Because they want the approval of families and peers, boys may start to restrict how much (and even what) they eat. For example, in a sample of 11- to 18-year-old boys, Vincent and McCabe (2000) found that maternal encouragement to lose weight accounted for 35% of the variance in the boys' self-reported dietary restraint. Similarly, perceived pressures from parents and peers (to lose weight) were related to more body change strategies (e.g., self-reported dieting and exercising to lose

weight) in 11- and 12-year-old boys 8 months later, explaining 27% of the variance (McCabe & Ricciardelli, 2003a). Social pressures to diet increase boys' awareness of the centrality and importance of a thin appearance in receiving approval from others and, in turn, may motivate them to reduce their food intake in hopes of becoming leaner.

Conversely, boys who are physically fit would not be focused on dieting because they generally have lower BMIs (Ortega et al., 2008) and their bodies would be less discrepant from the societal ideal than would boys who are less fit (Wilson, 2005). Because boys develop a sense of physical mastery, instrumentality, and self-determination through the process of becoming physically fit (Bas, & Donmez, 2009; Deci & Ryan, 2000; Hausenblas, Cook, & Chittester, 2008; Hands et al., 2009), they may be more focused on what their bodies can do than on achieving societal appearance standards (Bers & Quinlan, 1992; Gilbert, & Meyers, 2005; Lundgren, Anderson, & Thompson, 2004) and thus view food more as fuel to help their bodies “perform” than as a source of calories that would make them fat. For example, Moy, Petrie, Dockendorff, Greenleaf, and Martin (2013) examined self-reported dietary restraint, exercise, and intuitive eating in early adolescent boys and girls. They found that the boys and girls who were exercising to lose weight were more likely to eat to satisfy physical hunger needs than those who were not exercising; dieting to lose weight, on the other hand, was related to a tendency to eat as a means of coping with emotional distress. Because I only examined dietary intent as the outcome and did so at only one point in time, additional research is needed to (a) determine how high levels of cardiorespiratory fitness may reduce boys' risk of dietary restraint over time, (b) how cardiorespiratory fitness may be related to other disordered eating outcomes, such as drive for leanness or drive for muscularity, and (c) how other forms of physical fitness, such as strength and flexibility, may contribute to boys' and young men's eating related behaviors.

Body Satisfaction and Self-Esteem were unrelated to Dietary Restraint. These findings are inconsistent with previous research that has demonstrated direct associations between body dissatisfaction and dieting/food preoccupation in male and female adolescents (e.g., Halliwell & Harvey, 2006) and studies that have shown lower social self-esteem to be related to higher levels of self-reported dieting, weight preoccupation, and fear of gaining weight in undergraduate men (Fernandez & Pritchard, 2012). Although body dissatisfaction and low self-esteem have been identified as possible risk factors for disordered eating behaviors, including dieting, in men (Ricciardelli & McCabe, 2004), these variables may be less salient for early adolescent boys because of their focus on their fitness and physical instrumentality (i.e., what their bodies can do; Colella et al., 2009; Didie et al., 2010; Vartanian et al., 2012). In a study that examined boys' body change strategies over an 8-month timeframe, perceived peer and parent pressures to lose weight, but not self-esteem, predicted 6% of the variance in the boys' weight loss strategies (e.g., dieting; Ricciardelli & McCabe, 2003). It also may be that dieting (and weight-loss) is less central for young male adolescents than a pursuit of being more muscular; thus, for a different outcome (i.e., drive for muscularity), self-esteem and body satisfaction might be significant predictors. For example, Smolak and Stein (2006) found that self-esteem was significantly and inversely related to 11- to 15-year-old boys' drive for muscularity scores, and McFarland and Petrie (2012) found that male undergraduates' satisfaction with their legs and upper bodies was inversely related to their muscularity-oriented body image (i.e., the extent to which they wished they were more muscular). Thus, when boys' body satisfaction and self-esteem are low, they may be more at risk for engaging in behaviors to pursue a lean and muscular body rather than restricting caloric intake to be thin. In future studies, researchers might examine the relative

influence of body satisfaction and self-esteem on the separate drives for leanness, thinness, and muscularity in male adolescents and young adults.

Overall, many of the relations amongst the constructs proposed by Cafri et al.'s (2005) and Ricciardelli and McCabe's (2004) biopsychosocial models and Halliwell and Harvey's (2006) sociocultural model were supported; these constructs, in total, explained 35% of the variance in Dietary Restraint. Social Pressures to Lose Weight and to Diet directly and indirectly influenced early adolescent boys' dietary intentions, which is consistent with previous research conducted on girls and women (e.g., Keery et al., 2004) and on boys and men (e.g., Karazsia & Crowther, 2009, 2010; Menzel et al., 2011). Socially constructed expectations of masculinity are maintained and reinforced through social relationships and images of men who exhibit the physical ideal in media (Marcell et al., 2011). Increased pressure from parents, peers, and the media to adopt gender stereotypes, including societal body ideals, is instrumental in the gender-intensification process (i.e., pressure to adhere to gender norms; Smolak & Stein, 2006, 2010), and leads to negative health outcomes, including dieting. In my model, the deleterious effect of sociocultural pressures on boys' social body comparison, internalization, body satisfaction, self-esteem, and self-reported dietary restraint were comparable to sociocultural models of disordered eating in girls and women (e.g., Keery et al., 2004). Based on these findings, society's increasing focus on the appearance of men's bodies may shape how early adolescent boys interact socially and view and understand their bodies, and the extent to which boys feel positively about themselves and engage in health risk behaviors (e.g., dieting). Because societal appearance standards are extreme and unattainable and define both boys' relationships and perceptions of their bodies, such pressures increase boys' vulnerability for becoming dissatisfied with their

bodies and feeling worse about themselves. Boys' desires for social acceptance would be expected to drive them to attempt to align their bodies with social expectations through dieting.

In addition to the central role that Social Pressures to Lose Weight and Diet had in shaping boys' self-reported dieting, Cardiorespiratory Fitness was a primary factor. It was related to the boys feeling more satisfied with their bodies and more content with themselves overall, and to a lower need for caloric restriction, which is consistent with previous research (e.g., McCabe & Ricciardelli, 2003a; Ricciardelli et al., 2006). For example, McCabe and Ricciardelli (2003a) found that initial pressures from parents and peers (to increase weight) explained 27% of the variance in 11 and 12 year old boys' weight change strategies, which included self-reported dieting eight-months later. Similarly, media pressures (to lose weight and gain muscles) predicted self-reported dietary restraint 8 and 16-months later in 8 to 12 year old boys (Ricciardelli et al., 2006). Regarding the effects of Cardiorespiratory Fitness on boys' Dietary Restraint, boys who are fit generally feel physically competent (Petrie et al., 2010), have an elevated mood (Ortega, Ruiz, Castillo, & Sjostrom, 2008), and are attuned to their bodies (and, thus, apt to eat for physical reasons; Moy et al., 2013). Physically fit boys may simply emphasize what their bodies can do rather than how their body looks, thereby diminishing the adverse influence of social pressures. Given that researchers (e.g., Ruiz et al., 2010; Ortega, Ruiz, Castillo, & Sjostrom, 2008) have documented the salutary effects of cardiorespiratory fitness on psychological (e.g., body satisfaction and self-esteem) and physical (e.g., BMI) health in cross-sectional studies, longitudinal research should be conducted to test the influence of cardiorespiratory fitness on boys' dieting across the timeframe of early, middle, and late adolescence to determine if its effects strengthen or diminish over time.

Limitations, Implications and Directions for Future Research

The limitations of this study warrant discussion. First, excluding cardiorespiratory fitness, all measures were self-reported, and social desirability may have played a role in the boys' responses. Because boys are concerned with gaining social approval from their peers (Jones, 2004), they may have tried to portray themselves in the most positive light possible. To minimize this possibility, the boys completed the questionnaires anonymously and without adult or peer involvement, so there was no opportunity to make direct comparisons with others. Further, the boys were encouraged to answer the questionnaires honestly as they applied to themselves.

Second, the data were cross-sectional, so no conclusions about causality or the temporal nature of the relationships can be made. However, the directions of the relations in the present study are consistent with previous research and theories (e.g., Cafri et al., 2005; Halliwell & Harvey, 2006; Ricciardelli & McCabe, 2004). In future studies, researchers might consider incorporating longitudinal designs to examine how unhealthy dietary habits develop, change, and are maintained and how physical activity and fitness, as well as other psychosocial variables, might play a role.

Third, although my sample was diverse in that it included boys from all middle school grades and represented the overall racial/ethnic make-up of the school district, generalizability is limited to comparable groups of boys drawn from similar suburban school districts. Early adolescent boys experience pressures to lose weight and diet, yet the extent to which they internalize the societal ideal may vary from that of older adolescent boys and men. Further, it is not yet clear how social (e.g., social pressures to lose weight and diet), psychological (e.g., body satisfaction), and physical (e.g., cardiorespiratory fitness) factors would influence older adolescent boys' and men's dietary restraints. Thus, research is needed to examine both older

male adolescents and men to determine whether the overall model holds and whether certain relationships, such as between internalization and body satisfaction, become significant.

A fourth limitation is that I did not include other disordered eating outcomes, such as drive for muscularity (Grogan & Richards, 2002; Leit, Pope, & Gray, 2001). Researchers (e.g., Cafri et al, 2005) have suggested that boys and men believe that their masculinity is based on their ability to achieve a hyper-mesomorphic physique and that physical attractiveness is a determining factor in developing satisfying relationships. Thus, it would be interesting to determine the extent to which the physical and psychosocial variables in my model predict drive for muscularity (as opposed to a drive for thinness that was represented by my dietary intent measure) or more specific eating disorder outcomes, such as bulimic symptomatology. Given that social (i.e., pressures to lose weight and diet) and physical (i.e., cardiorespiratory fitness) factors were central to boys' self-reported dieting, research is needed to examine other potentially relevant social (e.g., fear of negative evaluation, lack of perceived social support) and physical (e.g., BMI and pubertal development) factors that may place them at risk for engaging in caloric restriction.

Although my study was cross-sectional, the results were consistent with longitudinal results demonstrating that early adolescent boys are dieting (Kjelsås, Bjørnstrøm, & Gøtestam, 2004; Ricciardelli & McCabe, 2003b, 2001a) and, in doing so, are at risk for negative health outcomes, including binge eating (Goldschmidt, Wall, Loth, Le Grange, & Neumark-Sztainer, 2012; Hautala et al., 2008), weight cycling (i.e., Fisher, Sinton, & Birch, 2009; Mathews & Lynn, 2008; Neumark-Sztainer, Wall, Story, Perry, & Standish, 2012), and obesity (Burton, Smit, & Lightowler, 2007). Given that boys are self-reporting relatively high levels of dietary restraint (McCabe & Ricciardelli, 2003b) and dieting appears to be directly influenced by social

pressures, intervention programs that target messages about weight, dieting, and physical appearance may reduce boys' risk for developing dietary restraint. Based on Stice, Shaw, and Marti's (2007) meta-analytic review of eating disorder prevention programs for female adolescents, school-based prevention programs that are interventionist led and multisession could simultaneously target biological (e.g., cardiorespiratory fitness), psychological (e.g., body satisfaction and self-esteem), and social (e.g., social pressures) factors to reduce the potential for dietary restraint. For example, peer-groups could provide a forum for boys to (a) talk about sociocultural pressures regarding appearance, (b) identify strategies to increase their body acceptance, (c) increase their knowledge regarding the deleterious effects of dieting on their physical health, (d) promote a healthy lifestyle and weight (e.g., exercise for stress management), and (e) develop healthy relationships (e.g., identifying ways to help each other; McVey, Lieberman, Voorberg, Wardrope, & Blackmore, 2003; Stice et al., 2007).

In addition, cardiorespiratory fitness played an important role in boys' body satisfaction, self-esteem, and self-reported dietary restraint in the present study, which is consistent with longitudinal research that found that cardiorespiratory fitness led directly to lower levels of self-reported dietary restraint and BMI in men over a 14 year time span (e.g., Kuk et al., 2009). Cardiorespiratory fitness has been associated with positive health outcomes, such as improved academic performance (Ruiz et al., 2010), increased sport participation (Renfrow et al., 2010) and athletic ability (Hands et al., 2009), lower depression and anxiety (Ruiz et al., 2010), and less adiposity (Caballero, 2007; Dunton et al., 2007). The benefits of being physically fit may increase the likelihood that boys will feel positively about themselves overall, which may help them to successfully navigate the social (e.g., expanding their social networks) and physical (e.g., increased adiposity) stressors that occur during adolescence. Early adolescent boys may

benefit from school-based programs that emphasize being physically active and developing high levels of cardiorespiratory fitness. Such programs might focus on boys' involvement in school sports, being physically active in after-school programs, or finding new and interesting ways to be active in required physical education classes.

For example, Peralta, Jones, and Okely (2009) documented the positive effects of the Fitness Improvement Lifestyle Awareness Program (i.e., a six-month controlled trial that incorporated weekly 60-minute curriculum sessions) in 7th grade Australian male adolescents' cardiorespiratory fitness. The intervention included goal setting, time management strategies, identification of barriers to physical activity, and two 20-minute lunchtime physical activity sessions. They found that the intervention group had greater increases in their cardiorespiratory fitness (i.e., a 20 meter Progressive Shuttle Run Test for Measuring Aerobic Fitness; Leger & Lambert, 1982), smaller increases in BMI, and greater reductions in waist circumference and percentage body fat, and spent less time watching television and more time participating in physical activity than did the boys in the control group. In their review of prevention programs targeting cardiorespiratory fitness in fifth-grade boys and girls, Beets, Beighle, Erwin, and Huberty (2009) documented the positive association between exposure to after-school physical activity programs and physical fitness. In their review, they found that male and female adolescents who attended 40% or more of the intervention sessions had the greatest improvement in physical fitness, including cardiorespiratory fitness, in comparison to the controls. For 5th grade boys and girls who had limited exposure to the after-school physical activity program during the summer had significantly lower cardiorespiratory fitness than those who were consistently exposed to the intervention programs (Beets et al., 2009). Based on these results, prevention programs should focus on promoting cardiorespiratory fitness in boys by increasing

their opportunities to exercise through involvement in sport clubs, as well as after-school, weekend, and summer term activities (Pate, Davis, Robinson, Stone, & McKenzie, 2006).

Conclusion

The present study examined the simultaneous relations of social (i.e., social pressures, social body comparisons), psychological (i.e., internalization, body satisfaction, self-esteem), and physical (i.e., cardiorespiratory fitness) factors in self-reported dietary restraint in early adolescent boys. As predicted, pressures to lose weight and diet were related directly to all the psychosocial factors in the model. This finding suggests that the negative effects of social pressures about weight and dieting are pervasive and may lead boys to seek out information regarding social expectations of their bodies via appearance comparisons, to internalize societal appearance norms, to feel dissatisfied with their current body size and shape, to feel poorly about themselves overall, and to restrict their caloric intake. Boys who engage in social body comparisons are apt to internalize societal appearance norms, and their body satisfaction is a determining factor in their global self-esteem. Higher levels of cardiorespiratory fitness, on the other hand, appeared to have salutary effects, as fitness was associated with higher levels of body satisfaction and self-esteem, and lower intention to restrict their eating. The results from the present study provide an important first step in determining which factors may influence self-reported dieting in early adolescent boys. Future studies should replicate and expand upon the current study by examining a biopsychosocial model of dietary restraint in older male adolescents and men.

APPENDIX
CONSENT FORMS AND DEMOGRAPHICS

UNIVERSITY OF NORTH TEXAS INSTITUTIONAL REVIEW BOARD
RESEARCH CONSENT FORM

Before agreeing to participate in the research study, it is important that you read and understand the following explanation of the proposed procedures. It describes the procedures, benefits, risks, and discomforts of the study. It also describes your right to withdraw your child from the study at any time. It is important for you to understand that no guarantees or assurances can be made as to the results of the study.

Participant (Child) Name (please print): _____ Date: _____

Title of Study: The Relationship of Physical Fitness and Activity, Sleep, and Nutritional Practices to Mood, Body Image, Self-Concept, Social Pressures and Internalization, Dietary Intake, Teasing, Weight Bias, and Academic Performance in Middle School Children and Their Parents.

Principal Investigator: Trent Petrie, Ph.D., Professor, Department of Psychology

Co-investigators: Christy Greenleaf, Ph.D., Associate Professor, and Scott Martin, Ph.D., Associate Professor, Department of Kinesiology, Health Promotion and Recreation; Priscilla Connors, Ph.D., Associate Professor, School of Merchandising and Hospitality Management; Patricia Kaminski, Ph.D., Associate Professor, John Ruiz, Ph.D., Assistant Professor, and Daniel Taylor, Ph.D., Associate Professor, Department of Psychology.

Start date of study 8/1/2010

End date of study 8/1/2011

Purpose of the study: The purpose of this project is to investigate the physical fitness and activity levels, sleep, nutritional practices, attendance, academic performance, behavioral conduct, and psychological health of middle school children in grades 6 through 8.

Description of the study: This study will examine fitness, activity levels, sleep, nutritional practices, and aspects of psychological health among middle school children. Participants in this study will fill out at least two different survey packets and complete a number of fitness activities and measures that are required by law in the State of Texas or are a required part of the middle school's physical education curriculum during the 2010-2011 school year. A subset of the children may be selected to participate in nutritional and physical activity education and focus groups that will occur during school hours. Children also may be asked to, for short periods of time (e.g., one week), (a) maintain a nutrition and/or physical activity log, and/or (b) wear Actical monitors continuously for one week. The Actical is a small watch-like monitor that measures physical activity energy (caloric) expenditure and step count; all the child must do is keep the watch on his/her wrist at all times. At the end of the one-week of monitoring, the researchers will retrieve the watch from your child during his/her school PE class. In addition, a subset of parents may be asked to participate in phone interviews or focus groups, complete survey questionnaires, regarding their family's health, activity levels, sleep, and nutritional practices, and/or wear the Actical monitors.

Procedures to be used: Middle school children will complete at least two different survey packets regarding their involvement in physical activity, their nutritional practices, their sleep patterns, and their psychological health (e.g., body image, self-concept). The survey packets will be completed in conjunction with the FITNESSGRAM physical fitness testing that is being conducted by the Denton Independent School District. The survey packets will take a

total of approximately 30 minutes to complete and will be done during normal school hours during physical education classes where the fitness testing will occur. Nutritional education and focus groups, which will take approximately 45 minutes, also will occur in conjunction with physical education and health classes during normal school hours. Interviews and focus groups with parents will be conducted via phone or in person during the evening hours and will take 30-90 minutes to complete. In addition, grades, attendance, behavioral conduct records, medical records, test scores, and other demographic data will be obtained directly from the Denton Independent School District. The boys and girls selected to wear the Actical will wear it on their wrist for one to two weeks. The data obtained from the Actical will be matched with their FITNESSGRAM data as well as all the other data obtained via self-report questionnaires and provided by the school district.

Description of foreseeable risks: The physical and health-related risks will be quite small based on your child's classification as an apparently healthy individual. In providing permission for your child to participate in this study and to complete the physical fitness activities, you acknowledge that your child has no known history of health problems that should prevent him/her from participating in this study. You understand that the data collection phase follows exercise guidelines established by the American College of Sports Medicine, and that there should be no psychological or physical after-effects experienced as a result of participating in this study. If your child wears an Actical, the watch will automatically record each child's level of physical activity. You and your child may discontinue the interviews, focus groups, nutritional education, Actical, or surveys at any time. However, your child is required by law (State of Texas) to complete the fitness activities to the best of his/her abilities.

Compensation: Children who complete the survey questionnaire will be entered into a random drawing to win one of at least six (6) \$10.00 cash prizes that will be given away at each participating middle school.

Benefits to the subject or others: Other potential benefits of this study are that children and parents will have an improved understanding of the relationship of physical fitness/activity and nutrition to psychological health and academic performance. In addition, each child who participates in the FITNESSGRAM will receive a summary copy of his/her results that will be sent home by the school's physical education instructors.

Procedures for maintaining confidentiality: Privacy is protected because your child will not be identified by name as a participant in this project; only group results will be reported. Confidentiality will be maintained by using only code numbers on the survey questionnaires themselves. The questionnaires will be kept locked in a UNT office. The key that matches code numbers to children's names will be kept by the principal investigator in a different location.

Review for the Protection of Participants: This research study has been reviewed and approved by the UNT Institutional Review Board (940) 565-3940. Contact the UNT IRB with any questions regarding your child's rights as a research subject.

Research Subject's Rights: I have read or have had read to me all the above. The researcher has explained the study to me and answered all of my questions. I have been told the risks and/or discomforts as well as the possible benefits of the study. I understand that my child does not have to take part in the surveys, Actical, or focus groups and that I do not have to participate in the phone interviews or focus groups and my refusal to participate or allow my child to participate or my decision to withdraw my child will involve no penalty, loss of rights, loss of benefits, or legal recourse to which I am entitled. I also understand that the fitness testing

is a requirement of my child's attendance at the middle school and that any questions I have concerning his/her involvement in that testing should be discussed with the school's principal. The study personnel may choose to stop my child's participation at any time. In case problems or questions arise, I have been told I can contact:

Trent Petrie, Ph.D.

Psychology Department
University of North Texas
(940) 565-2671

By signing below, I am providing permission for my child and myself to participate in the above described study.

Printed Name of Parent or Guardian

Signature of Parent or Guardian

Date

Child Assent Form

You are being asked to be part of a research project being done by the University of North Texas Departments of Psychology and Kinesiology, Health Promotion, and Recreation.

This study involves looking at your current level of physical fitness, your eating habits, and how these relate to how you feel about yourself and your friends.

You will be asked to complete two different surveys that have questions about your involvement in physical activities, your eating habits, and how you feel about yourself. Each survey will take about 15 minutes to complete.

You also will complete a series of fitness activities, such as push-ups and curl-ups, which are a requirement of your attendance in school. These fitness activities will be done during school in your normal physical education classes or at other times determined by your teachers and will take about three hours to do.

You also may be asked to wear a special watch for one week without taking it off. This watch allows us to measure how physically active you are. By completing the surveys, you will be entered into a drawing to win one of at six (6) \$10.00 cash gifts that will be given away at your school.

You also may be asked to join a small group of your classmates to learn and talk about physical activity/fitness, nutrition and making good choices about food and eating. These meetings would take place during school time and also might involve you keeping a log of what you eat and how active you are during a short period of time, such as a week.

If you decide to be part of this study, please remember you can stop doing the surveys at any time you want to. However, you may not stop your participation in the fitness testing because it is a school requirement (if you have questions about the fitness testing, you should speak to your physical education instructor).

If you would like to be a part of this study, please print and sign your name below.

Printed Name of Child

Signature of Child

Date

Demographics

Student ID _____

I. Background Information

1. Sex: Male Female
2. Age: _____ years
3. Grade for This School Year: 6th 7th 8th
4. Race/Ethnicity: White/Caucasian Hispanic/Mexican American
 Black/African-American American Indian
 Asian American/Pacific Islander Other (specify: _____)
5. Below, please place a check by all of the people who live with you on a regular basis:
- Mother Step-Mother Father Step-Father
 Brother Step-Brother Sister Step-Sister
 Grandmother Grandfather
6. Which of the following best describes the current relationship between your parents OR your guardians?
- Married and living together
 Never married but living together
 Never married and not living together
 Divorced and not living together
7. In the place where you **CURRENTLY** spend most nights (example - house), which adults take care of you?
- Both of your parents or guardians (tell us who _____)
 One of your parents or guardians (tell us who _____)
8. Where were you born? United States
 Mexico
 Another country (please tell us which country _____)
9. Where were your parents born? Both in the United States
 One in the United States, one in Mexico or another country
 Both in Mexico or other countries
10. What language do you speak at home? English only
 Spanish only
 English and Spanish
 Other (please tell us the language _____)

II. Weight History

1. How tall are you? _____ feet _____ inches _____ Do Not Know
 2. How much do you weigh now? _____ pounds _____ Do Not Know
 3. How much would you like to weigh? _____ pounds _____ Do Not Know
 4. Which of the following best describes what you currently are trying to do about your weight?
 - A. I am trying to stay the same weight
 - B. I am trying to lose weight
 - C. I am trying to gain weight
 - D. I am not doing anything to try and change my weight in any way
 5. Place a CHECK next to EACH ONE of the following methods that are you using **NOW** (or you have used **DURING THE LAST 6 MONTHS**) to manage your weight?
 - _____ A. Increased cardiovascular physical activity, such as running or aerobics
 - _____ B. Used anabolic steroids or growth hormones
 - _____ C. Eaten more calories (example - eat more food)
 - _____ D. Taken diet pills
 - _____ E. Used weight gain supplements (example - protein powders)
 - _____ F. Used laxatives
 - _____ G. Used diuretics
 - _____ H. Increased strength training, such as weight lifting
 - _____ I. Self-induced vomiting
-

REFERENCES

- Abrams, D., & Hogg, M. A. (2004). Collective identity: Group membership and self-conception. In M. B. Brewer, & M., Hewstone (Eds.), *Self and social identity* (pp. 147-181). Malden, MA: Blackwell Publishing.
- Agras, W. S., Bryson, S., Hammer, L. D., & Kraemer, H. C. (2007). Childhood risk factors for thin body preoccupation and social pressure to be thin. *Journal of the American Academy of Child & Adolescent Psychiatry*, *46*, 171-178. doi:10.1097/chi.0b013e31802bd997
- Ajzen, I. (2002). Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. *Journal of Applied Social Psychology*, *32*, 665-683. doi:10.1111/j.1559-1816.2002.tb00236.x
- Anderson, C., Petrie, T., & Neumann, C. (2011). Psychosocial correlates of bulimic symptoms among NCAA Division I female collegiate gymnasts and swimmers/divers. *Journal of Sport & Exercise Psychology*, *33*, 483-505. Retrieved from www.ncbi.nlm.nih.gov/pubmed/21808076
- Armstrong, S., & Oomen-Early, J. (2009). Social connectedness, self-esteem, and depression symptomatology among collegiate athletes versus nonathletes. *Journal of American College Health*, *57*, 521-526. doi:10.3200/JACH.57.5.521-526
- Austin, S. B., Haines, J., & Veugelers, P. (2009). Body satisfaction and body weight: Gender differences and sociodemographic determinants. *BMC Public Health*, *9*, 313. doi:10.1186/1471-2458-9-313
- Bandalos, D. L. (2002). Review of *Structural Equation Modeling: Foundations and Extensions* by David Kaplan. *Journal of Educational Measurement*, *39*, 183-186. doi: 10.1111/j.1745-3984.2002.tb01142.x
- Bardone-Cone, A. M., Cass, K. M., & Ford, J. A. (2008). Examining body dissatisfaction in young men within a biopsychosocial framework. *Body Image: An International Journal of Research*, *5*, 183-94. doi:10.1016/j.bodyim.2007.12.004
- Barlett, C. P., Vowels, C. L., & Saucier, D. A. (2008). Meta-analysis of the effects of media images on men's body image concerns. *Journal of Social and Clinical Psychology*, *27*, 279-310. doi:10.1521/jscp.2008.27.3.279
- Bas, M., & Donmez, S. (2009). Self-efficacy and restrained eating in relation to weight loss among overweight men and women in Turkey. *Appetite*, *52*, 209-216. doi:10.1016/j.appet.2008.09.017
- Baumeister, R. F. (2011). Self and identity: A brief overview of what they are, what they do, and they work. *Annals of the New York Academy of Sciences*. *1234*, 48-55. doi:10.1111/j.1749-6632.2011.06224.x

- Baumeister, R. F., DeWall, C. N., Ciarocco, N. J., & Twenge, J. M. (2005). Social exclusion impairs self-regulation. *Journal of Personality and Social Psychology, 88*, 589-604. doi:10.1037/0022-3514.88.4.589
- Baumeister, R. F., Gailliot, M., DeWall, C. N., & Oaten, M. (2006). Self-regulation and personality: How interventions increase regulatory success, and how depletion moderates the effects of traits on behavior. *Journal of Personality, 74*, 1773-1801. doi:10.1111/j.1467-6494.2006.00428.x
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*, 497-529. doi:10.1037//0033-2909.117.3.497
- Beets, M. W., Beighle, A., Erwin, H. E., & Huberty, J. L. (2009). After-school program impact on physical activity and fitness. *American Journal of Preventative Medicine, 36*, 6, 527-537. doi:10.1016/j.amepre.2009.01.033
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*, 238-246. doi:10.1037//0033-2909.107.2.238
- Bentler, P. M. (1995). *EQS structural equations program manual*. Encino, CA: Multivariate Software, Inc.
- Berge, J. M., Wall, M., Loth, K., & Neumark-Sztainer, D. (2010). Parenting style as a predictor of adolescent weight and weight-related behaviors. *Journal of Adolescent Health, 46*, 331-338. doi:10.1016/j.jadohealth.2009.08.004
- Berk, L. E. (2009). *Child development* (8th ed.). Needham Heights, MA: Boston Pearson Education/Allyn & Bacon.
- Blatt, S. J., & Blass, R. B. (1996). Relatedness and self-definition: A dialectic model of personality development. In G. G. Noam, & K. W. Fischer (Eds.), *Development and vulnerability in relationships* (pp. 309-338). Mahwah, NJ: Lawrence Erlbaum Associates Inc.
- Botta, R. A. (2003). For your health? The relationship between magazine reading and adolescents' body image and eating disturbances. *Sex Roles, 48*, 389-399. doi: 10.1023/A:1023570326812
- Boutelle, K., Eisenberg, M. E., Gregory, M. L., & Neumark-Sztainer, D. (2009). The reciprocal relationship between parent-child connectedness and adolescent emotional functioning over 5 years. *Journal of Psychosomatic Research, 66*, 309-316. doi:10.1016/j.jpsychores.2008.10.019
- Bowker A. (2006). The relationship between sport participation and self-esteem during early adolescence. *Canadian Journal of Behavioural Science, 38*, 214-229. doi:10.1037/cjbs2006009

- Boyes, A., Fletcher, G., & Latner, J. (2007). Male and female body image and dieting in the context of intimate relationships. *Journal of Family Psychology, 21*, 764–768. doi:10.1037/0893-3200.21.4.764
- Brown, R. J., & Ross, G. F. (2010). The battle for acceptance: An investigation into the dynamics of intergroup behavior. In H. Tajfel (Ed.), *Social identity and intergroup relations*. Cambridge, UK: Cambridge University Press.
- Burke, P. J. (1991). Identity process and social stress. *American Sociological Review, 56*, 836 – 849. doi:10.2307/2096259
- Burton, P., Smit, H. J., & Lightowler, H. J. (2007). The influence of restrained and external eating patterns on overeating. *Appetite, 49*, 191-197. doi:10.1016/j.appet.2007.01.007
- Caballero, B. (2007). The global epidemic of obesity: An overview. *Epidemiologic Reviews, 29*, 1-5. doi:10.1093/epirev/mxm012
- Cain, A. S., Bardone-Cone, A. M., Abramson, L. Y., Vohs, K. D., & Joiner, T. E. (2008). Refining the relationships of perfectionism, self-efficacy, and stress to dieting and binge eating: Examining the appearance, interpersonal, and academic domains. *International Journal of Eating Disorders* (advance online publication). doi:10.1002/eat.20563
- Cafri, G., Blevins, N., & Thompson, J. K. (2006). The drive for muscle leanness: A complex case with features of muscle dysmorphia and eating disorder not otherwise specified. *Eating and Weight Disorders, 11*, 117-118.
- Cafri, G., Thompson, J. K., Ricciardelli, L., McCabe, M., Smolak, L., & Yesalis, C. (2005). Pursuit of the muscular ideal: Physical and psychological consequences and putative risk factors. *Clinical Psychology Review, 25*, 215-239. doi:10.1016/j.cpr.2004.09.003
- Cafri, G., van den Berg, P., & Thompson, J. K. (2006). Pursuit of muscularity in adolescent boys: Relations among biopsychosocial variables and clinical outcomes. *Journal of Clinical Child and Adolescent Psychology, 35*, 283-291. doi:10.1207/s15374424jccp3502_12
- Cafri, G., Yamamiya, Y., Brannick, M., & Thompson, J. K. (2005). The influence of sociocultural factors on body image: A meta-analysis. *Clinical Psychology: Science and Practice, 12*, 421-433. doi:10.1093/clipsy/bpi053
- Campbell, A., & Hausenblas, H. A. (2009). Effects of exercise interventions on body image: A meta-analysis. *Journal of Health Psychology, 14*, 780-793. doi:10.1177/1359105309338977
- Canpolat, B. I., Orsel, S., Akdemir, A., & Ozbay, M. H. (2005). The relationship between dieting and body image, body ideal, self-perception, and body mass index in Turkish adolescents. *International Journal of Eating Disorders, 37*, 150-155. doi:10.1002/eat.20081

- Carnethon, M., Gutali, M., & Greenland, P. (2005). Prevalence and cardiovascular disease correlates of low respiratory fitness in adolescents and adults. *Journal of American Medical Association, 294*, 2981–2988. doi:10.1001/jama.294.23.2981
- Carraro, A., Scarpa, S., & Ventura, L. (2010). Relationships between physical self- concept and physical fitness in Italian adolescents. *Perceptual and Motor Skills, 110*, 522-530. doi:10.2466/pms.110.2.522-530.
- Cash, T. F. (2011). Cognitive-behavioral perspectives on body image. In T. F. Cash & L. Smolak (Eds.), *Body image: A handbook of science, practice, and prevention* (2nd ed., pp. 39–47). New York, NY: Guilford Press.
- Caspersen, C. J. Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Representative, 100*, 126-131. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1424733/>
- Centers for Disease Control and Prevention (2011, September 13). *Body mass index*. Retrieved from <http://www.cdc.gov/healthyweight/assessing/bmi/>
- Chittester, N. I., & Hausenblas, H. A. (2009). Correlates of drive for muscularity: The role of anthropometric measures and psychological factors. *Journal of Health Psychology, 14*, 872-877. doi: 10.1177/1359105309340986
- Choma, B. L., Visser, B. A., Pozzebon, J. A., Bogaert, A. F., Busseri, M. A., & Sadava, S. W. (2010). Self-objectification, self-esteem, and gender: Testing a moderated mediation model. *Sex Roles, 63*, 645-656. doi:10.1007/s11199-010-9829-8
- Choudhury, S., Blakemore, S., & Charman, T. (2006). Social cognitive development during adolescence. *SCAN, 1*, 165-174. doi:10.1093/scan/nsl024
- Clabaugh, A., Karpinski, A., & Griffin, K. (2008). Body weight contingency of self-worth. *Self and Identity, 7*, 337-359. doi:10.1080/15298860701665032
- Cole, D. A., Maxwell, S. E., Martin, J. M., Peeke, L. G., Seroczynski, A. D., Tram, J. A., . . . Maschman, T. (2001). The development of multiple domains of child and adolescent self-concept: A cohort sequential longitudinal design. *Child Development, 72*, 1723–1746. doi:10.1111/1467-8624.00375
- Colella, D., Morano, M., Robazza, C., & Bortol, L. (2009). Body image, perceived physical ability, and motor performance in nonoverweight and overweight Italian children. *Perceptual and Motor Skills, 108*, 209–218. Retrieved from <http://www.ammonsscientific.com/AmSci/>
- Cook, B., Hausenblas, H., Tuccitto, D., & Giacobbi, P. R. Jr. (2011). Eating disorders and exercise: A structural equation modelling analysis of a conceptual model. *European Eating Disorders Review, 19*, 216-225. doi:10.1002/erv.1111

- Cooper Institute. (2007). *FITNESSGRAM/ACTIVITYGRAM: Test administration manual* (4th ed.). Champaign, IL: Human Kinetics.
- Corning, A. F., & Gondoli, D. M. (2012). Who is most likely to fat talk? A social comparison perspective. *Body Image: An International Journal of Research*, 9, 528-531. doi: 10.1016/j.bodyim.2012.05.004
- Corning, A. F., Krumm, A. J., & Smitham, L. A. (2006). Differential social comparison processes in women with and without eating disorder symptoms. *Journal of Counseling Psychology*, 53, 338–349. doi:10.1037/0022-0167.53.3.338
- Craven, R. G., Marsh, H. W., & Burnett, P. C. (2003). Cracking the self-concept enhancement conundrum: A call and blueprint for the next generation of self-concept enhancement research. In H. W. Marsh, R. G. Craven, & D. M. McInerney (Eds.), *International advances in self-research* (pp. 67–90). Greenwich, CT: Information Age.
- Craft, L., Pfeiffer, K., & Pivarnik, J. (2003). Predictors of physical competence in adolescent girls. *Journal of Youth and Adolescence*, 32, 431–438. doi: 10.1023/A:1025986318306
- Crocker, J. (2002). The costs of seeking self-esteem. *Journal of Social Issues*, 58, 597 – 615. doi:10.1111/1540-4560.00279
- Crocker, J., & Luhtanen, R. K. (2003). Level of self-esteem and contingencies of self-worth: Unique effects on academic, social, and financial problems in college freshmen. *Personality and Social Psychology Bulletin*, 29, 701 – 712. doi: 10.1177/0146167203029006003
- Crocker, J., & Park, L. E. (2004). The costly pursuit of self-esteem. *Psychological Bulletin*, 130, 392 – 414. doi:10.1037/0033-2909.130.3.392
- Crocker, J., & Wolfe, C. T. (2001). Contingencies of self-worth. *Psychological Review*, 108, 593-623. doi:10.1037//0033-295X.108.3.593
- Cummings, M. E., Davies, P. T., & Campbell, S. B. (2000). *Developmental psychopathology and family process: Theory, research, and clinical implications*. New York, NY: Guildford Press.
- Davison, K. K., & Birch, L. L. (2002). Processes linking weight status and self-concept among girls from ages 5 to 7 years. *Developmental Psychology*, 38, 735-748. doi:10.1037//0012-1649.38.5.735
- Davison, T. E., & McCabe, M. P. (2005). Relationships between men's and women's body image and their psychological, social, and sexual functioning. *Sex Roles*, 52, 463–475. doi: 10.1007/s11199-005-3712-z
- Davison, T. E., & McCabe, M. P. (2006). Adolescent body image and psychosocial functioning. *Journal of Social Psychology*, 146, 15–30. doi:10.3200/SOCP.146.1.15-30

- de Bruyn, E. H. (2010). Associations of peer acceptance and perceived popularity with bullying and victimization in early adolescence. *Journal of Early Adolescence, 30*, 543–566. doi:10.1177/0272431609340517
- Deci, E. L., & Ryan, R. M. (2000). The 'what' and 'why' of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*, 227-268.
- DeWall, C. N., Baumeister, R. F., & Vohs, K. D. (2008). Satiated with belongingness? Effects of acceptance, rejection, and task framing on self-regulatory performance. *Journal of Personality and Social Psychology, 95*, 1367-1382. doi:10.1037/a0012632
- DeWall, C. N., Maner, & Rouby, D. A. (2009). Social exclusion and early-stage interpersonal perception: selective attention to signs of acceptance. *Journal of Personality and Social Psychology, 96*, 729-741. doi:10.1037/a0014634
- Didie, E. R., Kuniega-Pietrazak, T., & Phillips, K. A. (2010). Body image in patients with body dysmorphic disorder: Evaluations of and investment in appearance, health/illness, and fitness. *Body Image: An International Journal of Research, 7*, 66-69.
- Di Paula, A., & Campbell, J. D. (2002). Self-esteem and persistence in the face of failure. *Journal of Personality and Social Psychology, 83*, 711-724. doi: 10.1037/0022-3514.83.3.711
- Dishman, R. K., Hales, D. P., Pfeiffer, K. A., Felton, G., Saunders, R., Ward, D. S.,...Pate, R. R. (2006). Physical self-concept and self-esteem mediate cross-sectional relations of physical activity and sport participation with depression symptoms among adolescent girls. *Health Psychology, 25*, 396-407. doi:10.1037/0278-6133.25.3.396
- Drummond, M. (2002). Men, body image, and eating disorders. *International Journal of Men's Health, 1*, 79-93. doi:10.3149/jmh.0101.89
- Dowda, M., Ainsworth, B. E., Addy, C. L., Saunders, R., & Riner, W. (2003). Correlates of physical activity among U.S. young adults, 18-30 years of age, from NHANES III. *Annals of Behavioural Medicine, 26*, 15-23.
- DuBois, D. L., Tevendale, H. D., Burk-Braxton, C., Swenson, L. P., & Hardesty, J. L. (2000). Self-system influences during early adolescence: Investigation of an integrative model. *Journal of Early Adolescence, 20*, 12-43. doi: 10.1177/0272431600020001002
- Dunton, G. F., Schneider, M., Cooper, D. M. (2007). An investigation of psychosocial factors related to changes in physical activity and fitness among female adolescents. *Psychology & Health, 22*, 929-944. doi:10.1080/14768320601124915
- Dutton, K. R. (1995). *The perfectible body: The Western ideal of male physical development*. New York, NY: Continuum.

- Eddy, K. N., Keel, P. K., Leon, G. L. (2010). Vulnerability to eating disorders in childhood and adolescent. In R. E. Ingram & J. M. Price (Eds.), *Vulnerability to psychopathology: Risk across the lifespan* (2nd ed., pp. 425-453). New York, NY: Guilford Press.
- Ekeland, E., Heian, F., Hagen, K. B., & Coren, E. (2005). Can exercise improve self-esteem in children and young people? A systematic review of randomized controlled trials. *British Journal of Sports Medicine*, *39*, 792–798. doi:10.1136/bjism.2004.017707
- Enders, C. K., & Bandalos, D. L. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural Equation Modeling: A Multidisciplinary Journal*, *8*, 430-457. doi:10.1207/S15328007SEM0803_5
- Falkner, N. H., Neumark-Sztainer, D., Story, M., Jeffery, R. W., Beuhring, T., & Resnick, M. D. (2001). Social, educational, and psychological correlates of weight status in adolescents. *Obesity Research*, *9*, 32-42. doi:10.1038/oby.2001.5
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, *7*, 117–140. doi:10.1177/001872675400700202
- Field, A. E., Aneja, P., Austin S. B., Sheier, A., deMoor, C., & Gordon-Larsen, P. (2007). Race and gender differences in the association of dieting and gains in BMI among young adults. *Obesity*, *15*, 456 – 464. doi:10.1038/oby.2007.560
- Field, A. E., Austin, S. B., Taylor, C. B., Malspeis, S., Bernard, R., Rockett, H. R.,...Colditz, G. A. (2003). Relation between dieting and weight change among preadolescents and adolescents. *Pediatrics*, *112*, 900–906. doi:10.1542/peds.112.4.900
- Field, A. F., Carmago, C. A., Taylor, C. B., Berkey, C. S., Roberts, S. B., & Colditz, G. A. (2001). Peer, parent, and media influences on the development of weight concerns and frequent dieting among preadolescent and adolescent girls. *Pediatrics*, *107*, 54–60. doi:10.1542/peds.107.1.54
- Field, A. E., & Kitos, N. (2009). Social and interpersonal influences on obesity in youth: Family, peers, and society. In L. J. Heinberg & K. J. Thompson (Eds.). *Obesity in youth: Causes, consequences, and cures* (pp. 59-76). Washington, DC: American Psychological Association.
- Fisher, J. O., & Birch, L. L. (1999). Restricting access to palatable food affect children's behavioral response, food selection, and intake. *American Journal of Clinical Nutrition*, *69*, 1264-1272. Retrieved from <http://www.ajcn.org/content/69/6/1264.full.pdf+html>
- Fisher, J. O., & Birch, L. L. (2000). Parents' restrictive feeding practices are associated with young girls' negative self-evaluation of eating. *Journal of the American Dietetic Association*, *100*, 1341-1346.
- Fisher, J. O. Sinton, M. M. & Birch, L. L. (2009). Early parental influence and risk for the emergence of disordered eating. In Smolak, L. & Thompson, J. K. (Eds.), *Body image*,

eating disorders, and obesity in youth: Assessment, prevention, and treatment (pp. 17-34). Washington, DC: American Psychological Association.

- Flament, M. F., Hill, E. M., Buchholz, A., Henderson, K., Tascad, G. A., Goldfield, G. (2012). Internalization of the thin and muscular body ideal and disordered eating in adolescence: The mediation effects of body esteem. *Body Image: An International Journal of Research*, 9, 68-75. doi:10.1016/j.bodyim.2011.07.007
- Frazier, P., Tix, A., & Barron, K. (2004). Testing moderator and mediator effects in counseling psychology research. *Journal of Counseling Psychology*, 51, 115–134. doi:10.1037/0022-0167.51.1.115
- French, S. A., Leffert, N., Story, M., Neumark-Sztainer, D., Hannan, P., & Benson, P. L. (2001). Adolescent binge/purge and weight loss behaviors: Associations with developmental assets. *Journal of Adolescent Health*, 28, 211-221. doi:10.1016/S1054-139X(00)00166-X
- Frisén, A., & Holmqvist, K. (2010). Physical, sociocultural, and behavioral factors associated with body-esteem in 16-year old Swedish boys and girls. *Sex Roles*, 63, 373–385. doi:10.1007/s11199-010-9806-2
- Fulkerson, J. A., Strauss, J., Neumark-Sztainer, D., Story, M., & Boutelle, K. (2007). Correlates of psychosocial well-being among overweight adolescents: The role of the family. *Journal of Consulting & Clinical Psychology*, 75, 181-186. doi:10.1037/0022-006X.75.1.181
- Furnham, A., Badmin, N., & Sneade, I. (2002). Body image dissatisfaction: Gender differences in eating attitudes, self-esteem, and reasons for exercise. *Journal of Psychology*, 136, 581-596. doi:10.1080/00223980209604820
- Gardner, W. L., & Knowles, M. L. (2008). Love makes you real: Favorite television characters are perceived as “real” in a social facilitation paradigm. *Social Cognition*, 26, 156-168. doi:10.1521/soco.2008.26.2.156
- Gilbert, N., & Meyers, C. (2005) Fear of negative evaluation and the development of eating pathology: A longitudinal study among nonclinical women. *International Journal of Eating Disorders*, 37, 307-312. doi:10.1002/eat.20105
- Goldschmidt, A. B., Wall, M., Loth, K. A., Le Grange, D., & Neumark-Sztainer, D. (2012). Which dieters are at risk for binge eating? A prospective study of adolescents and young adults. *Journal of Adolescent Health*, 51, 86-92. doi:10.1016/j.jadohealth.2011.11.001
- Goldschmidt, A., Wilfley, D. E., Eddy, K. T., Boutelle, K., Zucker, N., Peterson, C. B., ... Le Grange, D. (2011). Overvaluation of shape and weight among overweight children and adolescents with loss of control eating. *Behaviour Research & Therapy*, 49, 682-688. doi:10.1016/j.brat.2011.07.011

- Goossens, L., Braet, C., Van Vlierberghe, L., & Mels, S. (2009). Weight parameters and pathological eating as predictors of obesity treatment outcome in children and adolescents. *Eating Behaviors, 10*, 71-73. doi:10.1016/j.eatbeh.2008.10.008
- Goossens, L., Braet, C., Van Durne, K., & Decaluwe, V., & Bosmans, G. (2012). The parent-child relationship as predictor of eating pathology and weight gain preadolescents. *Journal of Clinical Child & Adolescent Psychology, 41*, 445-457. doi:10.1080/153774416.2012.660690
- Grieve, F. G. (2007). A conceptual model of factors contributing to the development of muscle dysmorphia. *Eating Disorders, 15*, 63–80. doi:10.1080/10640260601044535
- Grieve, F. G., & Helmick, A. (2008). The influence of men's self-objectification on the drive for muscularity: Self-esteem, body satisfaction and muscle dysmorphia. *International Journal of Men' Health, 7*, 288-298. doi:10.3146/jmh.0703.288
- Griffiths, L. J., Parsons, T. J., & Hill, A. J. (2010). Self-esteem and quality of life in obese children and adolescents: A systematic review. *International Journal of Pediatric Obesity, 5*, 282-304. doi:10.3109/17477160903473697
- Grogan, S. (2010). Promoting positive body image in males and females: Contemporary issues and future directions. *Sex Roles, 63*, 757–765. doi:10.1007/s11199-010-9894-z
- Guérin, F., Marsh, H. W., & Famose, J. P. (2004). Generalizability of the PSDQ and its relationship to physical fitness: The European French connection. *Journal of Sport and Exercise Psychology, 26*, 19–38.
- Gulas, C., & McKeage, K. (2000). Extending social comparison: An examination of unintended consequences of idealized advertising imagery. *Journal of Advertising, 29*, 17–28. Retrieved from <http://www.journalofadvertisingresearch.com/>
- Haines, J., Neumark-Sztainer, D., Eisenberg, M. E., & Hannan, P. J. (2006). Weight teasing and disordered eating behaviors in adolescents: Longitudinal findings from Project EAT (Eating Among Teens). *Pediatrics, 117*, 209-215. doi:10.1542/peds.2005-1242
- Hagger, M. S. (2010). Self-regulation: an important construct in health psychology research and practice. *Health Psychology Review, 4*, 57-65. doi: 10.1080/17437199.2010.503594
- Hagger, M., Biddle, S. J. H., & Wang, C. K. J. (2005). Physical self- concept in adolescence: Generalizability of a multidimensional, hierarchical model, across gender and grade. *Educational and Psychological Measurement, 65*, 297–322. doi: 10.1177/0013164404272484
- Hagger, M. S., Hein, V., & Chatzisarantis, N. L. D., (2011). Achievement goals, physical self-concept, and social physique anxiety in a physical activity context. *Journal of Applied Social Psychology, 41*, 1299–1339. doi: 10.1111/j.1559-1816.2011.00761.x

- Halliwell, E. & Harvey, M. (2006). Examination of a sociocultural model of disordered eating among male and female adolescents. *British Journal of Health Psychology, 11*, 235-248. doi:10.1348/135910705X39214
- Hands, B., Larkin, D., Parker, H. Straker, L., & Perry, M. (2009). The relationship among physical activity, motor competence and health-related fitness in 14-year-old adolescents. *Scandinavian Journal of Medicine & Science in Sport, 19*, 655–663. doi: 10.1111/j.1600-0838.2008.00847.x
- Harrison, K. (2000). Television viewing, fat stereotyping, body shape standards, and eating disorder symptomatology in grade school children. *Community Research, 27*, 617-640. doi:10.1177/009365000027005003
- Harter, S. (1999). *The construction of the self: A developmental perspective*. New York: Guilford Press.
- Harter, S., Stocker, C., & Robinson, N. S. (1996). The perceived directionality of the link between approval and self-worth: The liabilities of a looking glass orientation among young adolescents. *Journal of Research on Adolescence, 6*, 285-308.
- Hausenblas, H. A., Cook, B., & Chittester, N. (2008). Can exercise treat eating disorders. *Exercise and Sport Sciences Reviews, 36*, 43 - 47.
- Hausenblas, H. A., & Fallon, E. A. (2006). Exercise and body image: A meta-analysis. *Psychology & Health, 21*, 33-47. doi:10.1080/14768320500105270
- Hautala, L. A., Junnila, J., Helenius, H., Vaananen, A., Liuksila, P., Raiha, H.,...Saarijarvi, S., (2008). Towards understanding gender differences in disordered eating among adolescents. *Journal of Clinical Nursing, 17*, 1803–1813. doi: 10.1111/j.1365-2702.2007.02143.x
- Heatherton, T. F., & Vohs, K. D. (2000). Interpersonal evaluations following threats to self: Role of self-esteem. *Journal of Personality and Social Psychology, 78*, 725-736 doi:10.1037/0022-3514.78.4.725
- Heinberg, L., Thompson, J. K., & Stormer, S. (1995). Development and validation of the sociocultural attitudes towards appearance questionnaire. *International Journal of Eating Disorders, 17*, 81-89. doi:10.1002/1098-108X(199501)17:1<81::AID-EAT2260170111>3.0.CO;2-Y
- Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review, 94*, 319–340. doi:10.1037/0033-295X.94.3.319
- Hu, L. & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*,1-55. doi:10.1080/10705519909540118

- Hofmann, W., Rauch, W., & Gawronski, B. (2007). And deplete us not into temptation: Automatic attitudes, dietary restraint, and self-regulatory resources as determinants of eating behavior. *Journal of Experimental Social Psychology* 43, 497–504. doi:10.1016/j.jesp.2006.05.004
- Jones, D.C. (2001). Social comparison and body image: Attractiveness comparisons to models and peers among adolescent girls and boys. *Sex Roles*, 45, 645-664. doi: 10.1023/A:1014815725852
- Jones, D. C. (2004). Body image among adolescent girls and boys: a longitudinal study. *Developmental Psychology*, 40, 823–835. doi:10.1037/0012-1649.40.5.823
- Jones, D. C., Bain, N., & King, S. (2008). Weight and muscularity concerns as longitudinal predictors of body image among early adolescent boys: A test of the dual pathways model. *Body Image: An International Journal of Research*, 5, 195–204. doi:10.1016/j.bodyim.2007.12.001
- Jones, D. C. & Crawford, J. K. (2006). The peer appearance culture during adolescence: Gender and body mass variations. *Journal of Youth and Adolescence*, 2, 257-269. doi:10.1007/s10964-005-9006-5
- Jones, D. C., Vigfusdottir, T. H., & Lee, Y. (2004). Body image and the appearance culture among adolescent girls and boys: An examination of friend conversations, peer criticism, appearance magazines, and the internalization of appearance ideals. *Journal of Adolescent Research*, 19, 323-339. doi:10.1177/0743558403258847
- Karazsia, B. T. & Crowther, J. H. (2008). Psychological and behavioral correlates of the SATAQ-3 with males. *Body Image: An International Journal of Research*, 5, 109-115. doi:10.1016/j.bodyim.2007.08.004
- Karazsia, B. T. & Crowther, J. H. (2009). Social body comparison and internalization: Mediators of social influences on men's muscularity-oriented body dissatisfaction. *Body Image: An International Journal of Research*, 6, 105-112. doi:10.1016/j.bodyim.2008.12.003
- Karazsia, B. T., & Crowther, J. H. (2010). Sociocultural and psychological links to men's engagement in risky body change behaviors. *Sex Roles*, 63, 747-756. doi: 10.1007/s11199-010-9802-6. ISSN: 0360-0025
- Keery, H., Boutelle, K., van den Berg, P., & Thompson, J. K. (2005). The impact of appearance-related teasing by family members. *Journal of Adolescent Health*, 37, 120-127. doi:10.1016/j.jadohealth.2004.08.015.
- Keery, H., van den Berg, P., & Thompson, J. K. (2004). An evaluation of the tripartite influence model of body dissatisfaction and eating disturbance with adolescent girls. *Body Image: An International Journal of Research*, 1, 237-251. doi:10.1016/j.bodyim.2004.03.00

- Kelly, N. R., Mazzeo, S. E., Evans, R. K., Stern, M., Thacker, L. F., Thornton, L. M., & Laver, J. H. (2011). Physical activity, fitness and psychosocial functioning of obese adolescents. *Mental Health and Physical Activity* 4, 31-37. doi:10.1016/j.mhpa.2010.11.001
- Kirk, D. (2002). The social construction of the body in physical education and sport. In A. Laker (Ed.), *The sociology of sport and physical education: An introductory reader*. New York, NY: RoutledgeFalmer.
- Kjelsås, E., Bjørnstrøm, C., & Gøtestam, K. G. (2004). Prevalence of eating disorders in female and male adolescents (14-15 years). *Eating Behaviors*, 5, 13-25. doi:10.1016/S1471-0153(03)00057-6
- Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York: Guilford Press.
- Knauss, C., Paxton, S., & Alsaker, F. (2008). Body dissatisfaction in adolescent boys and girls: Objectified body consciousness, internalization of the media body ideal and perceived pressure from media. *Sex Roles*, 59, 633-643. doi:10.1007/s11199-008-9474-7
- Knowles, M. L., & Gardner, W. L. (2008). Benefits of membership: The activation and amplification of group identities in response to social rejection. *Personality and Social Psychology Bulletin*, 34, 1200-1213. doi:10.1177/0146167208320062
- Krueger, D. W. (2002). Psychodynamic perspectives on body image. In T. F. Cash, & Pruzinsky (Eds.), *Body image: A handbook of theory, research, and clinical practice* (pp. 30-37). New York, NY: Guilford Press.
- Kuk, J. L., Arden, C. I., Church, T. S., Hebert, J. R., Sui, X., & Blair, S. N. (2009). Ideal weight and weight satisfaction: Association with health practices. *American Journal of Epidemiology*, 170, 456-463. doi:10.1093/aje/kwp135
- Labre, M. P. (2002). Adolescent boys and the muscular male body ideal. *Journal of Adolescent Health*, 30, 233-242. doi: 10.1016/S1054-139X(01)00413-X
- Labre, M. P. (2005). Burn fat, build muscle: A content analysis of men's health and men's fitness. *International Journal of Men's Health*, 4, 187-200. doi:10.3149/jmh.0402.187
- Lampard, A. M., Byrne, S. M., & McLean, N. (2011). Does self-esteem mediate the relationship between interpersonal problems and symptoms of disordered eating? *European Eating Disorders Review*, 19, 454-458.
- Lawler, M., & Nixon, E. (2011). Body dissatisfaction among adolescent boys and girls: The effects of body mass, peer appearance culture, and internalization of appearance ideals. *Journal of Youth and Adolescence*, 40, 59-71. doi:10.1007/s10964-009-9500-2
- Leary, M. R. (2010). Affiliation, acceptance, and belonging. In S. T. Fiske & G. G. Lindzey (Eds.), *Handbook of social psychology: Vol. 2* (5th ed., pp. 864-897). Hoboken, NJ: John Wiley & Sons.

- Leary, M. R., & Baumeister, R. F. (2000). The nature and function of self-esteem: Sociometer theory. *Advances in Experimental Social Psychology*, 32, 1-62. doi:10.1016/S0065-2601(00)80003-9
- Leit, R. A., Gray, J. J., & Pope, H. G., Jr. (2002). The media's representation of the ideal male body: A cause for muscle dysmorphia? *International Journal of Eating Disorders*, 31, 334-338. doi:10.1002/eat.10019
- Leit, R. A., Pope, H. G. Jr., & Gray, J. J. (2001). Cultural expectations of muscularity in men: The evolution of Playgirl centerfolds. *International Journal of Eating Disorders*, 29, 90-93. doi:10.1002/1098-108X(200101)29:1<90::AID-EAT15>3.3.CO;2-6
- Lenroot, R., K. & Giedd, J. N. (2010). Sex differences in the adolescent brain. *Brain and Cognition*, 72, 46-55. doi:10.1016/j.bandc.2009.10.008
- Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question and weighing the merits. *Structural Equation Modeling*, 9, 151-173. Retrieved from <http://faculty.psy.ohio-state.edu/cunningham/pdf/little.sem.2002.pdf>
- Levine & Chapman (2011). Media influences on body image. In T. F. Cash & L. Smolak (Eds.), *Body image: A handbook of science, practice, and prevention* (2nd ed., pp. 101–109). New York, NY: Guilford Press.
- Levine, M. P., & Smolak, L. (2001). Body image development in adolescence. In T.F. Cash & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research, and clinical practice* (pp. 74-82). New York, NY: Guilford Press.
- Lindwall, M. (2002). *Exercising the self: On the role of exercise, gender and culture for physical self-perceptions*. Unpublished doctoral dissertation. Department of Psychology, Stockholm University: Intellecta Docusys AB. Retrieved from https://redaktor.1177.se/Dokument/Vastra_Gotaland/Lindwall.pdf
- Loth, K., van den Berg, P., Eisenberg, M., & Neumark-Sztainer, D. (2008). Stressful life events and disordered eating behaviors: Findings from project EAT. *Journal of Adolescent Health*, 43, 514-516. doi:10.1016/j.jadohealth.2008.03.007
- Lorber, J. & Martin, P. Y. (2007). The socially constructed body: Insights from feminist theory. In P. Kivisto. *Illuminating social life classical and contemporary theory revisited*. Rock Island, IL: Sage Publications.
- Lowe, M. R. & Levine, A. S. (2005). Eating motives and the controversy over dieting: Eating less than needed versus less than wanted. *Obesity Research*, 13, 797-806. doi:10.1038/oby.2005.90
- Lowry, K. (2007). The effects of weight management programs on self-esteem in pediatric overweight populations. *Journal of Pediatric Psychology*, 32, 1179-1195. doi:10.1093/jpepsy/jsm048

- Lundgren, J. D., Anderson, D. A., & Thompson, J. K. (2004). Fear of negative appearance evaluation: Development and evaluation of a new construct for risk factor work in the field of eating disorders. *Eating Behaviors, 5*, 75-84. doi:10.1016/S1471-0153(03)00055-2
- Lunner, K., Wertheim, E. H., Thompson, J. K., Paxton, S. J., McDonald, F., & Halvaarson, K. S. (2000). A cross-cultural examination of weight-related teasing, body image, and eating disturbance in Swedish and Australian samples. *International Journal of Eating Disorders, 28*, 430-435. doi:10.1002/1098-108X(200012)28:4<430::AID-EAT11>3.0.CO;2-Y
- Maccoby, E., & Martin, J. (1993). Socialization in the context of family: Parent-child interactions. In E. M. Hetherington (Ed.), *Handbook of child psychology: Socialization, personality, and social development* (Vol. 4, pp. 1-101). New York, NY: Wiley.
- Maner, J. K., DeWall, C. N., Baumeister, R. F., & Schaller, M. (2007). Does social exclusion motivate interpersonal reconnection? Resolving the “porcupine problem.” *Journal of Personality and Social Psychology, 92*, 42-55. doi:10.1037/0022-3514.92.1.42
- Marsh, H. W. (1992). *Self-Description Questionnaire (SDQ) II: A theoretical and empirical basis for the measurement of multiple dimensions of adolescent self-concept: An interim test manual and research monograph*. New South Wales, Australia: University of Western Sydney, Macarthur.
- Marsh, H. W., Parada, R. H., & Ayotte, V. (2004). A multidimensional perspective of relations between self-concept (self-description questionnaire II) and adolescent mental health (youth self-report). *Psychological Assessment, 16*, 27-41. doi:10.1037/1040-3590.16.1.27
- Marsh, H. W., & Redmayne, R. S. (1994). A multidimensional physical self-concept and its relations to multiple components of physical-fitness. *Journal of Sport & Exercise Psychology, 16*, 43–55. Retrieved from <http://journals.humankinetics.com/>
- Marsh, H. W., Richards, G. E., Johnson, S., Roche, L., & Tremayne, P. (1994). Physical self-description questionnaire: Psychometric proprieties and a multitrait-multimethod analysis of relations to existing instruments. *Journal of Sport and Exercise Psychology, 16*, 270–305. Retrieved from <http://journals.humankinetics.com/jsep>
- Marsh, H. W., & Shavelson, R. J. (1985). Self-concept: Its multifaceted, hierarchical structure. *Educational Psychologist, 20*, 107-125. doi:10.1207/s15326985ep2003_1
- Martens, M. P. (2005). Future directions of structural equation modeling in counseling psychology. *The Counseling Psychologist, 33*, 375-382. doi:10.1177/0011000005274598
- Martens, M. P., & Haase, R. F. (2005). Advanced applications of structural equation modeling in counseling psychology research. *Counseling Psychologist, 34*, 878-911. doi:10.1177/0011000005283395

- Martin, K. A., & Lichtenberger, C. M., (2002). Fitness enhancement and changes in body image. In T. F. Cash, & Pruzinsky (Eds.), *Body Image: A handbook of theory, research, and clinical practice* (pp. 414-421). New York, NY: Guilford Press.
- Martin, J. A., McCaughtry, N., Flory, S., Murphy, A., & Wisdom, K. (2011). Using social cognitive theory to predict physical activity and fitness in underserved middle school children. *Research Quarterly for Exercise and Sport*, *82*, 247-255.
- Matthews, A., & Lynn, S. (2008). Subclinical bulimia vs. depression in an interpersonal context. *Eating Behaviors*, *9*, 509-512. doi:10.1016/j.eatbeh.2008.07.001
- Muraven, M. R., & Baumeister, R. F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychological Bulletin*, *126*, 247-259. doi:10.1037/0033-2909.126.2.247
- McCabe, M. P. & McGreevy, S. J. (2010). Role of media and peers on body change strategies among adult men: Is body size important? *European Eating Disorders Review*, *19*, 438-446. doi:10.1002/erv.1063
- McCabe, M. P., & Ricciardelli, L. A. (2001a). Parent, peer, and media influences on body image and strategies to both increase and decrease body size among adolescent boys and girls. *Adolescence*, *36*, 225-239.
- McCabe, M. P., & Ricciardelli, L. A. (2001b). The structure of the perceived sociocultural influences on body image and body change questionnaire. *International Journal of Behavioral Medicine*, *8*, 19-41. doi:10.1207/S15327558IJBM0801_02
- McCabe, M. P. & Ricciardelli, L. A. (2003a). A longitudinal study of body change strategies among adolescent males. *Journal of Youth and Adolescence*, *32*, 105-113. doi: 10.1023/A:1 021805717484
- McCabe, M. P., & Ricciardelli, L. A. (2003b). Body image and strategies to lose weight and increase muscle among boys and girls. *Health Psychology*, *22*, 39-46. doi:10.1037//0278-6133.22.1.39
- McCabe, M., & Ricciardelli, L. (2003c). Sociocultural influences on body image and body changes among adolescent boys and girls. *Journal of Social Psychology*, *143*, 5-26. doi:10.1016/j.eatbeh.2010.01.005
- McCabe, M. P. & Ricciardelli, L. A. (2004). A longitudinal study of pubertal timing and extreme body change behaviors among adolescent boys and girls. *Adolescence*, *39*, 145-166.
- McCabe, M. P., & Ricciardelli, L. A. (2005). A longitudinal study of body image and strategies to lose weight and increase muscles among children. *Applied Developmental Psychology*, *26*, 559-577. doi:10.1016/j.appdev.2005.06.007

- McCabe, M., Ricciardelli, L., & Finemore, J. (2002). The role of puberty, media and popularity with peer son strategies to increase weight, decrease weight and increase muscle tone among adolescent boys and girls. *Journal of Psychosomatic Research, 52*, 145–153.
- McCabe, M. Ricciardelli, L. A. & Holt, K. (2010). Are there different sociocultural influences on body image and body change strategies for overweight adolescent boys and girls? *Eating Behaviors 11*, 156–163. doi:10.1016/j.eatbeh.2010.01.005
- McConnell, A. R. (2011). The multiple-self-aspects framework: Self-concept representation and its implications. *Personality and Social Psychology Review, 15*, 3-27. doi:10.1177/1088868310371101
- McCreary, D. R., & Sasse, D. K. (2000). An exploration of the drive for muscularity in adolescent boys and girls. *Journal of American College Health, 48*, 297-304. doi:10.1080/07448480009596271
- McCreary, D. R., Saucier, D. M., & Courtenay, W. (2005). The drive for muscularity and masculinity: Testing the associations among gender-role traits, behaviors, attitudes, and conflict. *Psychology of Men & Masculinity, 6*, 83–94. doi:10.1037/1524-9220.6.2.83
- McFarland, M. B., & Petrie, T. A. (2012). Male body satisfaction: Factorial and construct validity of the body parts satisfaction scale for men. *Journal of Counseling Psychology*. Advance online publication. doi:10.1037/a0026777
- Mellor, D., Fuller-Tyszkiewicz, M., McCabe, M. P., & Ricciardelli, L. (2010). Body image and self-esteem across age and gender: A short-term longitudinal study. *Sex Roles, 63*, 672–681. doi:10.1007/s11199-010-9813-3
- Mendelson, B. K., White, D. R., & Mendelson, M. J. (1996). Self-esteem and body esteem: Effects of gender, age and weight. *Journal of Applied Developmental Psychology, 17*, 321–346. doi:10.1016/S0193-3973(96)90030-1
- Menzel, J. E., Schaefer, L. M., Burke, N. L., Mayhew, L. L., Brannick, M. T., & Thompson, J. K. (2010). Appearance-related teasing, body dissatisfaction, and disordered eating: A meta-analysis. *Body Image: An International Journal of Research, 7*, 261–270. doi:10.1016/j.bodyim.2010.05.004
- Menzel, J. E., Sperry, S. L., Small, B., Thompson, J. K., Sarwer, D. B., & Cash, T. F. (2011). Internalization of appearance ideals and cosmetic surgery attitudes: A test of the tripartite influence model of body image. *Sex Roles, 65*, 469-477. doi:10.1007/s11199-011-9983-7
- Mond, J., van den Berg, P., Boutelle, K., Hannan, P., & Neumark-Sztainer, D. (2011). Obesity, body dissatisfaction, and emotional well-being in early and late adolescence: Findings from the Project EAT study. *Journal of Adolescent Health Adolescent Health, 48*, 373-378. doi:10.1016/j.jadohealth.2010.07.022

- Morry, M. M., & Staska, S. L. (2001). Magazine exposure: Internalization, self-objectification, eating attitudes, and body satisfaction in male and female university students. *Canadian Journal of Behavioural Science, 33*, 269–279. doi:10.1037/h0087148
- Moy, J., Petrie, T. A., Dockendorff, S., Greenleaf, C., & Martin, S. (2013). Dieting, exercise, and intuitive eating among early adolescents. *Eating Behaviors, 14*, 529-532. doi:10.1016/j.eatbeh.2013.06.014
- Mruk, C. J. (2006). Self-esteem research, theory, and practice: Toward a positive psychology of self-esteem (3rd ed.). New York, NY: Springer Publishing Company, Inc.
- Murnen, S. K. (2011). Gender and body images. In T. F. Cash & L. Smolak (Eds.), *Body image: A handbook of science, practice, and prevention* (pp. 173–179). New York, NY: Guilford Press.
- Myers, T. A., & Crowther, J. H. (2007). Sociocultural pressures, thin-ideal internalization, self-objectification, and body dissatisfaction: Could feminist beliefs be a moderating factor? *Body Image: An International Journal of Research, 4*, 296-308. doi:10.1016/j.bodyim.2007.04.001
- Myers, T., & Crowther, J. (2009). Social comparison as a predictor of body dissatisfaction: A meta-analytic review. *Journal of Abnormal Psychology, 118*, 683–698. doi:10.1037/a0016763
- Neumark-Sztainer, D., Bauer, K. W., Friend, S., Hannan, P. J., Story, M., & Berge, J. M. (2010). Family weight talk and dieting: How much do they matter for body dissatisfaction and disordered eating behaviors in adolescent girls? *Journal of Adolescent Health, 47*, 270-276. doi:10.1016/j.jadohealth.2010.02.001
- Neumark-Sztainer, D., Goeden, C., Story, M., & Wall, M. (2004). Associations between body satisfaction and physical activity in adolescents: Implications for programs aimed at preventing a broad spectrum of weight-related disorders. *Eating Disorders: The Journal of Treatment & Prevention, 12*, 125–137. doi:10.1080/106402604904 44989
- Neumark-Sztainer, D., Wall, M., Haines, J., Story, M., & Eisenberg, M. E. (2007). Why does dieting predict weight gain in adolescents? Findings from Project EAT-II: A 5-year longitudinal study. *Journal of the American Dietetic Association, 107*, 448-455. doi: 10.1016/j.jada.2006.12.013
- Neumark-Sztainer, D., Wall, M., Story, M. & Perry, C. L., & Standish, A. R. (2012). Dieting and unhealthy weight control behaviors during adolescence: Associations with 10-year changes in body mass index. *Journal of Adolescent Health, 50*, 80 – 86. doi:10.1016/j.jadohealth.2011.05.010
- Neziroglu, F., Khehlani-Patel, S., & Veale D. (2008). Social learning theory and cognitive behavioral models of body dysmorphic disorder. *Body Image: An International Journal of Research, 5*, 28-38. doi:10.1016/j.bodyim.2008.01.002

- Oaten, M., & Cheng, K. (2006). Longitudinal gains in self-regulation from regular physical exercise. *British Journal of Health Psychology, 11*, 717–733.
- O’Dea, J. A., & Abraham, S. (1999). Onset of disordered eating attitudes and behaviors in early adolescence: Interplay of pubertal status, gender, weight, and age. *Adolescence, 34*, 671–679. Retrieved from <http://www.eric.ed.gov/>
- Ogden, C., Carroll, M., Curtin, L., Lamb, M., & Flegal, K. (2010). Prevalence of high body mass index in U.S. children and adolescents. *Journal of the American Medical Association, 303*, 242–249. doi:10.1001/jama.2009.2012
- Olivardia, R., Pope, H. G., Jr., Borowiecki, J. J., III, & Cohane, G. H. (2004). Biceps and body image: The relationship between muscularity and self-esteem, depression, and eating disorder symptoms. *Psychology of Men & Masculinity, 5*, 112–120. doi:10.1037/1524-9220.5.2.112
- Ortega, F., Ruiz, J., Castillo, M., & Sjostrom, M. (2008). Physical fitness in childhood and adolescent: A powerful marker of health. *International Journal of Obesity, 32*, 1–11. doi:10.1038/sj.ijo.0803774
- Papies, E. K., Stroebe, W., & Aarts, H. (2008). The allure of forbidden food: On the role of attention in self-regulation. *Journal of Experimental Social Psychology, 44*, 1283–1292. doi:10.1016/j.jesp.2008.04.008
- Paxton, S. J., Eisenberg, M. E., & Neumark-Sztainer, D. (2006). Prospective predictors of body dissatisfaction in adolescent girls and boys: A five-year longitudinal study. *Developmental Psychology, 42*, 888–899. doi: 10.1037/0012-1649.42.5.888
- Paxton, S. J., Wertheim, E. H., Gibbons, K., Szmukler, G. I., Hillier, L., & Petrovich, J. L. (1991). Body image satisfaction, dieting beliefs, and weight loss behaviors in adolescent girls and boys. *Journal of Youth and Adolescence, 20*, 361–379. doi:10.1007/BF01537402
- Petrie, T. A., Greenleaf, C., & Martin, S. (2010). Biopsychosocial and physical correlates of middle school boys’ and girls’ body satisfaction. *Sex Roles, 63*, 631–644. doi:10.1007/s11199-010-9872-5
- Phares, V., Steinberg, A. R., & Thompson, J. K. (2004). Gender differences in peer and parental influences: Body image disturbance, self-worth, and psychological functioning in preadolescent children. *Journal of Youth and Adolescence, 33*, 421–429. doi:10.1023/B:JOYO.0000037634.18749.20
- Pompper, D. (2010). Masculinities, the metrosexual, and media images: Across dimensions of age and ethnicity. *Sex Roles, 63*, 682–696. doi: 10.1007/s11199-010-9870-7
- Pope, H. G. Jr., Phillips, K. A., & Olivardia, R. (2000). *The Adonis Complex*. New York, NY: Free Press.

- Pope, H. G., Olivardia, R., Gruber, A., & Borowiecki, J. (1999). Evolving ideals of male body image as seen through action toys. *International Journal of Eating Disorders*, *26*, 65-72.
- Puhl, R. M., & Heuer, C. (2009). The stigma of obesity: A review and update. *Obesity*, *17*, 941-964. doi:10.1038/oby.2008.636
- Puhl, R. M., & Latner, J. D. (2007). Stigma, obesity, and the health of the nation's children. *Psychological Bulletin*, *133*, 557-580. doi:10.1037/0033-2909.133.4.557
- Quaresma, A., Palmeira, A. L., Martins, S. S., Veloso, S., Fonseca, H., & de Matos, M. G. (2009). Fitness versus fatness and quality of life: Analysis of the influence of cardiorespiratory fitness on the weight related quality of life of adolescents. *Fitness & Performance*, *8*, 254-263. doi:10.3900/fpj.8.4.254.e
- Reboussin, B. A., Rejeski, W. J., Martin, K. A., Callahan, K., Dunn, A. L., King, A. C., Sallis, J. F. (2000). Correlates of satisfaction with body function and body appearance in middle and older aged adults: The activity counseling trial (ACT). *Psychology and Health: An International Journal*, *15*, 239-254.
- Renfrow, M. S., Caputo, J. L., Otto, S. M., Farley, R. R., & Eveland-Sayers, B. M. (2010). The relationship between sports participation and health-related physical fitness in middle school and high school students. *Physical Educator*, *68*, 118-123.
- Ricciardelli, L. A., & McCabe, M. P. (2001a). Children's body image concerns and eating disturbance: A review of the literature. *Clinical Psychology Review*, *21*, 325-344. doi: 10.1016/S0272-7358(99)00051-3
- Ricciardelli, L. A., & McCabe, M. P., (2001b). Dietary restraint and negative affect as mediators of body dissatisfaction and bulimic behavior in adolescent girls and boys. *Behaviour Research and Therapy*, *39*, 1317-1328. doi:10.1016/S0005-7967(00)00097-8
- Ricciardelli, L. A. & McCabe, M. P. (2001c). Self-esteem and negative affect as moderators of sociocultural influences on body dissatisfaction, strategies to decrease weight, and strategies to increase muscles among adolescent boys and girls. *Sex Roles*, *44*, 189-207. doi:10.1023/A:1010955120359
- Ricciardelli, L. A., & McCabe, M. P., (2003a). Sociocultural influences on body image and body changes among adolescent boys and girls. *Journal of Social Psychology*, *143*, 5-26. doi:10.1007/s11199-004-0722-1
- Ricciardelli, L. A., & McCabe, M. P. (2003b). Sociocultural and individual influences on muscle gain and weight loss strategies among adolescent boys and girls. *Psychology in the Schools*, *40*, 209-224. doi:10.1002/pits.10075
- Ricciardelli, L. A., & McCabe, M. P. (2004). A biopsychosocial model of disordered eating and the pursuit of muscularity in adolescent boys. *Psychological Bulletin*, *130*, 179-205. doi:10.1037/0033-2909.130.2.179

- Ricciardelli, L. A. & McCabe, M. P. (2007). Pursuit of muscularity among adolescents. In J. K. Thompson & G. Cafri (Eds.), *The muscular ideal: Psychological, social, and medical perspectives* (pp. 199-216). Washington, DC: American Psychological Association.
- Ricciardelli, L. A., & McCabe, M. P. (2011) Body image development in adolescent boys, in Cash, Thomas F. and Pruzinsky, Thomas (Eds.), *Body image: A handbook of theory, research and clinical practice* (pp. 85-92). New York, NY: Guildford Press.
- Ricciardelli, L. A., McCabe, M. P., Holt, K. E., & Finemore, J. (2003). A biopsychosocial model for understanding body image and body change strategies among children. *Applied Developmental Psychology, 24*, 475-495. doi:10.1016/S0193-3973(03)00070-4
- Ricciardelli, L. A., McCabe, M. P., Lillis, J., & Thomas, K. (2006). A longitudinal investigation of the development of weight and muscle concerns among preadolescent boys. *Journal of Youth and Adolescence, 2*, 177-187. doi:10.1007/s10964-005-9004-7
- Ricciardelli, L. A., McCabe, M. P. & Ridge, D. (2006). The construction of the adolescent male body through sport. *Journal of Health Psychology, 11*, 577-587. doi:10.1177/1359105306065018
- Robins, R. W., Trzesniewski, K. H., Tracy, J. L., Gosling, S. D., & Potter, J. (2002). Global self-esteem across the life span. *Psychology and Aging, 3*, 423-434. doi:10.1037//0882-7974.17.3.423
- Rodgers, R. F., Ganchou, C., Franko, D. L., & Chabrol, H. (2012). Drive for muscularity and disordered eating among French adolescent boys: A sociocultural model. *Body Image: An International Journal of Research, 9*, 318–323. doi: 10.1016/j.bodyim.2012.03.002
- Roemmich, J. N., Lambiase, M. J., Lobarinas, C. L., & Balantekin, K. N. (2011). Interactive effects of dietary restraint and adiposity on stress-induced eating and the food choice of children. *Eating Behaviors, 12*, 309–312. doi:10.1016/j.eatbeh.2011.07.003
- Ruffolo, J. S., Phillips, K. A., Menard, W., Fay, C., Weisberg, R. B. (2006). Comorbidity of body dysmorphic disorder and eating disorders: Severity of psychopathology and body image disturbance. *International Journal of Eating Disorders, 39*, 11-19. doi: 10.1002/eat.20219
- Ruiz, J. R., Ortega, F. B., Castillo, R., Martín-Matillas, M., Kwak, L., Vicente-Rodríguez, G., . . . Moreno, L. A. (2010). Physical activity, fitness, weight status, and cognitive performance in adolescents. *Journal of Pediatrics, 157*, 917–922. doi:10.1016/j.jpeds.2010.06.026
- Russell, D. W., Kahn, J. H., Spoth, R., & Altmaier, E. M. (1998). Analyzing data from experimental studies: A latent variable structural equation modeling approach. *Journal of Counseling Psychology, 45*, 18-29. doi:10.1037/0022-0167.45.1.18
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68-78.

- Sameroff, A. (2000). Developmental systems and psychopathology. *Development and Psychopathology, 12*, 297-312. doi:10.1017/S0954579400003035
- Sameroff, A. (2010). A unified theory of development: A dialectic integration of nature and nurture. *Child Development, 81*, 6-22. doi:10.1111/j.1467-8624.2009.01378.x
- Schlomer, G. L., Bauman, S., & Card, N. A. (2010). Best practices for missing data management in counseling psychology. *Journal of Counseling Psychology, 57*, 1–10. doi:10.1037/a0018082
- Schur, E. A., Sanders, M., & Steiner, H. (2000). Body dissatisfaction and dieting in young children. *International Journal of Eating Disorders, 27*, 74-82. doi:10.1002/(SICI)1098-108X(200001)27:1<74::AID-EAT8>3.0.CO;2-K
- Schwartz, M. B., & Brownell, K. D. (2004). Obesity and body image. *Body Image: An International Journal of Research, 1*, 43-56. doi:10.1016/S1740-1445(03)00007-X
- Serpe, R. T., & Stryker, S. (1987). The construction of self and the reconstruction of social relationships. *Advances in Group Processes, 4*, 41 – 66. Retrieved from <http://www.emeraldinsight.com/books.htm?issn=0882-6145>
- Sinton, M. M., & Birch, L. L. (2005). Weight status and psychosocial factors predict the emergence of dieting in preadolescent girls. *International Journal of Eating Disorders, 38*, 346–354. doi:10.1002/eat.20176
- Skrondal, A. & Rabe-Hesketh, S. (2005) *Generalized latent variable modeling: Multilevel, longitudinal, and structural equation models*. Boca Raton, FL: Taylor & Francis.
- Slater, A., & Tiggemann, M. (2010). Body image and disordered eating in adolescent girls and boys: A test of objectification theory. *Sex Roles, 63*, 42-49. doi:10.1007/s11199-010-9794-2
- Smolak, L. (2004). Body image in children and adolescents: Where we do we go from here? *Body Image: An International Journal of Research, 1*, 15–28. doi:10.1016/S1740-1445(03)00008-1
- Smolak, L. (2009). Risk factors in the development of body image, eating problems and obesity. In Smolak, L. & Thompson, J. K. (Eds.), *Body image, eating disorders, and obesity in youth: Assessment, prevention, and treatment* (pp. 135-156). Washington, DC: American Psychological Association.
- Smolak L, Levine, M., & Thompson, J. K. (2001). The use of the sociocultural attitudes towards appearance questionnaire with middle school boys and girls. *International Journal of Eating Disorders, 29*, 216–223. doi:10.1002/1098-108X(200103)29:2<216::AID-EAT1011>3.0.CO;2-V

- Smolak, L., Murnen, S., & Thompson, J. K. (2005). Sociocultural influences and muscle building in adolescent boys. *Psychology of Men and Masculinity*, 6, 227-239. doi:10.1037/1524-9220.6.4.227
- Smolak, L., & Stein, J. A. (2006). The relationship of drive for muscularity to sociocultural factors, self-esteem, physical attributes gender role, and social comparison in middle school boys. *Body Image: An International Journal of Research*, 3, 121-129. doi:10.1016/j.bodyim.2006.03.002
- Smolak, L. & Stein, J. A. (2010). A Longitudinal investigation of gender role and muscle building in adolescent boys. *Sex Roles* 63, 738-746. doi:10.1007/s11199-010-9819-x
- Smolak, L., & Thompson, J. K. (2009). Body image, eating disorders, and obesity in children and adolescents: Introduction to the second edition. In L. Smolak & J. K. Thompson (Eds.), *Body image, eating disorders, and obesity in youth: Assessment, prevention, and treatment* (2nd ed., pp. 3-14). Washington, DC: American Psychological Association.
- Spear, B. A. (2006). Does dieting increase the risk for obesity and eating disorders? *Journal of the American Dietetic Association*, 106, 523-525. doi:10.1016/j.jada.2006.01.013
- Stanford, J. N., & McCabe, M. P. (2005). Sociocultural influences on adolescent body image and body change strategies. *Body Image: An International Journal of research*, 2, 105-113. doi:10.1016/j.bodyim.2005.03.002
- Stice, E. (1998). Relations of restraint and negative affect to bulimic pathology: A longitudinal test of three competing models. *International Journal of Eating Disorders*, 23, 243-260. doi:10.1002/(SICI)1098-108X(199804)23:3<243::AID-EAT2>3.0.CO;2-J
- Stice, E., & Agras, W. S. (1998). Predicting onset and cessation of bulimic behaviors during adolescence: A longitudinal grouping analysis. *Behavior Therapy*, 29, 257-276. doi:10.1016/S0005-7894(98)80006-3
- Stice, E., & Bulik, C. M. (2008). Eating disorders. In Beauchaine, T. P. & Hinshaw, S. P. (Eds.), *Child and Adolescent Psychopathology* (pp. 643-669). Hoboken, New Jersey: John Wiley & Sons, Inc.
- Stice, E., Cooper, J. A., Schoeller, D. A., Tappe, K., & Lowe, M. R. (2007). Are dietary restraint scales valid measures of moderate- to long-term dietary restriction? Objective biological and behavioral data suggest not. *Psychological Assessment*, 19, 449-458. doi:10.1037/1040-3590.19.4.449
- Stice, E., Fisher, M., & Lowe, M. (2004). Are dietary restraint scales valid measures of acute dietary restriction? Unobtrusive observational data suggest not. *Psychological Assessment*, 16, 51-59. doi:10.1037/1040-3590.16.1.51
- Stice, E., & Peterson, C. B. (2007). Eating disorders. In E. J. Mash, & R. A. Barkley (Eds.), *Assessment of childhood disorders* (pp. 751-780). New York, NY: Guilford Press.

- Stice, E., Sysko R., Roberto, C. A., & Allison, S. (2010). Are dietary restraint scales valid measures of dietary restriction? Additional objective behavioral and biological data suggest not. *Appetite*, *54*, 331–339. doi:10.1016/j.appet.2009.12.009
- Strauss, R. S., Pollack, H. A., (2003). Social marginalization of overweight children. *Archives of Pediatric Adolescent Medicine*, *157*, 746–752. doi:10.1001/archpedi.157.8.746
- Strelan, P. & Hargreaves, D. (2005). Reasons for exercise and body esteem: Men's responses to self-objectification. *Sex Roles*, *53*, 495-503. doi:10.1007/s11199-005-7137-5
- Striegel-Moore, R. H., & Bulik, C. M. (2007). Risk factors for eating disorders. *American Psychologist*, *62*, 181-198. doi:10.1037/0003-066X.62.3.181
- Stroebe, W. (2008). Dieting, overweight, and obesity. Self-regulation in a food-rich environment. Washington DC: American Psychological Association.
- Stroot, S. A. (2002). Socialisation and participation in sport. In A. Laker (Ed.), *The sociology of sport and physical education: An introductory reader* (pp. 129-147). New York, NY: Routledge Falmer.
- Stryker, S. (1980). *Symbolic interactionism: A social structural version*. Menlo Park, CA: Benjamin-Cummings.
- Swann, W. B., & Bosson, J. K. (2010). Self and identity. In S. T. Fiske, D. T. Gilbert, & G. G. Lindzey (Eds.), *Handbook of social psychology: Vol. 2* (5th ed., pp. 589–629). Hoboken, NJ: John Wiley & Sons.
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). New York, NY: Harper & Row.
- Tesser, A. (2000). On the confluence of self-esteem maintenance mechanisms. *Personality and Social Psychology Review*, *4*, 290-299. doi:10.1207/S15327957PSPR0404_1
- Tiggemann, M. (2004). Body image across the adult life span: Stability and change. *Body Image: An International Journal of Research*, *1*, 29-41. doi:10.1016/S1740-1445(03)00002-0
- Tiggemann, M. (2005). Body dissatisfaction and adolescent self-esteem: Prospective findings. *Body Image: An International Journal of Research*, *2*, 129–135. doi:10.1016/j.bodyim.2005.03.006
- Tiggemann, M. (2011). Sociocultural perspectives on human appearance and body image. In T. F. Cash & L. Smolak (Eds.), *Body image: A handbook of science, practice, and prevention* (2nd ed., pp. 12–19). New York, NY: Guilford Press.
- Tiggemann, M., & Wilson-Barrett, E. (1998). Children's figure ratings: Relationship to self-esteem and negative stereotyping. *International Journal of Eating Disorders*, *23*, 83–88. doi:10.1002/(SICI)1098-108X(199801)23:1<83::AID-EAT10>3.0.CO;2-O

- Thompson, J. K. & Cafri, G. (Eds.) (2007). *The muscular ideal: Psychological, social, and medical perspectives*. Washington, DC: American Psychological Association.
- Thompson, J. K., & Heinberg, L. J. (1993). Preliminary test of two hypotheses of body image disturbance. *International Journal of Eating Disorders*, *14*, 59–63. doi:10.1002/1098-108X(199307)14:1<59::AID-EAT2260140108>3.0.CO;2-T
- Thompson, J. K., Heinberg, L. J., & Tantleff-Dunn, S. (1991). The physical appearance comparison scale (PACS). *Behavior Therapist*, *14*, 174. Retrieved from <http://www.abct.org/Members/?m=mMembers&fa=JournalsPeriodicals#sec3>
- Thompson, J. K., van den Berg, P., Roehrig, M., Guarda, A. S., & Heinberg, L. J. (2004). The sociocultural attitudes towards appearance scale-3 (SATAQ-3): Development and validation. *International Journal of Eating Disorders*, *35*, 293–304. doi:10.1002/eat.10257
- Thorgersen-Ntoumani, C., Ntoumanis, N., Barkoukis, V., & Spray, C. M. (2009). The role of motivation to eat in the prediction of weight control behaviors in female and male adolescents. *Eating Behaviors*, *10*, 107–114. doi:10.1016/j.eatbeh.2009.03.001
- Trautwein, U., Gerlach, E., & Lüdtke, O. (2008). Athletic classmates, physical self-concept, and free-time physical activity: A longitudinal study of frame of reference effects. *Journal of Educational Psychology* *100*, 988-1001. doi: 10.1037/0022-0663.100.4.988
- Turner, J. C. (2010). Towards a cognitive redefinition of the social group. In H. Tajfel (Ed.), *Social identity and intergroup relations* (pp. 15-36). Cambridge, UK: Cambridge University Press.
- Tylka, T. L. (2011). Refinement of the tripartite influence model for men: Dual body image pathways to body change behaviors. *Body Image: An International Journal of Research*, *8*, 199-207. doi:10.1016/j.bodyim.2011.04.008
- Valois, R. F., Zullig, K. J., Huebner, E. S., & Drane, J. W. (2003). Dieting behaviors, weight perceptions and life satisfaction among public high school adolescents. *Eating Disorders*, *11*, 271–288. doi:10.1080/10640260390242506
- van den Berg, P., Mond, J., Eisenberg, M., Ackard, D., & Neumark-Sztainer, D. (2010). The link between body dissatisfaction and self-esteem in adolescents: Similarities across gender, age, weight status, race/ethnicity, and socioeconomic status. *Journal of Adolescent Health*, *47*, 290–296. doi:10.1016/j.jadohealth.2010.02.004
- van den Berg, P., Paxton, S. J., Keery, H., Wall, M., Guo, J., & Neumark-Sztainer, D. (2007). Body dissatisfaction and body comparison with media images in males and females. *Body Image: An International Journal of Research*, *4*, 257-268. doi:10.1016/j.bodyim.2007.04.003

- van den Berg, P., & Thompson, J. K. (2007). Self-schema and social comparison explanations of body dissatisfaction: A laboratory investigation. *Body Image: An International Journal of Research*, 4, 29-38. doi:10.1016/j.bodyim.2006.12.004
- Vartanian, L. R. (2009). When the body defines the self: Self-concept clarity, internalization, and body image. *Journal of Social and Clinical Psychology*, 28, 94-126. doi:10.1521/jscp.2009.28.1.94
- Vartanian, L. R., & Herman, C. P. (2006). Beliefs about the determinants of body weight predict dieting and exercise behavior. *Eating Behaviors*, 7, 176-179. doi:10.1016/j.eatbeh.2005.08.009
- Vartanian, L. R., Herman, C. P., & Polivy, J. (2006). Does regulatory focus play a role in dietary restraint? *Eating Behaviors*, 7, 333-341. doi:10.1016/j.eatbeh.2005.11.007
- Vartanian, L. R., Herman, C. P., & Polivy, J. (2007). Consumption stereotypes and impression management: How you are what you eat. *Appetite*, 48, 265-277. doi:10.1016/j.appet.2006.10.008
- Vartanian, L. R., Herman, C. P., & Polivy, J. (2008). Judgments of body weight based on food intake: A pervasive cognitive bias among restrained eaters. *International Journal of Eating Disorders*, 41, 64-71. doi:10.1002/eat.20440
- Vartanian, L. R., & Hopkinson, M. M. (2010). Social connectedness, conformity, and the internalization of societal standards of attractiveness. *Body Image: An International Journal of Research*, 7, 86-89. doi:10.1016/j.bodyim.2009.10.001
- Vartanian, L. R., & Shaprow, J. G. (2008). Effects of weight stigma on exercise motivation and behavior: A preliminary investigation among college-aged females. *Journal of Health Psychology*, 13, 131-138. doi:10.1177/1359105307084318
- Vartanian, L. R., Wharton, C. M., & Green, E. B. (2012). Appearance vs. health motives for exercise and for weight loss. *Psychology of Sport & Exercise*, 13, 251-256. doi:10.1016/j.psychsport.2011.12.005
- Veale, D. (2004). Advances in a cognitive behavioural model of body dysmorphic disorder. *Body Image: An International Journal of eating Disorders*, 1, 113-125. doi:10.1016/S1740-1445(03)00009-3
- Verstuyf, J., Patrick, H., Vansteenkiste, M., & Teixeira, P. J. (2012). Motivational dynamics of eating regulation: a self-determination theory perspective. *International Journal of Behavioral Nutrition and Physical Activity*, 9, 1-21. doi:10.1186/1479-5868-9-21
- Verstuyf, J., Vansteenkiste, M., & Soenens, B. (2012). Eating regulation and bulimic symptoms: The differential correlates of health-focused and appearance-focused eating regulation. *Body Image: An International Journal of Research*, 9, 108-117. doi:10.1016/j.bodyim.2011.09.003

- Vincent, M. A., & McCabe, M. P. (2000). Gender differences among adolescents in family, and peer influences on body dissatisfaction, weight loss and binge eating behaviors. *Journal of Youth and Adolescence*, *39*, 205-221. doi: 0047-2891/00/0400-0205\$18.00/0
- Vohs, K.D., & Baumeister, R.F. (Eds.) (2011). *Handbook of self-regulation: Research, theory, and applications* (2nd ed.). New York, NY: Guilford Press.
- Weston, R., & Gore, P. A. Jr. (2006). A brief guide to structural equation modeling. *Counseling Psychologist*, *34*, 719-751. doi:10.1177/0011000006286345
- Wheeler, H. A., Adams, G. R. & Keating, L. (2001). Binge eating as a means for evading identity issues: The association between an avoidance identity style and bulimic behavior. *Identity: An International Journal of Theory and Research*, *1*, 161-178.
- Williams K. L., & Galliher, R. V. (2006). Predicting depression and self- esteem from social connectedness, support, and competence. *Journal of Social & Clinical Psychology*, *25*, 855–874. doi:10.1521/jscp.2006.25.8.855
- Wilson, J. N., Markey, C. N., & Markey, P. M. (2012). Fitness correlates of obligatory versus health motives for exercise: An examination of men in the military. *Psychology of Sport and Exercise*, *13*, 371-377. doi:10.1016/j.psychsport.2012.01.002
- Wupperman, P., & Neumann, C. S. (2006). Depressive symptoms as a function of sex-role rumination, and neuroticism. *Personality and Individual Differences*, *40*, 189-201. doi:10.1016/j.paid.2005.05.017