

THESIS

EXAMINING THE ASSOCIATIONS AMONG PERFECTIONISM, OBSESSIVE-COMPULSIVENESS, BODY DISSATISFACTION, EXERCISE DEPENDENCE AND DISORDERED EATING IN COLLEGE WOMEN

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## ABSTRACT

### EXAMINING THE ASSOCIATIONS AMONG PERFECTIONISM, OBSESSIVE-COMPULSIVENESS, BODY DISSATISFACTION, EXERCISE DEPENDENCE AND DISORDERED EATING IN COLLEGE WOMEN

Many U.S. women engage in some form of weight or shape management behaviors (WSMB) – including disordered eating or excessive exercise – in their lifetime. Disordered eating includes fasting, skipping meals, binge eating, purging/self-induced vomiting, and laxative or diuretic use (Neumark-Sztainer, Wall, Larson, Eisenberg, & Loth, 2011; Striegel-Moore, Silberstein, Frensch, & Rodin, 1989). Excessive exercise is defined as exercise characterized by greater amounts of time spent exercising and a sense of obligation to exercise. Exercise dependence occurs when the individual experiences psychological and/or physiological craving for physical activity (Hausenblas, & Symons Downs, 2002).

Emerging adulthood, the period between 18 and 25 years of age, is a critical time for the onset or exacerbation of disordered eating and exercise dependence among women, especially women attending college (Compas, Wagner, Slavin, & Vannatta, 1986; Vohs, Heatherton, & Herrin, 2001). Many factors likely contribute to WSMB in young women, including sociocultural, family, peer and psychological factors. A major limitation of the literature on psychological factors associated with WSMB is that it has focused nearly exclusively on women of European-descent. Yet there are indications that WSMB may be a significant problem among women of Latina-descent.

Building on past studies and considering the gaps in empirical knowledge, this study examined two psychological constructs potentially associated with WSMB in European- and Latina-descent college women. Specifically this study examined the associations between perfectionism and obsessive-compulsiveness and the WSMB of disordered eating and exercise dependence accounting for body dissatisfaction as a potential confounder of these associations. Five hundred two college women (87.5% European-descent, 12.5% Latina-descent) participated in the study. Multiple-group structural equation modeling examined whether the relations among latent constructs in the hypothesized model differed across ethnic groups.

An unconstrained model, in which the paths were not constrained to be equal for the two ethnic groups, was a significantly better fit for the data. Perfectionism and obsessive-compulsiveness were positively associated with body dissatisfaction for European-descent women. However, only perfectionism was positively associated with body dissatisfaction for women of Latina-descent. Body dissatisfaction was not significantly associated, either positively or negatively, with disordered eating or exercise dependence for either ethnic group. For women of European-descent, perfectionism and obsessive-compulsiveness were positively associated with both disordered eating and exercise dependence. For Latina-descent women, obsessive-compulsiveness was positively associated with disordered eating and exercise dependence. The association between obsessive-compulsiveness and exercise dependence was moderated by ethnicity such that the association was more pronounced for Latina-descent women than for European-descent women. I conclude that while college women of European- and Latina-descent engage in similar rates of WSMB, the degree to which perfectionism and obsessive-compulsiveness may be associated with these behaviors may differ for the two groups. Longitudinal research is necessary to further investigate the issues raised in the present study.

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## INTRODUCTION

Many women in the United States (U.S.) engage in some form of weight or shape management behaviors (WSMB) – behaviors intended to manage or even change one's weight and/or shape – including disordered eating and/or excessive exercise (Mintz & Betz, 1988). Disordered eating<sup>1</sup> refers to dysregulated eating behaviors including fasting, skipping meals, binge eating, purging/self-induced vomiting, and laxative or diuretic use (Neumark-Sztainer, Wall, Larson, Eisenberg, & Loth, 2011; Striegel-Moore, Silberstein, Frensch, & Rodin, 1989). It is estimated that 20% of U.S. women engage in disordered eating in their lifetime (Hoek, 2006; Hudson, Hiripi, Pope, & Kessler, 2007; National Institute of Mental Health, 2001; Striegel-Moore & Bulik, 2007; Striegel- Moore, Rosselli, Perrin, DeBar, Wilson, May, & Kraemer, 2009). Excessive exercise is characterized by increased duration (greater time spent) and obligatoriness towards exercise such that exercising interferes with important activities, occurs at inappropriate times or in inappropriate settings, and/or continues despite injury (American Psychiatric Association, 1994; Mond, Hay, Rodgers, & Owen, 2006). Exercise dependence occurs when a person experiences psychological and/or physiological craving for physical activity/exercise (Hausenblas, & Symons Downs, 2002). The prevalence of exercise dependence in community samples remains unknown but in fitness club members it can exceed 40% (Hausenblas & Symons Downs, 2002; Lejoyeux, Avril, Richoux, Embouazza, & Nivoli, 2008).

Emerging adulthood, defined as the period between 18 and 25 years of age (Arnett, 2000), is a critical time for the onset or exacerbation of the WSMB of disordered eating and exercise dependence, especially so for young women who attend college (Compas, Wagner,

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<sup>1</sup> Definitions of key terms are provided in Appendix I.

Slavin, & Vannatta, 1986; Vohs, Heatherton, & Herrin, 2001). For instance, approximately one quarter of college women engage in at least some bingeing and purging as a method of weight and/or shape management (The Renfrew Center Foundation for Eating Disorders, 2003). A review of the literature on eating disturbances concluded that more than 90% of college women diet as a method of weight and/or shape management (Shisslak, Crago, & Estes, 1995). Speculation as to why college women are vulnerable to WSMB include: 1) the life transition of starting college (Cooley & Toray, 2001), 2) exposure to disordered eating and unhealthy dieting among close peers (Fairburn, & Beglin, 1990), 3) exposure to college-specific triggering factors including academic competition, and 4) gender and identity development (although not specific to college women only) (Pritchard, 2008; Silverstein, Carpman, Perlick, & Perdue, 1990; Snyder & Hasbrouck, 1996; Striegel-Moore, Silberstein, Frensch, & Rodin, 1989).

Multiple factors likely contribute to the WSMB of disordered eating and exercise dependence in young women. Past research indicates that chief among these contributing factors are dominant media messages that promote sociocultural norms of ultra-thin as beautiful, a standard of so-called beauty and attractiveness unobtainable by most women (Cash, 2005; Stice, 2002; Stice, Spangler, & Agras, 2001; Sypeck, Gray, & Ahrens, 2004). Media pressure to be thin impacts the satisfaction one has with her body and can promote the WSMB of disordered eating and exercise dependence (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). Moreover, evidence to support the role of sociocultural factors in WSMB is substantial. For example, a seminal study of Fujian adolescents found that weight and shape preoccupation, body dissatisfaction, and purging to control weight increased after the introduction of U.S. media via television (Becker, 2004). The role of family in WSMB has also been investigated with prospective studies. Maternal eating disorder history increases the likelihood of disordered eating

in child(ren) (Field, Javaras, Aneja, Kitos, Camargo, Taylor, & Laird, 2008), and the absence of regularly scheduled family meals also predicts disordered eating (Haines, Gillman, Rifas-Shiman, Field, & Austin, 2010). Further, cross-sectional studies and a meta-analytic review have concluded that appearance-focused family culture and weight and/or shape commentary from parents are significantly associated with disordered eating (Golan & Crow, 2004; Kluck, 2004). Peers are also another important influence in WSMB. Longitudinal research on the role of peers in WSMB indicates that dieting friends and sexual harassment predict disordered eating (Eisenberg & Neumark-Sztainer, 2010; Petersen & Hyde, 2013). Finally, psychological factors have been examined, and associations with WSMB found, for depressive symptoms (Liechty & Lee, 2013) and body dissatisfaction (Stice, 2002).

Perfectionism and obsessive-compulsiveness are among psychological constructs potentially salient in the WSMB of disordered eating and exercise dependence. Perfectionism has been discussed as a salient psychological construct across various forms of psychopathology including depressive disorders, suicidal ideation, anxiety disorders, and eating disorders (Shafran & Mansell, 2001). Perfectionism has been shown to reinforce eating disordered behaviors, thereby suggesting that perfectionism could be critical in maintaining clinical eating disorders (Shafran & Mansell, 2001). However, while perfectionism has been examined in clinical eating disorders (Bardone-Cone, Wonderlich, Frost, Bulik, Mitchell, Uppala, & Simonich, 2007), far fewer examinations to date have examined perfectionism's associations with subthreshold weight or shape management behaviors. Obsessive-compulsiveness is another potentially salient construct associated with WSMB. Obsessive-compulsiveness can be understood as perfectionism's cousin; the two are correlated and can co-occur in a number of psychopathologies including clinical eating disorders and personality disorders (Hewitt & Flett,

1991). Accordingly, it is necessary to examine the associations between perfectionism and obsessive-compulsiveness with subthreshold WSMB in college women in efforts to: 1) inform future longitudinal investigations and 2) elucidate potential opportunities for prevention and intervention.

A limitation, however, of the literature on the associations between psychological constructs and WSMB is that it has focused nearly exclusively on adolescents and women of European-descent. To date, the associations between perfectionism and obsessive-compulsiveness and subthreshold WSMB have never been examined in samples identifying as Latina-descent. However, there is indication that women of Latina-descent are an at-risk population for the WSMB of disordered eating and exercise dependence and the least likely, along with women of Native American-descent, to be referred to treatment services (Cordero, Julian, & Murray, 2013; Franko, Coen, Roehrig, Rodgers, Jenkins, Lovering, & Cruz, 2012; Franko, Jenkins, & Rodgers, 2012; George & Franko, 2010).

#### *Weight or Shape Management Behaviors: Disordered Eating*

Disordered eating is defined as a wide range of subclinical, dysregulated and compensatory eating behaviors intended to reduce one's weight and/or to change one's shape (Mintz & Betz, 1988). Dysregulated eating behaviors can include fasting, skipping meals, and binge eating while compensatory behaviors may involve purging/self-induced vomiting, and laxative and diuretic use (Neumark-Sztainer, Wall, Larson, Eisenberg, & Loth, 2011; Striegel-Moore, Silberstein, Frensch, & Rodin, 1989). Subclinical, disordered eating is distinguished from a clinical eating disorder with regards to severity or the frequency of the behaviors. For example, occasional fasting and skipping meals constitutes disordered eating; should the restriction of food intake become so severe that the individual's body weight is less than

“minimally normal” considering height (severity), anorexia nervosa, a clinical eating disorder, would be diagnosed (American Psychiatric Association, 2013, p. 338). Binge eating refers to overeating episodes with a subjective sense of loss of control over eating. Occasional binge eating with or without compensation – such as self-induced vomiting – constitutes disordered eating; binge eating and compensatory behaviors that occur at least once a week (frequency) for at least three months (duration) meet criteria for bulimia nervosa (American Psychiatric Association, 2013, p. 345), and regular binge eating accompanied by psychological distress but in the absence of compensatory behavior may constitute binge eating disorder (American Psychiatric Association, 2013).

Disordered eating at subclinical threshold levels across the lifespan is associated with an increased risk of developing full-syndrome clinical threshold eating disorders, and a host of other behavioral and socioemotional problems, including smoking, alcohol and drug use, depression, and suicidality (Brausch & Gutierrez, 2009; Field et al., 2003; Killen, Taylor, Telch, Robinson, Maron, & Saylor, 1987; Neumark-Sztainer, Story, Dixon, & Murray, 1998; Patton, Selzer, Coffey, Carlin, & Wolfe, 1999; Polivy, & Herman, 1985; Ross & Ivis, 1999; Stice, Cameron, Killen, Hayward, & Taylor, 1999). When disordered eating symptoms develop into a clinical eating disorder, other serious physical health problems follow including dermatological, endocrinological, skeletal, reproductive, and nutritional problems (Mitchell & Crow, 2006). Yet, even at subthreshold levels, disordered eating has been associated with depression, anxiety, low self-esteem, substance use, and menstrual irregularity and the weakening of bones (Berry & Howe, 2000; Sanborn, Horea, Siemers, & Dieringer, 2000; Santos, Richards, & Bleckley, 2007; Von Ranson, Iacono, & McGue, 2002).

### *Weight or Shape Management Behaviors: Exercise Dependence*

Exercise dependence is defined as a psychological and/or physiological craving for leisure-time physical activity (Hausenblas & Symons Downs, 2002). Like other dependence disorders, exercise dependence is best understood in terms of a cluster of cognitive, behavioral (exercise interferes with social or occupational commitments), and physiological (withdrawal) symptoms. Perfectionism and obsessive-compulsiveness are two psychological factors that likely contribute to the WSMB of exercise dependence (Hausenblas & Giacobi, 2004). A longitudinal investigation conducted with British adolescents found that perfectionism and obsessive-compulsiveness predicted excessive exercising over a two-year period (Goodwin, Haycraft, & Meyer, 2014). In a similar, cross-sectional study of British adolescents, both perfectionism and obsessive-compulsiveness were among the strongest predictors of excessive exercise in regression analyses (Goodwin, Haycraft, Willis, & Meyer, 2011). A limitation of this research, however, is the lack of ethnic diversity.

Few studies to date have examined exercise dependence in collegiate samples. Of these is a cross-sectional examination of predominantly European-descent students that found the prevalence of exercise dependence to be just over 20% (Garman, Hayduk, Crider, & Hodel, 2004). Further, a second cross-sectional study of predominantly European-descent college women concluded that exercise dependence is associated with disordered eating (Cook & Hausenblas, 2011). At the present, exercise dependence has not been examined in individuals of Latina-descent at any age. Therefore, although perfectionism and obsessive-compulsiveness likely are associated with the WSMB of exercise dependence for college women of Latina-descent, this possibility requires empirical confirmation due to the ethnic homogeneity of samples in past investigations.

### *Body Dissatisfaction*

Body dissatisfaction refers to negative subjective evaluations and experiences of one's body, particularly the stomach, hips, and/or breasts (Stice & Shaw, 2002). Body dissatisfaction has been associated with disordered eating behaviors, including restrictive eating and binge eating and purging, in cross-sectional studies of college women of European and Australian descent (Rodgers, Chabrol, & Paxton, 2011; van den Berg, Thompson, Obremski-Brandon, & Covert, 2002). There is also evidence that body dissatisfaction predicts the exacerbation of disordered eating over time during college years (Striegel-Moore, Silberstein, Frensch, & Rodin, 1989). For example, Cooley and Toray (2001) found that amongst women of European-descent entering college, body dissatisfaction predicted the exacerbation of disordered eating, more frequent binge eating and purging for example, over a seven month period after controlling for baseline disordered eating symptoms and attitudes. These findings suggest an association – possibly even a causal relationship – between body dissatisfaction and disordered eating for college women of European-descent. It is unclear, however, if the same is true for college women of Latina-descent. Further, examinations evaluating the association between body dissatisfaction and the WSMB of exercise dependence are lacking for all non-European ethnic groups. Thus, this potential association too requires examination.

While, historically, there has been some debate in the literature as to which ethnic group, girls and women from European-descent or girls and women from Latina-descent, is more impacted by body dissatisfaction (Barry & Grilo, 2002; McComb & Clopton, 2002), a recent meta-analysis has concluded that, consistent with a “majority of studies” on the subject, there are no meaningful differences between the two groups in regards to body dissatisfaction (Grabe & Hyde, 2006, p. 624). Nevertheless, what is known about body dissatisfaction, including its

antecedents, consequences, and associations, is limited for individuals of Latina-descent, especially those in college.

### *Perfectionism*

Perfectionism refers to a tendency to hold, adhere to, and/or pursue excessively high personal standards (Chang, Ivezaj, Downey, Kashima, & Morady, 2008; Frost, Marten, Lahart, & Rosenblate, 1990). Perfectionism can be adaptive, such that it facilitates goal-oriented behavior, as well as maladaptive, such that it facilitates excessive self-doubt and preoccupation with making mistakes (Bieling, Israeli, & Antony, 2004; Frost et al., 1990; Hamachek, 1978). Research on perfectionism's association with the WSMB of disordered eating and exercise dependence is limited. Prior, cross-sectional investigations utilizing samples of predominantly European-descent have found that perfectionism is significantly associated with body dissatisfaction and disordered eating symptoms, including fasting, binge eating, self-induced vomiting, and diuretic and laxative abuse (Brown, Parman, Rudat, & Craighead, 2012; Ferrier-Auerbach & Martens, 2009; Forbush, Heatherton, & Keel, 2007; Tissot & Crowther, 2008). To date, only one longitudinal investigation assessing perfectionism's relationship with disordered eating has been conducted; perfectionism predicted an increase in dieting and bingeing behaviors over eleven weeks in predominantly (92.4%) European-descent college women (Fitzsimmons-Craft, Bardone-Cone, Brownstone, & Harney, 2012).

Even less is known about the role of perfectionism in exercise dependence. A cross-sectional study of adult exercisers found that perfectionism was positively associated with exercise dependence (Miller & Mesagno, 2014) and, within two cross-sectional samples of college students from predominantly European-descent, those at-risk for exercise dependence scored significantly higher on a multidimensional measure of perfectionism than those not at-risk

(Downs, Hausenblas, & Nigg, 2004; Hausenblas & Downs, 2002). Taken together, these studies suggest perfectionism may be associated with exercise dependence for those of European-descent. The role of perfectionism in the WSMB of disordered eating and exercise dependence has not been evaluated in Latinas. So, while existing research supports perfectionism as a likely predictor of disordered eating and a potentially salient construct in exercise dependence in college women of European-descent, no studies have examined this psychological variable's role in the WSMB of disordered eating and exercise dependence in Latinas.

#### *Obsessive-Compulsiveness*

Obsessive-compulsiveness refers to an inability to inhibit or delay avoidant, repetitive actions, behaviors, and cognitions. Obsessive-compulsiveness typically encompasses over-reflective responses and perfectionistic dimensions (Frost & Steketee, 1997; Humphreys, Clopton, & Reich, 2007; Li, & Chen, 2007) and can manifest itself in both obtrusive thoughts and/or ritualistic behaviors. Obsessive-compulsiveness has been termed a psychological defense to cope with anxiety and thus is generally conceptualized as a trait (Salzman, 1968; 1993).

The role of obsessive-compulsiveness in the WSMB of disordered eating has been investigated a few times in college women. Roberts (2006) was the first to highlight high comorbidity between obsessive-compulsiveness and disordered eating in a small sample of undergraduates of European-New Zealand descent. Subsequently, obsessive-compulsiveness was found to both correlate with (Celikel, Cumurcu, Koc, Etikan, & Yucel, 2008; Humphreys, Clopton, & Reich, 2007) and predict over two years (Lilenfeld, Jacobs, Woods, & Picot, 2008) disordered eating in small samples of college women from primarily European-descent. With regards to the role of obsessive-compulsiveness in the WSMB of exercise dependence, we can only reference cross-sectional studies that utilized community, and not collegiate, samples; this

small body of research has found a positive association between obsessive-compulsiveness and commitment to exercise (Spano, 2001). It was also found that excessive exercisers score significantly higher on measures of obsessive-compulsiveness than non-excessive exercisers (Gulker, Laskis, & Kuba, 2001).

Similar to existing work on perfectionism, investigations – either cross-sectional or longitudinal – of obsessive-compulsiveness’ associations with the WSMB of disordered eating and exercise dependence with individuals of Latina-descent are altogether lacking. Even within the broader context of obsessive-compulsive disorders, individuals from Latina-descent have been particularly underrepresented (Wetterneck, Little, Rinehart, Cervantes, Hyde, & Williams, 2012). Given few studies have examined obsessive-compulsiveness in WSMB, and none with samples from Latina-descent, evaluating the associations between obsessive-compulsiveness and the WSMB of disordered eating and exercise dependence can, in part, address a gap in the current literature.

#### *Summary and Current Study Objective*

As previously stated, nearly all research to date on the WSMB of disordered eating and exercise dependence has been conducted with women of European-descent. Yet, there are indications that Latina-descent women constitute a vulnerable group with regard to the WSMB of disordered eating in particular. Further, Latina-descent women have not been included in investigations of perfectionism and obsessive-compulsiveness, two likely salient psychological factors in WSMB. And finally, prior empirical undertakings have failed to explore the role of perfectionism, obsessive-compulsiveness, and body dissatisfaction in the WSMB of disordered eating and exercise dependence across ethnic groups. For these reasons, college women of Latina-descent are included in the present study.

Accordingly, the primary purpose of this study was to evaluate a model of two psychological variables, perfectionism and obsessive-compulsiveness, in relation to two forms of WSMB, disordered eating and exercise dependence, and considering body dissatisfaction as a potential confound, in college women. Second, this study aimed to explore whether the posited model fit both European and Latina-descent college women.

### *Hypotheses*

- 1) Perfectionism and obsessive-compulsiveness were expected to be positively correlated (Frost & Steketee, 1997; Frost, Krause, & Steketee, 1996).
- 2) Both perfectionism and obsessive-compulsiveness were expected to be positively associated with body dissatisfaction among both European- and Latina-descent college women (Bardone-Cone et al., 2007; Downey & Chang, 2007; Frost et al., 1990; Gulker, Laskis, & Kuba, 2001)<sup>2</sup>.
- 3) Body dissatisfaction was expected to be positively associated with the WSMB of disordered eating and exercise dependence (Keel, Fulkerson, & Leon, 1997; Neumark-Sztainer, Butler, & Palti, 1996; Stice & Shaw, 2002). This relationship was expected to be moderated by ethnicity, such that the association between body dissatisfaction and exercise dependence would be stronger for European- than Latina-descent college women<sup>3</sup>.

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<sup>2</sup> Perfectionism and obsessive-compulsiveness, it was theorized, increase susceptibility to thin-ideal internalization (Boone et al., 2001; Pokrajac-Bullian et al., 2008; Tissot & Crowther, 2008), a known precursor to body dissatisfaction not assessed in the present study.

<sup>3</sup> Given the positive association between SES and physical activity (Ford et al., 1991; Giles-Corti & Donovan, 2002; Gordon-Larsen, McMurray, & Popkin, 1999) and acknowledging Latina-descent women, like other ethnic minorities, are disproportionately impacted by poverty and low SES (American Psychological Association, 2014), it was theorized that Latina-descent women would be less likely to endorse exercise dependence as WSMB (as physical activity is likely less culturally relevant for this group).

The full hypothesized model can be seen in Figure 1.

## METHOD

### *Participants*

Participants were 502 college women. Four hundred thirty-nine (87.5%) were of European-descent ( $M_{age} 18.67 \pm 1.05$ ) and 63 (12.5%) Latina-descent ( $M_{age} 18.75 \pm 1.25$ ). Mean height, weight, and BMI were: 1.62 meters ( $SD = .06$ ), 66.06 kilograms ( $SD = 19.19$ ), and 24.99 BMI (kilograms/meters squared) ( $SD = 6.63$ ) respectively.

### *Materials*

### Measures

The *Eating Attitudes Test-26*, a 26-item instrument (EAT-26; Garner, Olmsted, Bohr, Garfinkel, 1982), was used as a continuous assessment of total disordered eating ( $\alpha = 0.83$ ). The EAT consists of three subscales: dieting – capturing dieting behaviors and drive for thinness (“I am aware of the calorie content of foods that I eat”), bulimia and food preoccupation – capturing binge eating and vomiting (“I vomit after I have eaten”), and oral control – capturing the perceived social pressures around weight (“I avoid eating when I am hungry”). A total score greater than 20 indicates potential risk for a clinical eating disorder, although follow-up diagnostic interviewing would be required for formal diagnosis and/or treatment. As such, a score of 20 and below was used to operationally define subthreshold disordered eating; participants scoring 21 and higher were excluded from analyses. The EAT-26 has been found to positively correlate with body dissatisfaction. The measure has shown acceptable psychometric properties including reliability and validity in clinical, nonclinical, and collegiate samples (Doninger, Enders, & Burnett, 2005; Garner et al., 1982), in adolescent and young adult samples (Koslowsky et al., 1992) and, has been used in the past with Cuban American women and

Latina-descent college students (Jane, Hunter, & Lozzi, 1999; Rich & Thomas, 2008). However, there are no normative data for Latina-descent women available presently. In the present study, internal reliability<sup>4</sup> was poor ( $\alpha = 0.53$ ); the dieting and bulimia/food preoccupation subscales had adequate internal reliabilities ( $\alpha = 0.83$  and  $0.74$  respectively) whereas the oral control subscale had poor internal reliability ( $\alpha = 0.57$ ). Internal reliability concerns pertaining to the oral control subscale in particular have been raised previously in the literature (Mazzeo & Espelage, 2002) and the subscale modified in some studies in attempts to remedy this (Ocker, Lam, Jensen, & Zhang, 2007). Nevertheless, the scale has been cited more than 2,800 times and is the most widely utilized measure of disordered eating (Nasser, 1997).

The *Exercise Dependence Scale* (EDS; Hausenblas & Downs, 2002) is a 21-item scale used to measure exercise dependence ( $\alpha = 0.93 - 0.95$ ). Representative items include: “I exercise when injured” and “I exercise longer than I plan.” Exercise dependence can be judged continuously, as was done in the present study, or three groups can be identified: at-risk, nondependent-symptomatic, and nondependent-asymptomatic. The scale was psychometrically validated with college samples and found to have adequate internal reliability and validity (Hausenblas & Downs, 2002; Hausenblas & Symons Downs, 2002). Normative data are not yet available. In the present study, internal reliability was strong ( $\alpha = 0.95$ ). The scale has been used in collegiate samples that included small, Latina populations (8-12%), providing preliminary support for the measure’s use in the present study (Hausenblas & Downs, 2002; Hausenblas & Fallon, 2002; Hausenblas & Giacobbi, 2004). Scores on each item were summed to provide a total score; higher scores indicate more exercise dependence symptoms.

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<sup>4</sup> All estimates of internal reliability reported are for the entire sample.

The *Body Shape Questionnaire* (BSQ; Cooper, Taylor, Cooper, & Fairburn, 1987) was used to assess body dissatisfaction ( $\alpha = 0.97$ ). Sample items include: “Has worry about your shape made you diet?” and, “Have you felt ashamed of your body?” The BSQ has previously shown adequate psychometric properties in community and collegiate samples (Cooper et al., 1987; Di Pietro & Silveira, 2009; Evans & Dolan, 1993; Rosen, Jones, Ramierz, & Waxman, 1996) and was found to positively correlate with EAT-26 scores in adult samples. In the present study, internal reliability was strong ( $\alpha = 0.98$ ). The BSQ has been used (with acceptable psychometric properties) in a sample of Brazilian college students supporting its use in the present study with Latinas (Di Pietro & Silveira, 2009). However, no normative data exist for Latina-descent individuals. After select reverse coding, BSQ total scores of less than 81 suggest little or no worry about body shape, scores between 81 and 110 suggests slight worry, 111-140 suggests moderate worry and scores exceeding 140 suggest extreme concern about one’s body shape (Cooper & Taylor, 1988).

The *Frost Multidimensional Perfectionism Scale* (FMPS; Frost, Marten, Lahart, & Rosenblate, 1990) is a 35-item scale that measured perfectionism. It consists of six subscales: concern for mistakes ( $\alpha = 0.88$ , CM: 9 items summed) – considered most central to the perfectionism construct, organization ( $\alpha = 0.93$ , O: 6 items summed), parental criticism ( $\alpha = 0.84$ , PC: 4 items summed), parental expectations ( $\alpha = 0.84$ , PE: 5 items summed), personal standards ( $\alpha = 0.83$ , PS: 7 items summed), and doubting/doubts about actions ( $\alpha = 0.77$ , D: 4 items summed). Higher scores on a subscale indicate greater endorsement of that particular facet of perfectionism. Items include: “I try to be an organized person” and “I have extremely high goals”. The FMPS was shown to have adequate internal reliability and validity in a collegiate sample (Frost et al., 1990) and has been previously used with Latinas in college (Chang, Hirsch,

Sanna, Jeglic, & Fabian, 2011). No normative data for Latinas are available. In the present study, internal reliability was adequate ( $\alpha = 0.81$ ).

The *Yale-Brown Obsessive-Compulsive Scale* (Y-BOCS; Goodman et al., 1989, 1989), a 10-item scale, was used to evaluate obsessive-compulsiveness ( $\alpha = 0.89$ ). Psychometric properties of the Y-BOCS, including internal reliability and validity, were established using adult samples, and subsequently established for ethnic minorities, including Latina/os, and for collegiate populations (Frost, Krause, & Steketee, 1996; Frost et al., 1995; Garnaat & Norton, 2010). However, normative data for ethnic minorities, including those of Latina-descent, are not available. In the present study, internal reliability was strong ( $\alpha = 0.89$ ). Representative items are: “How much control do you have over your obsessive thoughts?” and “How much time do you spend performing compulsive behaviors?”. After some reverse coding, the first five items are summed to form the severity index score for obsessions, the last five items are summed to form the severity index score for compulsions. Total scores ranging from 0 to 7 are considered subclinical, 8-15 mild, 16-23 moderate, 24-31 severe and 32-40 extreme.

These measures can be seen in their entirety in Appendix II.

### Computed Variables

Body mass index (BMI,  $\text{kg}/\text{m}^2$ ) was computed by dividing self-reported weight (kg) by the square of self-reported height (m). For adults, a BMI of 25.0 – 29.9 is considered overweight,  $\geq 30.0$  obese, and  $\geq 40.0$  extremely obese (Hedley, Ogden, Johnson, Carroll, Curtin, & Flegal, 2004; National Heart, Lung, and Blood Lung Institute, 1998).

### *Procedure*

All participants were undergraduate students at a public, Mountain West university enrolled in psychology courses. The courses in which participants were enrolled were part of a

department wide research credit pool. Recruitment and assessments were all conducted online using an electronic portal accessible to all potential participants. After providing electronic consent, participants completed measures in the following order: demographics (including self-report height and weight), EAT-26, BSQ, EDS, FMPS, and finally the YBOCS. Upon completion, all participants were debriefed electronically and provided counseling resources information. Participants received partial course credit for their involvement in the study. The University's Institutional Review Board approved all study procedures.

### *Analyses*

Using SPSS 22.0 (IBM Corp, 2013) variables were assessed for normal distribution. BMI was excessively kurtotic and thus outliers were adjusted to fall 1.5 times the interquartile range below the 25<sup>th</sup> percentile or above the 75<sup>th</sup> percentile – to the whiskers in Tukey's (1977) boxplot. Following this adjustment, all variables had acceptable levels of skew and kurtosis. Descriptive analyses were generated on all key variables; independent samples *t*-tests were also conducted to determine ethnic differences on mean levels of all key constructs. Pearson correlations examined inter-correlations among key variables for the whole sample (Table 2) and separately by ethnic group (Tables 3 and 4). Chi-square analyses for difference testing were conducted to describe ethnic differences in the percentages of college women meeting criteria for clinically-suggested cut-offs for disordered eating, perfectionism, and obsessive-compulsiveness.

Multiple-group structural equation modeling (SEM) based on full information maximum likelihood estimation was conducted with Amos 22.0 (Arbuckle, 2013) to assess the factor structure and hypothesized relationships among study variables. A confirmatory factor analysis (CFA) was conducted prior to ensure proposed factor structures were acceptable for the measurement of each construct. Then, a constrained model – one in which the structural and

measurement paths were constrained to be equal for both ethnic groups – was compared to an unconstrained model in which the paths were not constrained to be equal.

As model chi-square is sensitive to sample size, three additional fit indices were used to evaluate the measurement model for describing the data: 1) root mean square error of approximation (RMSEA) (Hu & Bentler, 1999), 2) Bentler comparative fit index (CFI), and 3) standardized root mean square residual (SRMR). The RMSEA is a measure of lack of fit per degrees of freedom, controlling for sample size (Ullman & Bentler, 2009). Values less than 0.08 indicate adequate model fit; values less than 0.06 indicate excellent fit (Hu & Bentler, 1999). CFI values greater than 0.90 suggest a reasonable fit and indicate that approximately 90% of the covariation in the data is reproduced by the hypothesized model (Kline, 2011). SRMR values less than 0.10 indicate adequate fit (Kline, 2005).

## RESULTS

Group differences are displayed in Table 1. Latina-descent women had a significantly higher BMI than European-descent women ( $M \pm SD$   $24.68 \pm 5.24$  versus  $22.21 \pm 3.34$ ,  $t(69.771) = -3.60$ ,  $p = .001$ ). Latina-descent women also scored significantly higher on the doubting subscale of the FMPS than European-descent women ( $M \pm SD$   $12.11 \pm 3.50$  versus  $11.09 \pm 3.36$ ,  $t(556) = -2.36$ ,  $p = .019$ ). There were no other significant mean-level differences between ethnic groups. Tables 2-4 display inter-correlations among key variables for the entire sample, European-descent, and Latina-descent participants respectively. With regards to the entire sample (Table 2), perfectionism, obsessions, and compulsions were all significantly, positively correlated with body dissatisfaction, disordered eating, and exercise dependence (all  $p < .05$ ); the same was also true for both groups when separated by ethnicity. BMI was significantly, positively correlated with disordered eating for European-descent women (Table 3),  $p < .05$ , but not for Latina-descent women (Table 4). Disordered eating and exercise dependence were also significantly, positively correlated for both groups ( $p < .05$ ). There were no significant differences by ethnicity in the percentages of women with elevated disordered eating (European-descent 10.4% vs. Latina-descent 12.5%), body dissatisfaction (European-descent 16.3% vs. Latina-descent 22.2%), or obsessive-compulsiveness (European-descent 52.9% vs. Latina-descent 51.4%; all  $p > .21$ ).

### *Measurement Model*

Prior to testing hypotheses, a model was estimated to determine if the measured variables significantly loaded onto their proposed latent constructs. The initial measurement model had poor fit,  $\chi^2(41, N = 502) = 480.89$ ,  $p < .001$ , RMSEA = .138, CFI = .81. Results indicated that

one of the measured variables loading onto the perfectionism latent variable, organization, loaded poorly. Thus, this variable was trimmed from the model and the model was re-estimated, resulting in adequate fit,  $\chi^2(28, N = 502) = 132.69, p < .001$ , RMSEA = .08 (90% CI .06 - .10), CFI = .95, SRMR = .06. Multiple-group modeling was employed to investigate whether factor loadings were invariant for the two ethnic groups. Specifically, the fit of a model in which factor loadings were constrained to be equal for both ethnic groups was compared to a model in which the loadings were unconstrained. The constrained multiple-group model did not significantly differ from the unconstrained model,  $\Delta \chi^2(7) = 10.669, p = .154$ , thereby suggesting adequate measurement invariance across ethnic groups.

### *Structural Modeling*

Multiple-group structural modeling was conducted to examine whether the relations among the latent constructs in the hypothesized model differed for women of European-descent and Latina-descent. The primary model had poor fit,  $\chi^2(43, N = 502) = 365.809, p < .001$ , RMSEA = .12 (90% CI .11 - .13), CFI = .88, SRMR = .07. Three theoretically supported modifications were made to the model and included: adding correlations between the error terms for 1) dieting and body dissatisfaction and 2) personal standards and body dissatisfaction and, 3) a path from exercise dependence to disordered eating. The final primary model (Figure 2) had adequate fit,  $\chi^2(40, N = 502) = 131.626, p < .001$ , RMSEA = .07 (90% CI .06 - .08), CFI = .95, SRMR = .05.

An unconstrained model ( $\chi^2(80, N = 502) = 178.357, p < .001$ , RMSEA = .05 (90% CI .04 - .06), CFI = .95, SRMR = .06) was a significantly better fit for the data than a model in which the paths were constrained ( $\chi^2(96, N = 502) = 204.284, p < .001$ , RMSEA = .05 (90% CI .04 - .06), CFI = .94, SRMR = .06) to be equal for both ethnic groups,  $\Delta \chi^2(16) = 25.927, p =$

.055. Thus, ethnicity did act as a significant moderator of the hypothesized relations in the model.

Perfectionism and obsessive-compulsiveness were positively correlated ( $r = .25, p < .01$ ). Both were positively associated with body dissatisfaction for European-descent women ( $\beta_s = .23$  and  $.27$  respectively,  $ps < .001$ ). Perfectionism was positively associated with body dissatisfaction for women of Latina-descent ( $\beta = .29, p < .01$ ). Body dissatisfaction was not significantly associated with disordered eating or exercise dependence for either ethnic group (all  $ps > .05$ ). For women of European-descent, perfectionism and obsessive-compulsiveness were positively associated with both disordered eating and exercise dependence (all  $ps < .05$ ). For Latina-descent women, obsessive-compulsiveness was positively associated with disordered eating and exercise dependence ( $p < .05$  and  $p < .001$  respectively). Finally, exercise dependence was positively associated with disordered eating for European-descent women only ( $\beta = .15, p < .01$ ). Please refer to Table 5 for all standardized estimates, by ethnic group, for the unconstrained model.

Finally, although significant in both ethnic groups, the association between obsessive-compulsiveness and exercise dependence was moderated by ethnicity such that the association was stronger for women of Latina-descent ( $\beta = .47$ ) than for women of European-descent ( $\beta = .17, p < .05$ ; please refer to Table 5.

## DISCUSSION

The current investigation aimed to evaluate a model of two forms of weight or shape management behaviors (WSMB), disordered eating and exercise dependence, in college women. The hypothesized model specified that perfectionism and obsessive-compulsiveness, psychological vulnerabilities with shared features, would be positively associated with each other and body dissatisfaction, which was hypothesized to be associated with both disordered eating and exercise dependence. Secondarily, this study sought to identify whether the associations in the posited model would differ by ethnicity.

Both groups had similar mean levels on the two outcome variables, disordered eating and exercise dependence, suggesting both groups display similar levels of WSMB in college. As predicted, perfectionism and obsessive-compulsiveness were positively correlated. They were also positively associated with body dissatisfaction for European-descent women. However, perfectionism, and not obsessive-compulsiveness, was positively associated with body dissatisfaction for women of Latina-descent. Unexpectedly, body dissatisfaction was not significantly associated with either form of WSMB for either ethnic group. For women of European-descent, perfectionism and obsessive-compulsiveness were positively associated with both disordered eating and exercise dependence. For Latina-descent women, obsessive-compulsiveness only, and not perfectionism, was positively associated with disordered eating and exercise dependence. The association between obsessive-compulsiveness and exercise dependence was moderated by ethnicity.

Before discussing the findings further, it is important to acknowledge a number of limitations to the current study and contextualize the findings within the study's limitations. First

and foremost, the design was cross-sectional in nature. The directionality of associations cannot be established from this study. Second, the model examined in the present study covaried for body dissatisfaction as potential confounder; subsequent investigations might examine to what extent body dissatisfaction serves as a mediator of the associations between perfectionism or obsessive-compulsiveness with the WSMB of disordered eating and exercise dependence. Third, only self-report measures were utilized. Behaviors related to disordered eating and exercise dependence were not assessed via semi-structured interviews. Furthermore, BMI was calculated using self-reported height and weight. Self-report measures can be particularly problematic as self-reported data are subject to social desirability effects (Barker, Pistrang, & Elliott, 2002; Podsakoff, & Organ, 1986). Weight, especially, is often under-reported by participants particularly as weight increases (Gorber, Tremblay, Moher, & Gorber, 2007). In future studies, assessment of WSMB should be more comprehensive, including semi-structured interviewing, and measurements of height and weight should be obtained in person rather than via self-report. Fourth, representation of Latina-descent women was small, in comparison, to that of European-descent women, which may have limited the power to detect significant associations among the constructs examined in this group. Further, cultural norms and values and potential diversity within the Latina-descent sample were not assessed. For example, Latina can encompass Mexican, Chilean, and Puerto Rican, among others. While the Latina-descent sample examined herein was too small to facilitate examinations of variability within this ethnic group, variability within ethnic groups is nonetheless recognized and warrants further study. Finally, generalizability is somewhat limited given that the sample consisted of university students identifying as women from a single university in Colorado, one of the only states in the country, along with Alaska and the District of Columbia, in which 25% or more of the adult population

meets physical activity recommendations (Centers for Disease Control and Prevention, 2014).

Said differently, the sample cannot be considered representative of all college women.

Perfectionism and obsessive-compulsiveness were positively correlated in Latina- and European-descent women, as predicted. This is unsurprising given overlap between the two including rigidity and inflexibility in thoughts and behaviors (Frost & Steketee, 1997; Humphreys, Clopton, & Reich, 2007; Li, & Chen, 2007). Consistent with previous findings, both were also positively associated with body dissatisfaction for European-descent women (Downey & Chang, 2007; Tissot & Crowther, 2008). While the associations of perfectionism, obsessive-compulsiveness, and body dissatisfaction had not been previously examined in Latina-descent college women, the same associations were predicted for this group. Perfectionism only, and not obsessive-compulsiveness, was positively associated with body dissatisfaction for women of Latina-descent. It seems that perfectionism, in particular, is a salient psychological correlate of body dissatisfaction but further longitudinal research is warranted to investigate the association found here.

Unexpectedly body dissatisfaction was not significantly associated, either positively or negatively, with disordered eating or exercise dependence for either ethnic group. Until this point, body dissatisfaction has been considered a robust predictor, and prospective risk factor even, of disordered eating (Keel, Fulkerson, & Leon, 1997; Neumark-Sztainer, Butler, & Palti, 1996; Stice, 2002; Stice & Shaw, 2002) for those of European-descent. The associations between perfectionism and obsessive-compulsiveness and both WSMB outcome variables likely explain this finding. In line with past research, for women of European-descent, perfectionism and obsessive-compulsiveness were positively associated with both disordered eating and exercise dependence (Brown, Parman, Rudat, & Craighead, 2012; Downs, Hausenblas, & Bigg, 2004;

Ferrier-Auerbach & Martens, 2009; Fitzsimmons-Craft et al., 2012; Forbush, Heatherton, & Keel, 2007; Gulker, Laskis, & Kuba, 2001; Hausenblas & Downs, 2002; Lilenfeld, Jacobs, Woods, & Picot, 2008; Miller & Mesagno, 2014; Roberts, 2006; Spano, 2001; Tissot & Crowther, 2008). For Latina-descent women, obsessive-compulsiveness only, and not perfectionism, was positively associated with disordered eating and exercise dependence. One possibility worth investigating is that perfectionism and obsessive-compulsiveness may be more dominant precursors to the WSMB of disordered eating and exercise dependence in college women than body dissatisfaction. Given the paucity of exercise dependence examinations in collegiate samples, at the present, it certainly seems perfectionism and obsessive-compulsiveness may be more salient in the WSMB of exercise dependence, in particular, than body dissatisfaction. However, these claims cannot be confirmed by cross-sectional examinations. Consequently, longitudinal investigations that employ semi-structured interviewing, to better assess a participant's intentions and motivations behind WSMB, may clarify these associations.

Results failed to support the moderation originally hypothesized between body dissatisfaction and exercise dependence. As body dissatisfaction was not associated with exercise dependence for either ethnic group, the association between body dissatisfaction and exercise dependence was not stronger for European-descent college women as predicted. Obsessive-compulsiveness, as previously stated, was associated with exercise dependence for both groups; this association, unexpectedly, was moderated by ethnicity such that the association was more pronounced for Latina-descent women than for European-descent women. Considering this is the first investigation to date to examine the association between obsessive-compulsiveness and exercise dependence in Latina-descent women, more research is needed to elucidate how

obsessive-compulsiveness manifests, the degree to which individuals subscribe to exercise-related beliefs and cognitions, and the role of exercise in WSMB in this group.

Collectively, findings from the current study suggest a number of noteworthy associations between perfectionism, obsessive-compulsiveness, body dissatisfaction and the WSMB of disordered eating and exercise dependence. More importantly, the present study indicates a number of differences in these associations when accounting for ethnicity. This study aimed not only to be inclusive of a traditionally under-represented group, Latinas, but also to consider how examined constructs and associations may or may not fit this group, two strengths. Historically, the field of psychology has been characterized by one-size fits all assumptions and approaches based on European American norms, directly contradicting culturally competent guidelines (American Psychological Association, 2003; Gil & Bob, 1999). Accordingly, more culturally competent research is needed to better understand these constructs for more diverse groups of women. Specifically, comprehensive, longitudinal investigations, with greater representations of ethnic minorities, are needed to address questions explored and raised in this study and, more accurately define these associations and potential causal mechanisms. Further, addressing potential confounds, like ethnic identity, acculturation, and socioeconomic status (none of which were assessed in the present study) – particularly as these may relate to one's internalization of the thin ideal – could provide a more detailed picture.

In conclusion, a model exploring the associations of perfectionism and obsessive-compulsiveness and the WSMB of disordered eating and exercise dependence, accounting for body dissatisfaction, seems to fit European and Latina-descent college women differently. Further research is needed to examine how these constructs relate to each other within diverse groups of college women.

*Table 1.* Descriptive Statistics of the Sample and Group Differences on Key Constructs

	European-descent (M ± SD)	Latina-descent (M ± SD)
Age (y)	18.67 ± 1.05	18.75 ± 1.25
Body mass index	22.21 ± 3.34	24.68 ± 5.24**
EAT26 Total	7.06 ± 5.27	7.51 ± 5.45
BSQ Total	96.10 ± 39.48	101.93 ± 39.25
EDS Total	48.93 ± 20.92	48.44 ± 19.61
Concern for Mistakes (FMPS)	24.07 ± 8.22	25.91 ± 8.17
Personal Standards (FMPS)	24.43 ± 5.32	24.45 ± 4.95
Parental Expectations (FMPS)	14.53 ± 4.03	15.39 ± 4.49
Parental Criticism (FMPS)	8.67 ± 3.86	9.50 ± 3.69
Organization (FMPS)	23.45 ± 4.55	23.67 ± 4.45
Doubting (FMPS)	11.11 ± 3.36	12.11 ± 3.50*
FMPS Total	105.99 ± 21.34	110.55 ± 20.29
Obsessions (YBOCS)	5.40 ± 3.71	5.06 ± 4.17
Compulsions (YBOCS)	3.50 ± 3.81	3.76 ± 4.08

\*Difference is significant at the 0.05 level (2-tailed).

\*\*Difference is significant at the 0.01 level (2-tailed).

EAT26 = score on Eating Attitudes Test-26 (disordered eating). BSQ = score on Body Shape Questionnaire (body dissatisfaction). EDS = score on Exercise Dependence Scale (exercise dependence). FMPS = score on the Frost Multidimensional Perfectionism Scale (perfectionism).

*Table 2.* Correlations Among Key Constructs for the Entire Sample

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. BMI	---	.09	.34**	.00	.09*	.00	.01	.08	.09*	-.07	.05	.04	-.02
2. EAT26 Total	---		.63**	.40**	.40**	.21**	.20**	.25**	.32**	.19**	.39**	.43**	.31**
3. BSQ Total		---		.23**	.45**	.17**	.28**	.34**	.39**	.01	.41**	.47**	.30**
4. EDS Total			---		.27**	.28**	.22**	.21**	.24**	.19**	.34**	.28**	.26**
5. CM				---		.59**	.59**	.61**	.67**	.09*	.89*	.38**	.26**
6. PS					---		.44**	.25**	.41**	.38**	.77**	.18**	.18**
7. PE						---		.74**	.45**	.06	.76**	.23**	.17**
8. PC							---		.48**	-.13**	.68**	.29**	.23**
9. Doubting								---		.06	.72**	.44**	.34**
10. Organization									---		.34**	.05	.09*
11. FMPS Total										---		.38**	.30**
12. Obsessions											---		.59**
13. Compulsions												---	

\*Correlation is significant at the 0.05 level (2-tailed).

\*\*Correlation is significant at the 0.01 level (2-tailed).

EAT26 = score on Eating Attitudes Test-26 (disordered eating). BSQ = score on Body Shape Questionnaire (body dissatisfaction). EDS = score on Exercise Dependence Scale (exercise dependence). CM = concern for mistakes. PS = personal standards. PE = parental expectations. PC = parental criticism.

FMPS = score on the Frost Multidimensional Perfectionism Scale (perfectionism).

*Table 3.* Correlations Among Key Constructs for European-descent College Women

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. BMI	---	.11*	.35**	-.01	.08	-.01	0.0	.04	.05	-.07	.03	.08	0.0
2. EAT26 Total	---		.62**	.41**	.40**	.20**	.19**	.26**	.30**	.18**	.38**	.44**	.31**
3. BSQ Total		---		.23**	.45**	.18**	.28**	.34**	.37**	.01	.41**	.50**	.32**
4. EDS Total			---		.25**	.26**	.20**	.21**	.23**	.17**	.31**	.28**	.26**
5. CM				---		.60**	.58**	.62**	.68**	.10*	.89**	.40**	.28**
6. PS					---		.46**	.27**	.43**	.37**	.78**	.19**	.17**
7. PE						---		.74**	.45**	.08	.76**	.24**	.17**
8. PC							---		.48**	-.11*	.69**	.29**	.24**
9. Doubting								---		.08	.72**	.46**	.35**
10. Organization									---		.35**	.03	.06
11. FMPS Total										---		.38**	.30**
12. Obsessions											---		.57**
13. Compulsions												---	

\*Correlation is significant at the 0.05 level (2-tailed).

\*\*Correlation is significant at the 0.01 level (2-tailed).

EAT26 = score on Eating Attitudes Test-26 (disordered eating). BSQ = score on Body Shape Questionnaire (body dissatisfaction). EDS = score on Exercise Dependence Scale (exercise dependence). CM = concern for mistakes. PS = personal standards. PE = parental expectations. PC = parental criticism.

FMPS = score on the Frost Multidimensional Perfectionism Scale (perfectionism).

*Table 4.* Correlations Among Key Constructs for Latina-descent College Women

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. BMI	---	.05	.38**	.02	.10	.02	.01	.17	.14	-.12	.09	-.01	-.09
2. EAT26 Total		---	.70**	.34*	.39**	.22	.28*	.21	.45**	.29*	.46**	.42**	.29*
3. BSQ Total			---	.27	.42**	.09	.27*	.37**	.50**	-.04	.40**	.34**	.15
4. EDS Total				---	.40**	.45**	.35*	.14	.37**	.31*	.52**	.32*	.31*
5. CM					---	.55**	.65**	.57**	.60**	.00	.91**	.31**	.17
6. PS						---	.28*	.09	.31*	.45**	.71**	.18	.24*
7. PE							---	.72**	.42**	-.07	.75**	.20	.18
8. PC								---	.43**	-.28*	.61**	.30*	.15
9. Doubting									---	-.04	.66**	.41**	.23
10. Organization										---	.27*	.20	.25*
11. FMPS Total											---	.38**	.27*
12. Obsessions												---	.71**
13. Compulsions													---

\*Correlation is significant at the 0.05 level (2-tailed).

\*\*Correlation is significant at the 0.01 level (2-tailed).

EAT26 = score on Eating Attitudes Test-26 (disordered eating). BSQ = score on Body Shape Questionnaire (body dissatisfaction). EDS = score on Exercise Dependence Scale (exercise dependence). CM = concern for mistakes. PS = personal standards. PE = parental expectations. PC = parental criticism.

FMPS = score on the Frost Multidimensional Perfectionism Scale (perfectionism).

Table 5. Standardized Parameter Estimates by Ethnic Group for the Unconstrained Structural Model

	European-descent Women $\beta$	Latina-descent Women $\beta$
Perfectionism to Body Dissatisfaction	.23***	.29**
Obsessive-Compulsiveness to Body Dissatisfaction	.27***	.05 <sup>+</sup>
Body Dissatisfaction to Exercise Dependence	.06	.13
Obsessive-Compulsiveness to Exercise Dependence	.17*** <sup>++</sup>	.47***
Perfectionism to Exercise Dependence	.09*	.12
Body Dissatisfaction to Disordered Eating	.06	-.04
Obsessive-Compulsiveness to Disordered Eating	.26***	.24*
Perfectionism to Disordered Eating	.13**	.06
Exercise Dependence to Disordered Eating	.15**	-.11

\*Significant at the 0.05 level.

\*\*Significant at the 0.01 level.

\*\*\*Significant at the 0.001 level.

<sup>+</sup>Difference is significant the 0.10 level.

<sup>++</sup>Difference is significant the 0.05 level.

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## Appendix I

## GLOSSARY

**Anorexia Nervosa:** A psychological disorder that includes body image distortions and excessive food restriction leading to pronounced weight loss and fears of becoming fat (American Psychiatric Association, 2013).

**Body dissatisfaction:** Negative subjective evaluations or experiences of one's physical body.

**Body image:** Body image refers to the “multifaceted psychological experience of embodiment” related to but not solely based on one’s physical appearance. Body image can encompass body-related self-perceptions, self-attitudes, thoughts, beliefs, feelings and behaviors (Cash, 2004, p. 1). An individual’s body image is often more psychosocially powerful than the objective features of their appearance (Cash, 2004).

**Body image distortions or disturbances:** Seeing the body as larger or different than it really is (American Psychiatric Association, 2013).

**Bulimia Nervosa:** A psychological disorder that includes frequent binge eating followed by inappropriate compensatory behaviors, such as self-induced vomiting, to avoid weight gain (American Psychiatric Association, 2013).

**Disordered eating:** Subclinical/subthreshold behaviors intended to change one’s weight or shape. Disordered eating can include: dysregulated eating, fasting, skipping meals, binge eating, irregular compensatory behaviors including purging, laxative and diuretic use, and excessive exercise. Synonyms: eating disturbances; subclinical/subthreshold eating pathology.

**Exercise dependence:** Psychological and or physiological craving for physical activity; **excessive exercise** is a manifestation of exercise dependence.

**Obsessive-Compulsiveness (OC):** OC refers to a marked inability to inhibit or delay avoidant,

repetitive behaviors; OC usually encompasses over-reflective responses and perfectionistic dimensions (Frost & Steketee, 1997; Li & Chen, 2007). OC is distinct from both Obsessive Compulsive Disorder (OCD) and Obsessive Compulsive Personality Disorder (OCPD) – pathologies detailed in the Diagnostic and Statistical Manual (American Psychiatric Association, 2013).

**Risk factor:** A construct/variable/factor that increases the probability of developing a given disorder; in other words, a risk factor is a variable that has been shown to prospectively predict some pathological outcome (Stice, Ng, & Shaw, 2010; Stice, 2002).

## Appendix II

### *Demographics*

Age: \_\_\_\_ Sex:  Female

Grade/standing: Freshman, Sophomore, Junior, Senior

What is your ethnicity?

White/Caucasian

Black/African American

Hispanic

Asian

Native American

Other ethnic group: \_\_\_\_\_

Do you work?

- Full time
- Part time

Have you ever been diagnosed by a professional with any mental health condition?

- |   |  |
|---|--|
| <input type="checkbox"/> Depression                     | <input type="checkbox"/> Bipolar Disorder      |
| <input type="checkbox"/> Anxiety                        | <input type="checkbox"/> Anorexia Nervosa      |
| <input type="checkbox"/> Obsessive Compulsive Disorder  | <input type="checkbox"/> Bulimia Nervosa       |
| <input type="checkbox"/> Post Traumatic Stress Disorder | <input type="checkbox"/> Binge Eating Disorder |
| <input type="checkbox"/> Addiction                      | <input type="checkbox"/> Personality Disorder  |
| <input type="checkbox"/> Learning Disability            | <input type="checkbox"/> Other: _____          |

How much do you weigh? .....

How tall are you? .....

*Eating Attitudes Test*

1. I am terrified about being overweight.  
Always/Usually/Often/Sometimes/Rarely/Never
2. I avoid eating when I am hungry.  
Always/Usually/Often/Sometimes/Rarely/Never
3. I find myself preoccupied with food.  
Always/Usually/Often/Sometimes/Rarely/Never
4. I have gone on eating binges where I feel that I may not be able to stop.  
Always/Usually/Often/Sometimes/Rarely/Never
5. I cut my food into small pieces.  
Always/Usually/Often/Sometimes/Rarely/Never
6. I am aware of the calorie content of foods that I eat.  
Always/Usually/Often/Sometimes/Rarely/Never
7. I particular avoid food with a high carbohydrate content (i.e., bread, rice, potatoes, etc.).  
Always/Usually/Often/Sometimes/Rarely/Never
8. I feel that others would prefer if I ate more.  
Always/Usually/Often/Sometimes/Rarely/Never
9. I vomit after I have eaten.  
Always/Usually/Often/Sometimes/Rarely/Never
10. I feel extremely guilty after eating.  
Always/Usually/Often/Sometimes/Rarely/Never
11. I am occupied with a desire to be thinner.  
Always/Usually/Often/Sometimes/Rarely/Never
12. I think about burning up calories when I exercise.  
Always/Usually/Often/Sometimes/Rarely/Never
13. Other people think that I am too thin.  
Always/Usually/Often/Sometimes/Rarely/Never
14. I am preoccupied with the thought of having fat on my body.  
Always/Usually/Often/Sometimes/Rarely/Never
15. I take longer than others to eat my meals.  
Always/Usually/Often/Sometimes/Rarely/Never

16. I avoid foods with sugar in them.  
Always/Usually/Often/Sometimes/Rarely/Never

17. I eat diet foods.  
Always/Usually/Often/Sometimes/Rarely/Never

18. I feel that food controls my life.  
Always/Usually/Often/Sometimes/Rarely/Never

19. I display self-control around food.  
Always/Usually/Often/Sometimes/Rarely/Never

20. I feel that others pressure me to eat.  
Always/Usually/Often/Sometimes/Rarely/Never

21. I give too much time and thought to food.  
Always/Usually/Often/Sometimes/Rarely/Never

22. I feel uncomfortable after eating sweets.  
Always/Usually/Often/Sometimes/Rarely/Never

23. I engage in dieting behavior.  
Always/Usually/Often/Sometimes/Rarely/Never

24. I like my stomach to be empty.  
Always/Usually/Often/Sometimes/Rarely/Never

25. I have the impulse to vomit after meals.  
Always/Usually/Often/Sometimes/Rarely/Never

26. I enjoy trying new rich foods.  
Always/Usually/Often/Sometimes/Rarely/Never

#### *Body Shape Questionnaire*

1. Has feeling bored made you brood about your shape?.....  
Never/Rarely/Sometimes/Often/Very Often/Always

2. Have you been so worried about your shape that you have been feeling you ought to diet?.....  
Never/Rarely/Sometimes/Often/Very Often/Always

3. Have you thought that your thighs, hips or bottom are too large for the rest of you?.....  
Never/Rarely/Sometimes/Often/Very Often/Always

4. Have you been afraid that you might become fat (or fatter)?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
5. Have you worried about your flesh being not firm enough?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
6. Has feeling full (e.g. after eating a large meal) made you feel fat?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
7. Have you felt so bad about your shape that you have cried?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
8. Have you avoided running because your flesh might wobble?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
9. Has being with thin men or women made you feel self-conscious about your  
shape?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
10. Have you worried about your thighs spreading out when sitting down?  
Never/Rarely/Sometimes/Often/Very Often/Always
11. Has eating even a small amount of food made you feel fat?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
12. Have you noticed the shape of other men or women and felt that your own shape  
compared unfavorably?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
13. Has thinking about your shape interfered with your ability to concentrate (e.g. while  
watching television, reading, listening to conversations)?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
14. Has being naked, such as when taking a bath, made you feel fat?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
15. Have you avoided wearing clothes which make you particularly aware of the shape of  
your body?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
16. Have you imagined cutting off fleshy areas of your body?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
17. Has eating sweets, cakes, or other high calorie food made you feel fat?  
Never/Rarely/Sometimes/Often/Very Often/Always

18. Have you not gone out to social occasions (e.g. parties) because you have felt bad about your shape?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
19. Have you felt excessively large and rounded?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
20. Have you felt ashamed of your body?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
21. Has worry about your shape made you diet?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
22. Have you felt happiest about your shape when your stomach has been empty (e.g. in the morning)?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
23. Have you thought that you are in the shape you are because you lack self-control?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
24. Have you worried about other people seeing rolls of fat around your waist or stomach?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
25. Have you felt that it is not fair that other men or women are thinner than you?....  
Never/Rarely/Sometimes/Often/Very Often/Always
26. Have you vomited in order to feel thinner?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
27. When in company have you worried about taking up too much room (e.g. sitting on a sofa, or a bus seat)?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
28. Have you worried about your flesh being dimply?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
29. Has seeing your reflection (e.g. in a mirror or shop window) made you feel bad about your shape?.....  
Never/Rarely/Sometimes/Often/Very Often/Always
30. Have you pinched areas of your body to see how much fat there is?....  
Never/Rarely/Sometimes/Often/Very Often/Always

31. Have you avoided situations where people could see your body (e.g. communal changing rooms or swimming baths)?.....  
Never/Rarely/Sometimes/Often/Very Often/Always

32. Have you taken laxatives in order to feel thinner?.....  
Never/Rarely/Sometimes/Often/Very Often/Always

33. Have you been particularly self-conscious about your shape when in the company of other people?.....  
Never/Rarely/Sometimes/Often/Very Often/Always

34. Has worry about your shape made you feel you ought to exercise?.....  
Never/Rarely/Sometimes/Often/Very Often/Always

#### *Exercise Dependence Survey*

1. I exercise to avoid feeling irritable. \_\_\_\_ Never--2--3--4--5—Always
2. I exercise despite recurring physical problems. \_\_\_\_ Never--2--3--4--5—Always
3. I continually increase my exercise intensity to achieve the desired effects/benefits. \_\_\_\_ Never--2--3--4--5—Always
4. I am unable to reduce how long I exercise. \_\_\_\_ Never--2--3--4--5—Always
5. I would rather exercise than spend time with family/friends. \_\_\_\_ Never--2--3--4--5—Always
6. I spend a lot of time exercising. \_\_\_\_ Never--2--3--4--5—Always
7. I exercise longer than I intend. \_\_\_\_ Never--2--3--4--5—Always
8. I exercise to avoid feeling anxious. \_\_\_\_ Never--2--3--4--5—Always
9. I exercise when injured. \_\_\_\_ Never--2--3--4--5—Always
10. I continually increase my exercise frequency to achieve the desired effects/benefits. \_\_\_\_ Never--2--3--4--5—Always
11. I am unable to reduce how often I exercise. \_\_\_\_ Never--2--3--4--5—Always
12. I think about exercise when I should be concentrating on school/work. \_\_\_\_ Never--2--3--4--5—Always
13. I spend most of my free time exercising. \_\_\_\_ Never--2--3--4--5—Always
14. I exercise longer than I expect. \_\_\_\_ Never--2--3--4--5—Always
15. I exercise to avoid feeling tense. \_\_\_\_ Never--2--3--4--5—Always
16. I exercise despite persistent physical problems. \_\_\_\_ Never--2--3--4--5—Always
17. I continually increase my exercise duration to achieve the desired effects/benefits. \_\_\_\_ Never--2--3--4--5—Always
18. I am unable to reduce how intense I exercise. \_\_\_\_ Never--2--3--4--5—Always
19. I choose to exercise so that I can get out of spending time with family/friends. \_\_\_\_ Never--2--3--4--5—Always
20. A great deal of my time is spent exercising. \_\_\_\_ Never--2--3--4--5—Always
21. I exercise longer than I plan. \_\_\_\_ Never--2--3--4--5—Always

#### *Multidimensional Perfectionism Scale*

1. My parents set very high standards for me.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree
2. Organization is very important to me.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree
3. As a child, I was punished for doing things less than perfectly.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree
4. If I do not set the highest standards for myself, I am likely to end up a second-rate person.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree
5. My parents never try to understand my mistakes.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree
6. It is important to me that I be thoroughly competent in what I do.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree
7. I am a neat person.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree
8. I try to be an organized person.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree
9. If I fail at school, I am a failure as a person.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree
10. I should be upset if I make a mistake.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree
11. My parents want me to be the best at everything.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree
12. I set higher goals than most people.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree
13. If someone does a task at school better than I do, then I feel as if I failed the whole task.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree
14. If I fail partly, it is as bad as being a complete failure.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree
15. Only outstanding performance is good enough in my family.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree
16. I am very good at focusing my efforts on attaining a goal.

Strongly disagree/Disagree/Neutral/Agree/Strongly agree

17. Even when I do something very carefully, I often feel that it is not quite right.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree

18. I hate being less than the best at things.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree

19. I have extremely high goals.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree

20. My parents expect excellence from me.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree

21. People will probably think less of me if I make a mistake.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree

22. I never feel that I can meet my parents' expectations.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree

23. If I do not do as well as other people, it means I am inferior being.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree

24. Other people seem to accept lower standards from themselves than I do.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree

25. If I do not do well all the time, people will not respect me.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree

26. My parents have always had higher expectations for my future than I have.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree

27. I try to be a neat person.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree

28. I usually have doubts about the simple everyday things I do.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree

29. Neatness is very important to me.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree

30. I expect higher performance in my daily tasks than most people.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree

31. I am an organized person.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree

32. I tend to get behind in my work because I repeat things over and over.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree

33. It takes me a long time to do something “right”.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree

34. The fewer mistakes I make, the more people will like me.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree

35. I never feel that I can meet my parents’ standards.  
Strongly disagree/Disagree/Neutral/Agree/Strongly agree

#### *Yale-Brown Obsessive-Compulsive Scale*

Obsessions are unwelcome and/or distressing ideas, thoughts, images or impulses that enter your mind again and again.

Compulsions are behaviors and/or acts that you feel compelled to perform, even though you may see them as senseless or excessive.

1. How much of your time is occupied by obsessive thoughts?

- None
- Less than 1 hour per day
- 1-3 hours per day
- 3-8 hours per day
- More than 8 hours per day

2. How much do your obsessive thoughts interfere with functioning in your social, work, or other roles?

- None
- Slight interference, but no impairment
- Definite interference, but manageable
- Substantial interference
- Extreme interference, incapacitating

3. How much distress do your obsessive thoughts cause you?

- None
- Mild, not too disturbing
- Moderate, disturbing, but still manageable
- Severe, very disturbing
- Extreme, near constant and disabling distress

4. How much of an effort do you make to resist the obsessive thoughts?

- Always make an effort to resist, or don’t even need to resist
- Try to resist most of the time
- Make some effort to resist
- Reluctantly yield to all obsessive thoughts
- Completely and willingly yield to all obsessions

5. How much control do you have over your obsessive thoughts?

- Complete control
- Much control, usually able to stop or divert obsessions with some effort and concentration
- Moderate control, sometimes able to stop or divert obsessions
- Little control, rarely successful in stopping or dismissing obsessions
- No control, rarely able to even momentarily alter obsessive thinking

6. How much time do you spend performing compulsive behaviors?

- None
- Less than 1 hour per day
- 1-3 hours per day
- 3-8 hours per day
- More than 8 hours per day

7. How much do your compulsive behaviors interfere with functioning in your social, work, or other roles?

- None
- Slight interference, but no impairment
- Definite interference, but manageable
- Substantial interference
- Extreme interference, incapacitating

8. How anxious would you become if you were prevented from performing your compulsive behaviors?

- No anxiety
- Only slightly anxious
- Some anxiety, but manageable
- Prominent and disturbing anxiety
- Extreme, incapacitating anxiety

9. How much of an effort do you make to resist the compulsions?

- Always make an effort to resist, or don't even need to resist
- Try to resist most of the time
- Make some effort to resist
- Reluctantly yield to all compulsions
- Completely and willingly yield to all compulsions

10. How much control do you have over the compulsions?

- Complete control
- Much control, usually able to stop or divert compulsive behavior with some effort and concentration
- Moderate control, sometimes able to stop or divert compulsive behavior
- Little control, rarely successful in stopping or dismissing compulsive behavior
- No control, rarely able to even momentarily alter compulsive behavior