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# Sociocultural influences, body dissatisfaction, and disordered eating among European American and Chinese female college students

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**Sociocultural influences, body dissatisfaction, and disordered eating among European  
American and Chinese female college students**

by

**Yi Du**

A dissertation submitted to the graduate faculty  
in partial fulfillment of the requirements for the degree of

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**ABSTRACT**

Based on the Tripartite Influence Model, the present study tested a path model describing the development of body dissatisfaction and disordered eating among European American ( $N = 271$ ) and Chinese female college students ( $N = 260$ ). Using path analysis, indirect and direct effects of sociocultural influences, appearance comparison, and thin-ideal were tested in each sample. A multiple group comparison revealed differences and similarities in these associations between European American and Chinese participants. Specifically, in both samples, appearance comparison and body dissatisfaction were found to mediate between sociocultural influences and disordered eating. Appearance comparison significantly mediated the indirect effect of sociocultural influences on body dissatisfaction only among European Americans, while thin-ideal internalization did not significantly and positively mediate any hypothesized indirect path. Group comparisons between sample means, correlation coefficients, and direct effects were also addressed. In addition, possible moderating effects of conformity to norms and maladaptive perfectionism were examined in order to identify potential moderated mediation effects that are not included in the theory. Conformity to norms was identified as a significant moderator in the association between appearance comparison and body dissatisfaction, and this moderation effect was more salient in China. For low conformity individuals, more appearance comparison was associated with more body dissatisfaction; for high conformity individuals, body dissatisfaction remained high regardless of their level of appearance comparison. Maladaptive perfectionism only had a main effect on body dissatisfaction, and its interaction with thin-ideal internalization was found non-significant in the current study. Contributions, limitations, and suggestions for future research were also discussed.

## CHAPTER ONE. INTRODUCTION

Body dissatisfaction and disordered eating have been well documented in Western countries, especially for females of European descent (e.g., Shroff & Thompson, 2006; Thompson & Smolak, 2001). Researchers using the Western samples have identified the common types of eating disorders (i.e., anorexia nervosa, bulimia nervosa, and binge eating) and their symptoms (e.g., extreme emotions, attitudes, and behaviors surrounding weight and food issues and body image concerns) (American Psychiatric Association, 2013). For many years, body dissatisfaction and disordered eating were believed to be culturally-bound phenomena characterized by the internalization of the Western standards of beauty (Nasser, 1988). Additionally, these phenomena were thought to occur mostly among young, affluent White females in Western societies (Jung & Forbes, 2007).

In recent years, however, research began to demonstrate that body dissatisfaction and disordered eating are also occurring among females in non-Western countries such as the People's Republic of China, the largest developing country in the world (Makino, Tsuboi, & Dennerstein, 2004). For example, Tong et al. (2011) found that the prevalence of eating disorders among young Chinese women is similar to their Western counterparts, especially in urban areas where the economy is relatively more developed. Such findings may seem counterintuitive to some readers, since the body types of Chinese women are typically leaner and smaller compared to their Western counterparts; therefore, Eastern females were assumed to be less likely to develop any issue with their body image and eating disorders. This assumption in the Western literature can be dangerous, potentially causing eating disorders among this population to go unrecognized or untreated (Chen & Jackson, 2008; Cummins, Simmons, & Zane, 2005).

Additionally, in Western literature, social and psychological theories have been proposed with an attempt to explain the development of body dissatisfaction and disordered eating. One of the theories is the Tripartite Influence Model (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). This theory specifies the sociocultural factors affecting body dissatisfaction and disordered eating through two mediators: appearance comparison and the thin-ideal internationalization. Such explanations are generally helpful in guiding the treatments for patients with eating disorders. However, as the empirical findings have been largely established from studies conducted in Western societies, few studies have attempted to explain the etiology of body dissatisfaction and disordered eating in China. Due to this limitation, it is difficult to determine the extent to which the Western theories, such as the Tripartite Influence Model, can be generalized to Eastern countries like China.

One question that motivates the development of the present study is, do Western theories on body image disturbance and disordered eating directly apply to the female population in Eastern countries like China? Few studies have attempted to answer this question. Attending to this gap in the literature, the present study aims to apply the Tripartite Influence Model to female populations from two cultural groups, European American living in the U.S, and Chinese living in China. Additionally, Phan and Tylka (2006) called for studies identifying factors that explain who tend to be more vulnerable in developing body dissatisfaction and disordered eating. Therefore, the role of one cultural value, adherence to norms, and one personality trait, perfectionism, was examined as potential moderators in the Tripartite Influence Model among the Western and non-Western populations.

### **Body Dissatisfaction and Disordered Eating in US and China**

Problems with body dissatisfaction and disordered eating among females have become prevalent in the recent years in both Western and non-Western cultures. In the United States, 20 million women were reported to suffer from a clinically significant eating disorder at some point in their life (Wade, et al., 2011). However, many more individuals also struggle with body dissatisfaction, subclinical disordered eating attitudes and/or behaviors without a clinical diagnosis of an eating disorder (National Eating Disorders Institution, 2014). While eating disorders can be serious and life threatening, body dissatisfaction and disordered eating are regarded as important risk factors for developing an eating disorder (Thompson et al., 1999). Specifically, Western literature has found significant associations between body dissatisfaction and eating disorders. Young women and girls who were less satisfied with their body image were reported to be more likely to engage in disordered eating behaviors (e.g., dieting, weight control) and change their body size and shape (Gordon, 2000; Grogan, Williams, & Conner, 1996).

Similarly, in China, body dissatisfaction and disordered eating have become serious public health issues (Tam, Ng, Yu, & Young, 2007). A pervasive presence of body dissatisfaction among young females has been found in major cities of China. Additionally, increasing number of Chinese girls and young women exhibited unhealthy body-related attitudes and eating behavior (Lee, Lee, Leung, & Yu, 1997; Huon, Walton, Lim, & Zheng, 1999). For example, Huon, Mingyi, Oliver, and Xiao (2002) gathered data from over 1200 Chinese female adolescents in six metropolitan areas in Mainland China. They found that even though few clinically significant cases of eating disorders were found in the sample at that time, a majority of the girls reported concerns about their weight to some degree and more than one fourth indicated that their body was “very” or “extremely” important in determining their self-worth.

Moreover, in this sample, about 40 percent reported they had binged and/or dieted before. Such findings suggest that females in China struggle with concerns about their weight, unhappiness with gaining weight, and fat phobia. Despite this, few studies have been conducted in China to understand the development of these body image concerns and disordered eating behaviors.

### **The Tripartite Influence Model**

The Tripartite Influence Model was developed in Western societies with an emphasis on understanding the formative factors that play a role in development and maintenance of body dissatisfaction and disordered eating. As the name indicates, this model suggests three primary influence variables that form the basis for later development of body image concerns and eating dysfunction, including parents, peers, and media (Thompson et al., 1999). Not only do they have a direct effect on body dissatisfaction, these influences also have an indirect effect on body dissatisfaction through two mediation pathways: physical appearance comparison, and thin-ideal internalization (Keery, van den Berg, & Thompson, 2004). Furthermore, body dissatisfaction is hypothesized to have a direct effect on dangerous disordered eating habits, such as restrictive eating or bulimic behaviors (Shroff & Thompson, 2006).

Currently, there were no studies that have directly applied the Tripartite Influence Model in the Chinese population. However, some studies in China did find scattered evidence to support the existence of three sociocultural factors and two mediation pathways among Chinese individuals. For example, comparing the Chinese adolescents and young adults with and without a DSM-IV eating disorder diagnosis, Jackson and Chen (2007) found that more eating disorder symptoms were identified when the person reported heightened appearance-related pressure from his or her parents, peers, and the media. This study also found that those who compared their own appearance with that of others indicated more eating disorder pathology. In another nine-

month perspective study, Jackson and Chen (2008) found that Chinese girls who were initially highly concerned with being fat and who experienced pressures from others to change their physical appearance reported more disordered eating nine months later. Furthermore, a high initial level of internalized appearance ideal predicted increased eating disorder symptoms nine months later. Such findings are consistent with what research has found in Western societies, which has supported the roles of sociocultural factors, appearance comparison, and thin-ideal internalization in the development of eating disorder in non-Western societies.

The Tripartite Influence Model has received empirical support in samples of Western adolescent and adult females (e.g., van den Berg, Thompson, Obremski-Brandon, & Coover, 2002; Keery et al., 2004; Shroff & Thompson, 2006). It is now recognized as an adequate theoretical framework in guiding research on body image disturbance and disordered eating. However, one limitation of the model is that it was solely developed within a western cultural context (e.g., western ideal of thinness) and validated mostly using European American samples. Even if the mechanisms proposed in the model seem universal and may be similar among Chinese and European American individuals, researchers should not make this assumption without empirical validation.

Moreover, researchers have made suggestions on ways to improve the Tripartite Influence Model. Direct paths from sociocultural influences and appearance comparison to disordered eating behaviors have been added to recent revisions of this model, and significant results suggest a need to assess the direct influence of predictors and mediators on the development of disordered eating (Keery et al., 2004). Other important variables contributing to body disturbance and disordered eating have also been identified. Even though not included in the original model, Body Mass Index (BMI) has been recognized as one major factor that can

influence body image and disordered eating (e.g., Huon, Walton, Lim, & Zhen, 1999; Jackson & Chen, 2008). High score of BMI has been found to be associated with high level of drive for thinness (Fan, Li, Liu, Hu, Ma, & Xu, 2010) and more upward social comparison (Bailey & Ricciardelli, 2010). Based on these suggestions and findings, it is important to consider adding these direct effects and control for BMI in the Tripartite Influence Model.

Thus, the present study serves as the first study validating the sociocultural influences and mediation pathways suggested by the Tripartite Influence Model in non-Western and Western cultures. Data were collected from two samples of female college students, one in a central, urban area in China, the other in a Midwest city of the United States.

### **Appearance Comparison and Conformity to Norms**

The Tripartite Influence Model specifies appearance comparison as one of the two mediators in the associations between the sociocultural influences and body dissatisfaction. In social psychology, the social comparison theory suggests that individuals seek accurate self-evaluations on their thoughts and abilities through comparing the self to others (Festinger, 1954). While the downward comparison can be considered as a type of defensive mechanisms where individuals compare themselves with others who are considered worse off, the upward comparison is to compare with others who seem to be superior or better. In the Western body image literature, dissatisfied women have been found to be more likely to engage in upward comparisons. They tend to compare their appearance to the more attractive body types, thus feeling more negative affect and more dissatisfied with their body (Leahey, Crowther, & Mickelson, 2007).

In the Eastern literature, evidence supporting the mediation effect of appearance comparison have also been found in China, and some suggest that one traditional cultural value,

conformity to norms, may moderate this mediation effect. In a case study on the socio-cultural perspective of the etiology of eating disorders, seven out of eight eating disorder patients indicated that they would feel embarrassed if they found themselves to be larger among their peers (Chan & Ma, 2004). For these patients, researchers found that such appearance comparison was accompanied by the need to follow the perceived norms for thinness. This need then led to dissatisfaction of their own body and disordered eating behaviors such as self-starvation, binging, and purging.

Therefore, some collectivistic values like conformity to norms may play an indirect role in fostering body image concerns of females (Jackson & Chen, 2008). The rationale is that, for those who highly value in conforming to norms, they may be more consciously aware of the majority's expectation of what is socially acceptable, and they may engage in more self-adjustment activities to prevent from deviating from norms. When an average-size woman recognizes the unrealistic thin-ideal as the norm for attractiveness and beauty, such perceived "deviation" from the self to the "norm" may create psychological disturbance and dissatisfaction of her body, thus later resulting in disordered eating and weight control behaviors.

Because conformity to norms is typically regarded as Asian values, its role in the development of body dissatisfaction and disordered eating has only been mentioned in the Eastern literature. However, it may also exhibit effects on the individuals from Western societies. One similar concept in the Western literature exists in the study of the gender-role norms. Female gender-role norms provide guidance for women regarding how they supposed to behave, think, and feel (Gilbert & Scher, 1999). Conformity to feminine norms happens when a woman adheres the societal rules specifying how to behave according to the expectations of femininity. Such expectations have been traditionally constructed by the dominant European American

culture. For women who highly value conformity, negative feelings such as shame and guilt may be experienced when behaviors, thoughts, and feelings are inconsistent with feminine norms (Mahalik et al., 2005).

Therefore, in the association among sociocultural influences, appearance comparison, and body dissatisfaction, a similar role of conformity to norms may also be applied in Western samples. However, no study conducted in the West has examined such associations. Combining the samples from both the East and West, the present study attempts to explore the potential moderating factor, conformity to norms, in the development of body dissatisfaction and disordered eating as proposed by the Tripartite Influence Model. In other words, it is hypothesized that the positive association between appearance comparison and body dissatisfaction would be significantly stronger for those who highly value conformity to norms, compared to those who value less conformity to norms.

### **Thin-Ideal Internalization and Perfectionism**

The Tripartite Influence Model also emphasized on the mediation effect of thin-ideal internalization in the association among sociocultural influences, body dissatisfaction, and disordered eating. Indeed, in Western societies, women indirectly receive pressures to manage their body indirectly from observing the unrealistically thin female body types presented in the media. These pressures may also come directly from family members and peers who encourage them to appear consistent with such “ideal” body types (Stice, 1994). Based on the empirical support of the Western literature, thin-ideal internalization is regarded as a causal risk factor for body dissatisfaction and eating disturbances (Stice, 2002).

Similar impacts of internalization can be found in the Eastern population as well. In a sample of international student women from China, Taiwan, Hong Kong, and Japan, thin-ideal

internalization was positively associated with symptoms of dieting and bulimia, even after controlling for their general distress and level of acculturation (Stark-Wroblewski, Yanico, & Lupe, 2005). However, considerably fewer studies have examined the association among internalization, body dissatisfaction, and disordered eating in the Eastern culture.

What is also left unexplored in the literature is the research on moderation factors explaining the individual differences in the effect of thin-ideal internalization on body image or disordered eating (Phan & Tylka, 2006). Under similar sociocultural influences, not everyone with the internalized thin ideal develops a strong sense of body dissatisfaction and disordered eating behaviors. Identifying the risk factors is crucial. Such knowledge will inform clinicians what types of clients may have concerns regarding body dissatisfaction, thus allowing them to develop early intervention plans for disordered eating.

One factor that has received attention in the literature is the personality trait of perfectionism. Slaney, Rice, Mobley, Trippi, and Ashby (2001) defined a type of maladaptive perfectionism as “perceived discrepancy”, which is characterized by the perceived failure for not meeting one’s standards for performance. In the Western literature, consistent findings suggest that women with disordered eating symptoms (e.g., dieting or bulimic behaviors) also tend to have elevated levels of maladaptive perfectionism (Bardone-Cone et al., 2007). The rationale is that, for those who tend to perceive substantial discrepancy between their ideal standards and the reality, after internalizing the unrealistic thin ideal and recognizing the reality-to-ideal discrepancy, they might feel less satisfied with their body shapes and develop a stronger need to personally achieve such standards. This may result in disordered eating attitudes and behaviors in order to build a perfect body shape. In contrast, for those who hold a less maladaptive type of

perfectionism, they may be protected when the thin ideal is presented and internalized, because they feel more okay with not being in the perfect body shape.

Neither Western nor Eastern researchers have examined the moderation effect of perfectionism in the relation between thin-ideal internalization and body dissatisfaction in the literature, and it has been encouraged in the literature to consider adding this variable in models of body image concerns and disordered eating (Stice, 2002). Thus, as a preliminary investigation, the present study hopes to take on this task to examine such proposed moderation effect in both cultures. It is hypothesized that the positive association between thin-ideal internalization and body dissatisfaction would be significantly stronger for those who endorse more characteristics of maladaptive perfectionism (i.e., discrepancy), compared to those who endorse less on the same set of characteristics.

### **The Present Study**

As discussed above, the first goal of the present study is to apply the Tripartite Influence Model in a non-Western culture (see Figure 1). To test the generalizability of the Tripartite Influence Model, first, it was hypothesized that in both European American and Chinese samples, appearance comparison and thin-ideal internalization would both separately mediate the association between sociocultural influences and body dissatisfaction and between sociocultural influences and disordered eating. Second, it was hypothesized that sociocultural influences would also have an indirect effect on disordered eating through body dissatisfaction. Specifically, all structural paths in Figure 1 were expected to be significantly positive. Moreover, I intended to establish measurement invariance first and then examine whether structural paths would be invariant between the two samples.

Additionally, going beyond a cross-cultural study examining whether a Western theory is universal and generalizable in a non-Western culture, the present study aims to expand our knowledge on the development of body dissatisfaction and disordered eating by examining the potential moderation effects of two variables, conformity to norms and maladaptive perfectionism, in both Western and non-Western samples (see Figure 2). Based on the rationales above, another set of hypotheses follow. First, conformity to norms would moderate the relationship between appearance comparison and body dissatisfaction. In other words, for those who value highly in conforming to norms (both European American and Chinese), the path from appearance comparison to body dissatisfaction would be significantly stronger compared to the path for those who are low in conformity to norms (see Figure 3). Second, maladaptive perfectionism would moderate the relationship between thin-ideal internalization and body dissatisfaction. In other words, for those who strive highly for perfection in a maladaptive way (i.e., high in discrepancy), the path from thin-ideal internalization to body dissatisfaction would be significantly stronger compared to that for those who are low in the maladaptive perfectionism (see Figure 4).

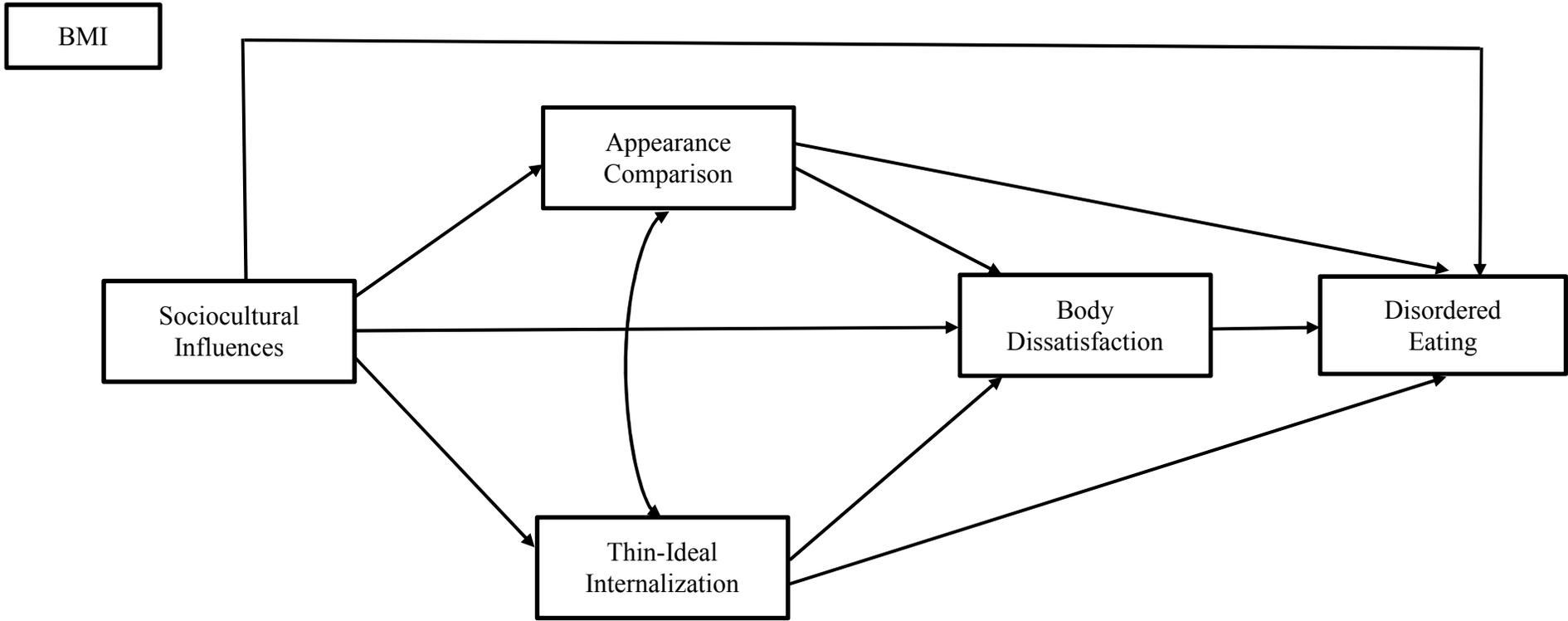


Figure 1. The hypothesized mediation model

Note. BMI was controlled for but its associations with other variables are not included for demonstration clarity.

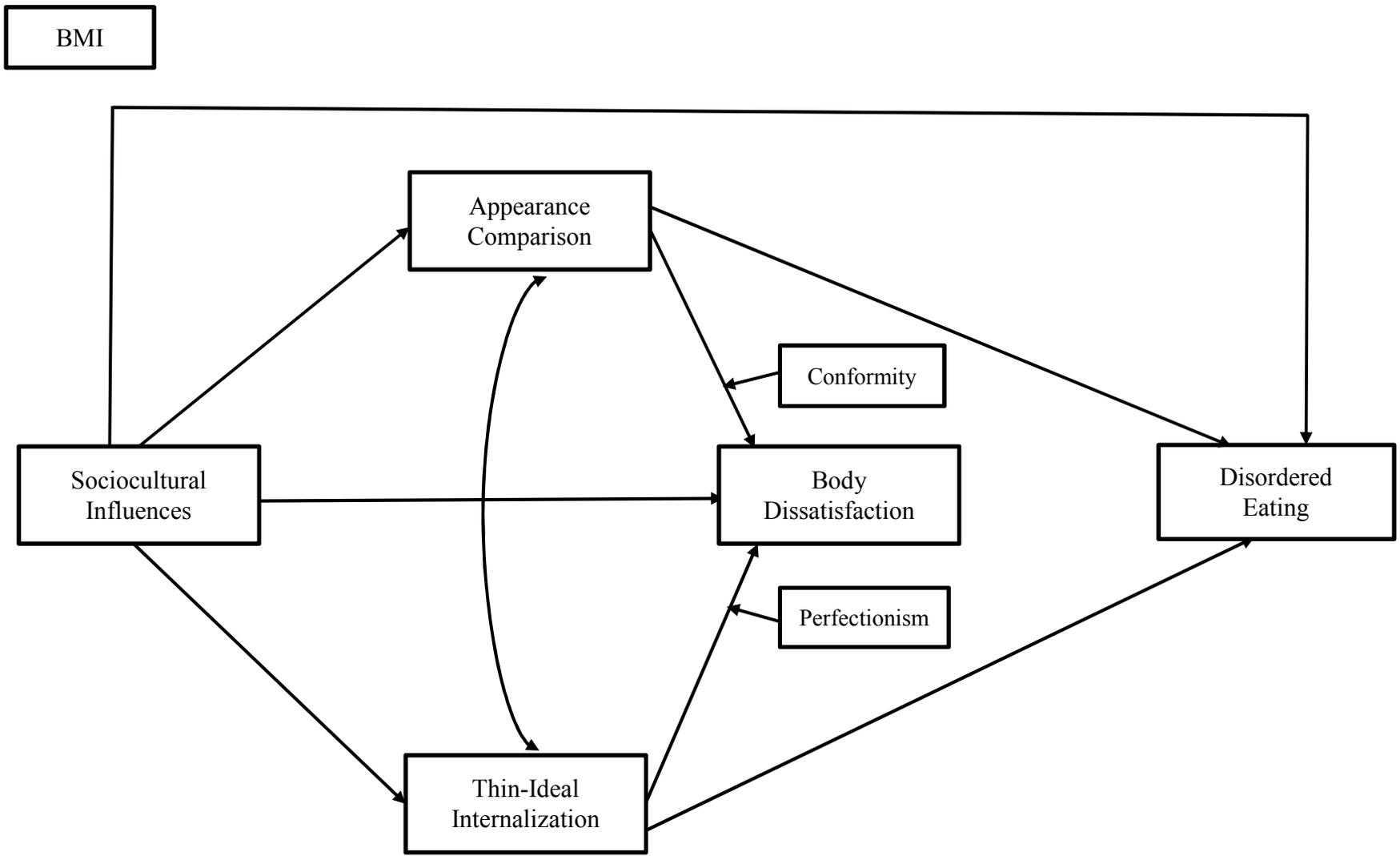


Figure 2. The hypothesized moderated mediation model

Note. BMI was controlled for but its associations with other variables are not included for demonstration clarity.

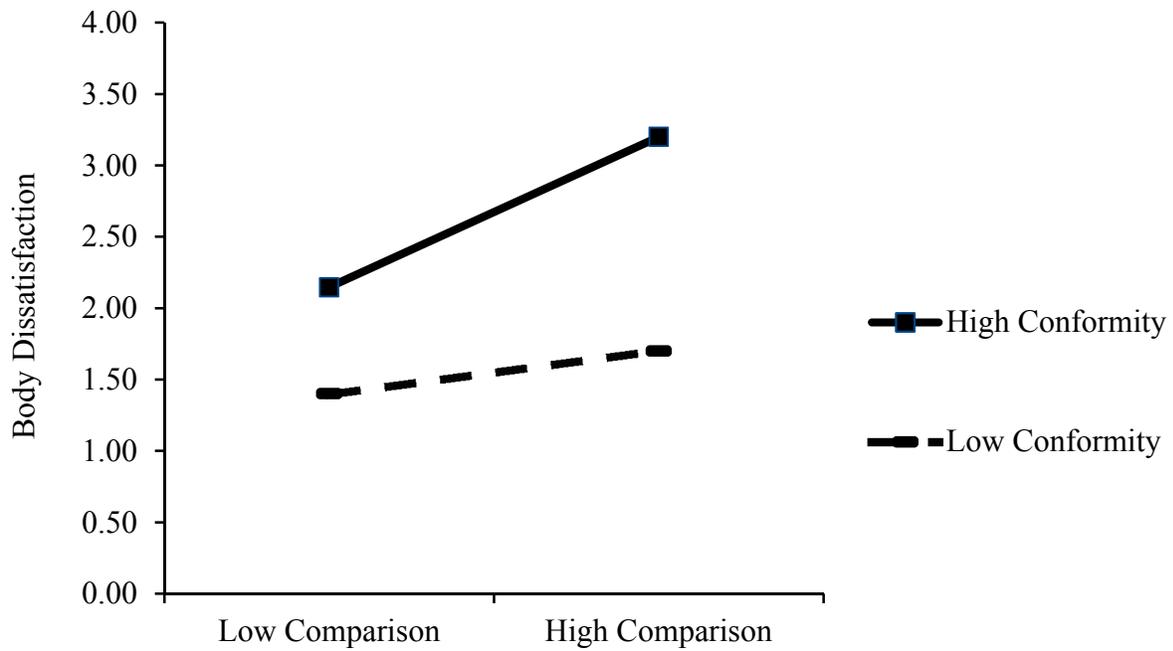


Figure 3. The hypothesized moderation effect: conformity to norms

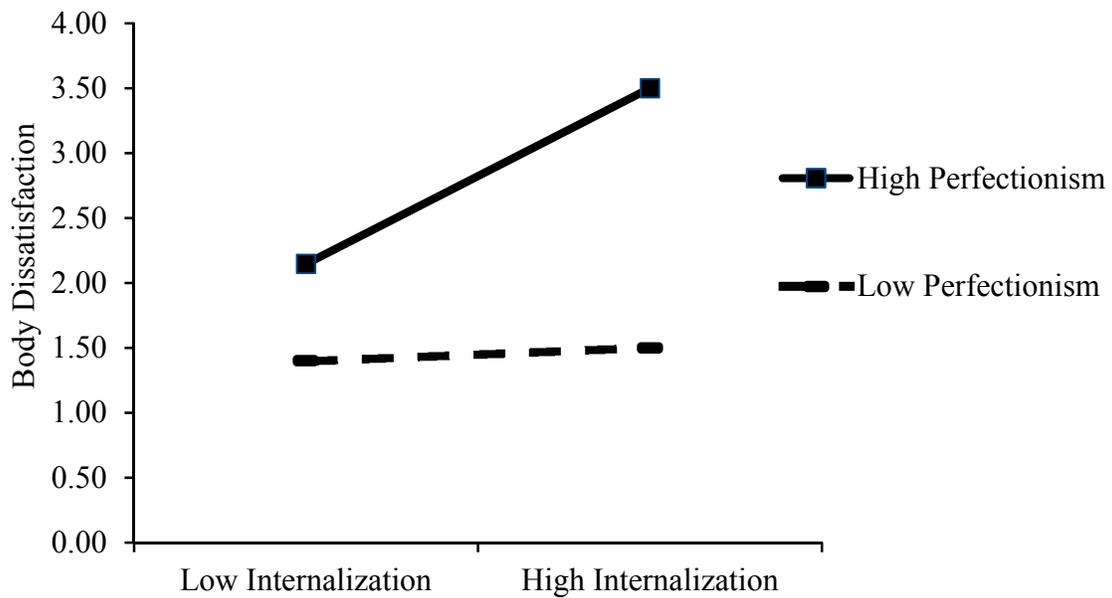


Figure 4. The hypothesized moderation effect: maladaptive perfectionism

## **CHAPTER TWO. LITERATURE REVIEW**

The following literature review first starts with an overview of the body dissatisfaction and disordered eating in the United States and China. After that, a review of the Tripartite Influence Model are given, specifying the three sociocultural influences (parents, peers, and media) and two mediators (appearance comparison and thin-ideal internalization), which eventually lead to body dissatisfaction and disordered eating. This part of the literature review is mostly limited to the studies in the West, considering the lack of empirical support of this model in the Chinese literature. Last but not least, the moderation roles of perfectionism and conformity to norms in the Tripartite Influence Model are discussed more in detail based on the existing literature.

### **Disordered Eating and Eating Disorders**

Eating disorders are characterized by severely disturbed eating behavior. In the U.S., the newly revised Diagnostic and Statistical Manual of Mental Disorders (DSM-5) specified three major categories of eating disorders: anorexia nervosa, bulimia nervosa, and binge eating disorder (American Psychiatric Association, 2013). Anorexia nervosa primarily affects adolescent girls and young women: it is characterized by distorted body image and excessive dieting, and such distorted beliefs and behaviors lead to severe weight loss along with a pathological fear of being or becoming fat. Bulimia nervosa, as another common type of diagnosis of eating disorder, is mainly characterized by frequent episodes of binge eating followed by inappropriate behaviors such as self-induced vomiting. Similarly, such pathological behaviors are mostly driven by unmet psychological needs and a desire for weight control (Thompson et al., 1999).

Binge eating disorder, as a newly approved addition in DSM-5, is defined as the recurring episodes of eating significantly more amount of food in a short period of time than most people would eat under similar circumstances. Such binge eating behavior normally accompanies with a lack of self-control. It was added as one type of eating disorders because clinicians in recent years identified more clinical cases where their clients or patients do not fit the criteria of anorexia or bulimia, but still show a clinically significant level of psychopathology. According to longitudinal studies on dieting and eating behaviors in the U.S., evidence have shown that binge eating disorder (BED) and sub-threshold BED have the highest 12-month and lifetime prevalence of any eating disorder among both adolescents and adults (Tanofsky-Kraff, et al., 2013).

Changes in eating disorder diagnoses in DSM-5 to some degree suggest increased body image concerns and distorted eating behaviors in today's American society. Indeed, research in recent years suggests that the prevalence of clinical eating disorders does not capture the extent of the public health problem of disordered eating. Among the American female college students, while diagnosable eating disorders are rare, disordered eating is present and remains consistent throughout the college years, with about 50 percent of the sampled individuals reporting dieting behaviors as they transition into college (Forney & Ward, 2012; Vohs, Heatherton, & Herrin, 1999).

Similarly, in China, such disordered eating attitudes and behaviors became prevalent in recent years. Some researchers believe that another three to ten percent of Chinese females may suffer from disordered eating at a subclinical level beyond the eating disorder population (Lee & Lee, 2000). In a sample of more than 2000 Chinese adolescent girls, about 36 to 57 percent reported avoiding sweet or fatty foods in their diet, 16 percent used dieting pills to manage their

weight, and almost 30 percent reported dieting (Fan et al., 2010). In another sample of over 1000 adolescent Chinese girls, 68 percent showed disordered eating attitudes and/or behaviors (Tam et al., 2007). Even though more than 95 percent were considered normal weight or underweight, 50 percent expressed wish to lose weight and about 40 percent indicated weight loss behaviors, including self-induced vomiting. What is also striking is that in this sample, almost half of the participants reported having little or no knowledge regarding eating disorders (Tam et al., 2007). Lacking the information about eating disorder or disordered eating in the Chinese society may hinder individuals' ability and willingness to seek help from mental health professionals when they are not fully aware of the danger of the problematic and unhealthy disordered eating behaviors.

Furthermore, even though individuals with disordered eating patterns do not necessarily meet the criteria for any eating disorder, their preoccupation with food, restricted food in-take (dieting), unhealthy weight-loss and binge eating behaviors could cause similar difficulties in their health, relationship, and other aspects of life as those experienced by eating disorder patients. In the United States, for example, a four-year longitudinal study showed that disordered eating behaviors were closely associated with depressive symptoms in a sample of adolescents (Ferreiro, Seoane, & Senra, 2012). Similarly, in China, in a sample of college students with more than half female participants, their disordered eating behaviors were significantly related to anxiety, depression, and hostility (Zhu, Cai, Chen, & Zhang, 2013).

In the present study, the Eating Attitude Test – Short Version (EAT-26; Koslowsky et al., 1992) is selected to measure the construct of disordered eating. Even though it was originally developed to diagnose anorexia nervosa, it is now also commonly applied to nonclinical populations as a way to identify individuals with various levels and types of disordered eating or

with food-intake/weight concerns (Koslowsky et al., 1992). Literature supports its psychometric properties in both Eastern and Western female population (e.g., Lake, Staiger, & Glowinski, 2000; Zhu et al., 2013).

### **Body Dissatisfaction and Eating Disorders**

From a physical appearance-based perspective, body image is defined as the perception of a person's own body shape/figure. In the body image literature, some researchers use body image disturbance as an umbrella term to conceptualize this construct in order to reflect all subcomponents of body image (Thompson et al., 1999).

Thompson et al. (1999) suggested that body image could be best conceptualized in a continuum model: the levels of disturbances can range from zero to extremely high. While most people in a population fall in the middle of the continuum, a high level of body image disturbances can be indicative of significant clinical problems, many of which are related to eating disorders and affective disorders such as depression. Another widely used term in the literature on body image is body dissatisfaction, which is characterized by the discrepancy between an ideal and actual body shape/size/figure. When an individual regards their body as extremely dissatisfactory to their own standards, such perception can lead to significant impairment in social and occupational functioning.

Regardless of which term is used, research suggests a strong link between one's perception of their own body and unhealthy eating behaviors. Body dissatisfaction has received the greatest empirical support as a precursor to eating disturbances (Thompson et al, 1999). For example, in their study of body image and disordered eating in adolescents, Slater and Tiggemann (2011) found that increased dissatisfaction and awareness of one's own body figure is associated with disordered eating symptoms through the feeling of body shame in a sample of

adolescent girls in the U.S. Similarly, in a large sample of Taiwanese adolescents (who share similar cultural values as their Chinese mainland counterparts, body dissatisfaction was found to contribute to disordered eating symptoms such as restrained eating and unhealthy weight control behaviors (Chang et al., 2010). Regarding the cultural group differences or similarities, Sanders and Heiss (1998) found that Asian American and European American women reported similar body dissatisfaction and eating attitudes. In another study, Mintz and Kashubeck (1999) found that Asian and European American women reported similar concerns regarding their weight and appearance. These findings altogether suggest that body dissatisfaction is strongly related to disordered eating behaviors, not only in the Western culture, but also in the Eastern culture. However, it is only an assumption that the link between body image concerns and disordered eating remains the same cross-culturally, and researchers have called for a need to test this association in studies using both non-Western and Western groups (Jackson & Chen, 2008).

### **The Tripartite Influence Model: Three Sociocultural Factors**

In the mid-1960s, more attention was paid to the concept of body image in psychological research and various civil-right movements in the U.S.(Arkoff & Weaver, 1966). Ever since then, researchers proposed various mechanisms and theories with an attempt to explain what sociocultural factors might contribute to body dissatisfaction (i.e., negative views of one's body), which eventually lead to disordered eating. As mentioned in the introduction chapter, one of such theories attempting to address these associations is the Tripartite Influence Model (Thompson et al., 1999). Thompson and his colleagues identified three primary sources of sociocultural influences (i.e., parents, peers, and media) and hypothesized that these influential social factors contribute significantly to individuals' identification of their own body image and the

development of an eating disorder. The following sections mainly focus on introducing each of the three factors, as well as evidence from both the Western and Eastern literature.

**Family.** Family is one of the most important channels for children to observe others and learn about possible attitudes they could pick up to approach the world, other people, and themselves. The influence of parents on children's beliefs on ideal body image cannot be underestimated, especially in today's world where body image concerns and disordered eating begin at a very young age. In a qualitative analysis of messages preschool children receive from their mothers and teachers, researchers observed these preschool girls expressed concerns about their appearance and losing weight even though they were only three to four years old. Correspondingly, researchers also found that their mothers expressed concerns about their own bodies and communicated the messages to their daughters about losing weight (McCabe et al., 2007).

Researchers started to pay attention to parental and familial influences on body image and eating disorder a couple decades ago. In their classic study, Minuchin and his colleague found that enmeshment, a family pattern in which individual autonomy and differences are suppressed with a concomitant blurring of parent-child relationship boundaries, characterized families with an anorexic adolescent (Minuchin, Rosman, & Baker, 1978). Studies found that direct comments from parents on children's physical appearance and their own dieting and binge eating behaviors all have a huge impact on children's internalization of a perfect body shape and body dissatisfaction. One study found that a high degree of criticism, especially focusing on the adolescent's weight, and coercive parental control, are both related with eating problems and body image concerns in the United States (Haworth-Hoepfner, 2000). In another study in Hong

Kong, high parental pressure for thinness was found to predict body dissatisfaction and dieting behaviors for 294 Hong Kong community adolescent girls (Lam et al., 2009).

Parents do not just directly affect children's perception of their own bodies and their desires to have a better body shape. They also indirectly affect their children's body image concerns through the climate they create in children's growing up environment. In a more recent study, Blackmer and her colleagues were interested in finding how American college athletes' perceived family-origin-climate is linked to their body image and eating attitudes (Blackmer, Searight, & Ratwik, 2011). They found that families permitting less individuality, emotional expression and support tended to be associated with an elevated risk of disordered eating behaviors and body image concerns among the young college athletes. Similar to the Western evidence, female adolescents in China who perceived greater pressure from parents to lose weight reported elevated body dissatisfaction, which resulted in actual weight loss actions (Xu et al., 2010).

**Peers.** Research has confirmed that high consensus can be achieved among individuals in evaluating others' attractiveness (Burns & Farina, 1992). Even children as young as three year old could agree with adults when it comes to rating their peers' attractiveness, thus they may also engage in preferential treatment or favoritism based on the level of attractiveness, laying the foundation for the later development of negative images and unhealthy disordered eating behaviors with an attempt to become more attractive.

The impact of peer influences is huge, especially when children transit into adolescence (Thompson et al., 1999). By observing or participating in appearance-related activities with their peers (such as having conversations around fashion and models, exercising and dieting for weight loss, teasing overweight body types), individuals can pick up what physical standards are

accepted by their peers, thus engaging in activities that help them meet the standards to be more liked by others. It is fundamentally wrong to believe that “if I am thinner, people will like me more” because close human connections are generally not established solely on attractiveness of physical appearance. However, when in a group of peers with similar minds on a perfect body image, individuals may find it hard to think otherwise. Such false belief suggests that human connection is conditional and only based on appearance, and it has been shown in the Western literature as a stronger predictor of body image disturbance (Oliver & Thelen, 1996).

Research in the United States confirmed the significance of peer influence on body dissatisfaction. For girls and adolescents, they receive more pressure for weight loss from female friends by discussing appearance concerns and addressing the importance of appearance ideals (Jones & Crawford, 2005). Additionally, young women tend to feel a stronger need to change their appearance after receiving critical feedback on their body shape from their peers, and such needs promoted more conversation around their looks and body shape (Jones, Vigfusdottir, & Lee, 2004). Relatively little research was done in the Chinese population. Among the studies that addressed peer influence on body dissatisfaction in China, Xu et al. (2010) reported that when adolescent girls perceived pressure from their peers to lose weight, they rated their body in a less satisfactory way, and they reported more body changing behaviors, especially with weight loss.

**Media.** Similar to the other two sociocultural factors, media plays an essential role in setting up the standards of female perfect body types ever since the media channels were invented and discovered. The media serves as a strong force in spreading the current social standards for beauty with a huge emphasis on the thinness, as well as a mirror that reflects what the mainstream social value endorses regarding our body shape. For example, Barbie, one of the most loved American toy characters, was found to become increasingly and unrealistically

slimmer over the years since her first appearance in the market (Dittmar, Halliwell, & Ive, 2006). Body shapes depicted in movies, magazines, news, and songs in today's pop culture all deliver similar messages: a woman's beauty is defined by the look; one can never be too thin to look good. Such messages can be internalized through an over-exposure to the mass media, thus affecting the women's view of self and others.

Literature on mass media effects confirms this mechanism in the United States. Fallon and Hausenblas (2004) found that exposure to the ideal physical appearances depicted by the media increases body dissatisfaction, especially for high-risk women who reported high drive for thinness. Studies in laboratory settings also provide strong evidence of media effects on body dissatisfaction and eating disorder symptoms. For example, in a controlled laboratory investigation, researchers found that after showing participants appearance-related and non-appearance-related videos, the appearance-related video group showed more mood disturbances and body dissatisfaction, especially for individuals who had internalized the thin ideal (Heinberg, Thompson, & Stormer, 1995). Therefore, the study also suggested that a possible pathway for the media exposure to take effect on body image would be through the thin-ideal internalization. Similarly, in a large sample of Taiwanese adolescents, as half of the female participants were found to be dissatisfied with their body, thin ideal media exposure (e.g., thin ads/messages, thin characters and models on TV or in newspaper/magazines), significantly predicted their low ratings of their appearance (Chang et al., 2013).

### **The Tripartite Influence Model: Two Mediators**

Over the years, researchers have been devoting their effort in exploring variables that *mediate or moderate* the association among sociocultural influences, body image and disordered eating, with a hope that such knowledge could inform clinicians to develop effective treatments

and interventions in the eating disorder population. Therefore, in addition to the direct effects of the three influential factors, the Tripartite Influence Model proposes that these factors have indirect impact on body image and disordered eating through two mediating pathways: appearance comparison, and internalization of the thin-ideal (Thompson et al., 1999).

**Appearance comparison.** Relevant literature supports the mediation role of comparison in the development of body dissatisfaction and disordered eating. The tendency to make appearance-related social comparisons can have a negative impact on one's body image (Vartanian & Dey, 2013). Festinger (1954) first brought up the theory of social comparison, which may help us understand how appearance comparison may affect our body image. Festinger proposed that human beings constantly compare themselves to others as a way to gain information about their own attributes. Upward comparisons occur when we judge ourselves against people who are better off, whereas downward comparisons happen when we compare ourselves against people who are worse off. Traditionally, upward comparisons are considered as a source for reality checks and inspiration to improve. However, when individuals constantly compare themselves to others who they believe having better body sizes or better looks, such upward comparison may lead to a negative evaluation of self, thus resulting in negative feelings about their own body.

Studies have confirmed a significant role appearance comparison plays in the development of body image and disordered eating. Leahey et al. (2007) found that body dissatisfaction is related to frequent appearance comparison, which in turn increases body dissatisfaction to a greater level and leads to thoughts of dieting. Women are found to be more frequently engage in comparison, and a high frequency of upward comparison was found to be significantly related to one's drive for thinness and bulimia related symptoms (Bailey &

Ricciardelli, 2010). This makes sense, as girls and women today, both in Western and Eastern societies, are overly exposed to images in the media that serve as comparison targets (Thompson, Coovert, & Stormer, 1998). Also, through verbal comments from family members and peers, such as criticism and teasing on body parts, individuals may compare themselves with others around them with better body shapes.

Consistent findings confirmed this association in Western societies, suggesting when American females perceive pressure from external sources such as family, friends, and media, they tend to engage in more upward comparison and less downward comparison; such tendency predicts higher body dissatisfaction and eating disturbance (Bailey & Ricciardelli, 2010). For example, in an experimental study, American college women were requested to watch commercials reflecting the thin ideal (i.e., media influence). Researchers found that those who were told to engage in appearance comparison while watching reported more body dissatisfaction than those who were not told not to do so (Cattarin, Thompson, Thomas, & Williams, 2000).

Moreover, several studies have also found a strong correlation between appearance comparison and eating disorders. In the U.S., Hamel, Zaitsoff, Taylor, Menna, and Grange (2012) studied the differences between adolescents with eating disorders and healthy controls. They found that maladaptive body related comparison is strongly related to disordered eating, including drive for thinness, bulimia, and body dissatisfaction. In a large sample of Chinese female participants, Jackson and Chen (2007) compared the more symptomatic eating disorder group and the less symptomatic group. They found that the symptomatic female group, presumably more dissatisfied with their body shape, reported more social pressures perceived externally, got teased more, and compared themselves more often with others regarding their

physical appearance. Therefore, evidence altogether suggests that appearance comparison is closely related to body dissatisfaction and disordered eating, and evidence has been gathered cross-culturally.

However, most studies on these relationship are exploratory and correlational in nature, and only a few studies have examined the mediating role of appearance comparison using the Tripartite Influence Model as a theoretical framework. Significant mediation effect has been found using U.S. female college students (Thompson, Coover, & Stormer, 1999) and adolescents (Keery et al., 2004). Thus, empirical evidence is very limited to conclude that Chinese individuals under sociocultural pressures may also report body dissatisfaction and engage in disordered eating through appearance comparison.

**Thin-ideal internalization.** The thin ideal established in the Western world through media influences has a strong negative impact on women's perceive body image and eating patterns. A thin ideal represents an ideal physical appearance that is endorsed by the mass media, and this is dangerous because it can be easily interpreted as "a woman's sense of worth solely depends on her appearance" (Thompson et al., 1999). Women today are exposed repetitively to the model figures in fashion magazines and on TV, as well as the comments suggesting the unrealistically thin ideal of a woman's body. Therefore, it is difficult for them to not internalize the so-called standard of beauty and start to hold the belief that they must be thin, be fit, or be in good shape to look beautiful. Since it is unrealistic to obtain the perfect body shape in the media modified by computer programs like Photoshop, women with the internalized thin ideal may find it hard to reach the level of the ideal body, thus evaluating themselves negatively and feeling dissatisfied. In other words, individuals who are influenced by the sociocultural factors may

develop body dissatisfaction through internalizing and believing in the thin ideal, which is a potential mediator proposed by the Tripartite Influence Model.

Findings in the Western literature support this notion. Women may evaluate their body negatively after receiving tremendous amount of pressure to be thin, causing shame and low self-esteem regarding their own body (Stice, 1994). In China, evidence from case studies also suggest how such effect takes place. For example, one Chinese girl who was diagnosed with anorexia nervosa reported that:

“The reason behind my anorexia nervosa is quite straightforward. I want to keep fit. My favorite female singer is very thin and trendy. I want to be like her. That’s the reason why I started fasting. Unpredictably, this fasting turned into anorexia nervosa (Chan & Ma, 2004).”

Such statement is astonishing yet can be commonly found among females who highly identify with the thin ideal in the Chinese culture. As the literature suggests, the long-term effects of thin-ideal internalization, along with appearance comparison, are powerful and startling. Longitudinal studies suggest that thin-ideal internalization prospectively predicts body dissatisfaction and eating disturbances, and thin-ideal is a salient risk factor for eating disorders in the U.S. samples (Thompson & Stice, 2001). Moreover, Stice (2001) found that thin-ideal internalization predicted increases in body dissatisfaction at a later time point, which in term predicted subsequent increase in eating disorder symptoms. However, most studies examining their effects on body dissatisfaction and disordered eating are conducted in Western countries, so their roles in the non-Western literature are less explored. Shaw, Ramirez, Trost, Randall, and Stice (2004) compared the established eating pathology risk factors (e.g., thin-ideal internalization) across the four ethnic groups in the U.S. (i.e., Asian, Black, Hispanic, White) and suggested that there are actually more similarities rather than differences regarding these risk

factors in developing disordered eating among various cultural groups. Thus, the present study aims to collect data from the two cultural samples (i.e., U.S. and China) to first identify the role of thin-ideal internalization in the development of body dissatisfaction and disordered eating in China, and also to verify such possible cultural similarities by apply the Tripartite Influence Model in both European American and Chinese female college students.

### **Conformity to Norms and Maladaptive Perfectionism as Moderators**

The Tripartite Influence Model clearly specifies the social and cognitive mechanism in which individuals develop body image concerns and disordered eating symptoms. It has received increasing attention in the literature in the recent years and informed a number of studies as a theoretical foundation (e.g., Papp, Urban, Czeglédi, Babusa, & Túry, 2013; Rodgers & Paxton, 2015). However, this model has two limitations based on the current literature. First, the Tripartite Influence Model was developed and validated only in Western countries, and there is no study conducted in an Eastern country to examine its cross-cultural applicability. To address this limitation, the present study attempts to collect data from two countries: U.S. and China. The goal is to establish the measurement and structural invariance of this model in both groups.

The second limitation of the Tripartite Influence Model is that, even though the model proposes two mediation pathways (i.e., appearance comparison and thin-ideal internationalization) through which the sociocultural factors influence body dissatisfaction and disordered eating, not every socially influenced individual who compares her appearance with that of others or who internalizes the thin ideal would develop a strong sense of body dissatisfaction. Jung and Forbes (2007) called for studies exploring the moderators in China and U.S. explaining the differences in the relationships among the variables identified by the Western theories such as the Tripartite Influences Model. Therefore, to address the second limitation, two

possible moderating variables are added included in the Tripartite Influence Model. The two moderators, 1) conformity to norms and 2) maladaptive perfectionism, are discussed in detail below, as well as the rationale and empirical evidence suggesting their moderation effects.

**Conformity to norms.** In the present study, conformity to norms is hypothesized to moderate the relationship between appearance comparison and body dissatisfaction. The concept of conformity to norms has been traditionally thought of as an Asian cultural value. According to Kim, Li, and Ng (2005), conformity to norms is characterized as “recognizing and adhering to the social expectations, norms, and practices,” and acting in a way that “one’s society considers normal and acceptable.” A person who values highly in conformity to norms would feel strong discomfort if she found herself not following the norms. In the body image literature, conformity to norms has been discussed as a potential factor influencing Asian Americans’ body dissatisfaction. For example, Lau, Lum, Chronister, and Forrest (2006) reported that Asian American women who indicated stronger adherence to Asian values, such as conformity to norms, reported greater overall body disturbance.

However, no evidence of conformity to norms as a moderator in such relationships has been discussed or explored in the European American sample. Even though conformity to norms can be identified as an Asian value, we cannot conclude that such value is less prevailing in the United States. In fact, conformity to norms has been widely recognized in the American literature in the area of college students’ alcohol use. In this realm of research, when they perceive the frequent and regular alcohol usage as the norm, college students tend to feel more motivated to drink more in quantity and frequency, especially for those who have a strong need for conformity (e.g., Prince & Carey, 2010). Applying the similar logic to the area of appearance comparison and body dissatisfaction, it is possible that for both European American and Chinese who value

highly in conformity to norms, they may feel more dissatisfied with their body when they engage in upward appearance comparison with others, because they may feel a strong need to have a body shape that is suggested by the norm. In contrast, for those who value less in conformity to norms, they may feel more comfortable with being different compared to others in the majority. Therefore, the effect of upward appearance comparison on body dissatisfaction would be buffered. Based on this rationale, one of the hypotheses in the study is that, after combining the two samples (i.e., European Americans and Chinese) into one larger sample, conformity to norms would moderate the effect of appearance comparison on body dissatisfaction.

**Maladaptive perfectionism.** While appearance comparison is mostly considered as others-oriented, thin-ideal internalization can be viewed as more self-focused. Once an individual has developed or internalized an ideal image of the body shape, she would automatically compare her view of self with the perfect ideal. Indeed, in the perfectionism literature, studies recognized that eating disorder patients are commonly found more perfectionistic (e.g., Kaye et al., 2004). However, less consistent findings were presented regarding the predictability of perfectionism on body dissatisfaction and disordered eating, and few studies have focused on testing perfectionism in interaction with other risk factors in the prediction of symptom level or diagnostic status related to body dissatisfaction and disordered eating (Bardone-Cone et al., 2007).

Perfectionism could possibly be an indirect rather than direct factor influencing body dissatisfaction by interacting with thin-ideal internalization (Boone, Soenens, and Braet, 2011). The rationale is that perfectionist individuals are considered as people who work extra hard to meet their ideal standards and decrease the discrepancy between the ideal and the reality. In the present study, the type of maladaptive perfectionism is operationalized as the discrepancy type,

characterized as a tendency to notice the gap between their personal standards and their own evaluation of meeting the standards. In a world where sociocultural factors constantly deliver the messages containing a thin ideal, women may easily notice or exaggerate the discrepancy between their ideal body image and the actual body shape, thus feeling dissatisfied with their own body. However, for those who feel more relaxed about not meeting the high personal standards, they may internalize the thin ideal from the sociocultural influences, but choose not to be overly harsh on themselves for not having an ideal body. Therefore, a moderation effect of the discrepancy type of maladaptive perfectionism is expected in the relationship between thin-ideal internalization and body dissatisfaction. In other words, individuals who have a stronger maladaptive perfectionistic tendency (i.e., discrepancy) may report more body dissatisfaction after internalizing the thin ideal; individuals who do not identify strongly with the maladaptive perfectionistic characteristics, however, may not report as much, or even less, body dissatisfactions compared to the maladaptive perfectionistic individuals.

### **The Present Study**

To summarize, one goal of the present study is to apply the Tripartite Influence Model in both the European American and Chinese college female student samples to establish the measurement and structural invariance of this model in the two cultural groups. Based on the Tripartite Influence Model, American and Chinese individuals would both indicate the three sociocultural factors having direct effects on body dissatisfaction and disordered eating. Additionally, appearance comparison and thin-ideal internalization are hypothesized to mediate the association between the sociocultural influences and body dissatisfaction in both European American and Chinese individuals (see Figure 1).

Another goal of the study is to evaluate the potential moderation effects of conformity to norms and perfectionism (see Figure 2). Specifically, first, conformity to norms is hypothesized to significantly moderate the relationship between appearance comparison and body dissatisfaction. For those who are high in conformity to norms, they may develop more body dissatisfaction when they compare their appearance to those who seem to be more consistent with the norms. Second, maladaptive perfectionism is hypothesized to significantly moderate the relationship between thin-ideal internalization and body dissatisfaction. After internalizing the thin ideal, for those who report a higher maladaptive perfectionism, they may report a higher degree of body dissatisfaction compared to those who report a lower maladaptive perfectionism.

## CHAPTER THREE. METHODS

### Participants and Procedure

**United States.** Approval from the Institutional Review Board (IRB) at Iowa State University (ISU) was obtained before collecting data from the European American female sample. The U.S. participants were recruited from a participant pool in the psychology department at ISU. They were required to be at least 18 years old and undergraduate female students taking courses in psychology and/or communication studies. Qualified participants first signed up for this study in the research pool. Upon signing up, they received a link to the survey, as well as an electronic form for informed consent. After completing the study, participants were directed to a separate webpage to fill out their names and course names for their research credits to be assigned.

A total of 271 European American female participants provided valid responses to the survey. Among them, there were 151 (56%) freshmen, 73 (27%) sophomores, 35 (13%) juniors, and 11 (4%) seniors (one person did not report her year in college); their ages ranged from 18 to 37 year old ( $M = 19.19$ ,  $SD = 1.69$ ); their body mass indices (BMIs) ranged from 16.31 to 42.91 ( $M = 23.65$ ,  $SD = 4.53$ ). As a general reference, a healthy adult BMI ranges roughly between 19 and 25 (Centers for Disease Control and Prevention, 2015).

**China.** Approval from the IRB at Iowa State University was also obtained before collecting data from a large university in Henan Province, China. Due to technology limitations, the IRB office granted permission for researchers to collect data using paper packets; participants were reassured that their participation would be completely voluntary with no compensation, and that no personally identifiable information would be collected.

A total of 260 Chinese female college students were recruited from an introductory psychology course. Among these participants, there were 135 (52%) freshmen, 45 (17%) sophomores, 67 (26%) juniors, and 1 (0.4%) senior (12 students did not respond to this question); their ages ranged from 18 to 23 years old ( $M = 19.62$ ,  $SD = 1.18$ ); their body mass indices (BMIs) ranged from 15.15 to 30.10 ( $M = 20.03$ ,  $SD = 2.02$ ).

### **Instruments**

All students in the U.S. completed an English version of the survey, and all students in China completed a Chinese version of the survey. The Chinese version for maladaptive perfectionism and conformity to norms were obtained from the original developers. The Chinese version of measures used for sociocultural influences, physical appearance comparison, thin-ideal internalization, body dissatisfaction was translated into Chinese following three steps of translation and back-translation process (Brislin, 1980). First, one doctoral student who are fluent in both Chinese and English translated these measures from English to Chinese. Second, one Chinese native speaker who is bilingual and unfamiliar with the measures translated them from Chinese back to English. In the last step, two native English speakers who are also unfamiliar to the measures or the purpose of the study compared the original items to the back-translated items in English. These steps were repeated until the equivalency and accuracy of all items are achieved.

**Demographic information and physical characteristics.** Participants were asked their age, year in college, relationship status, socioeconomic status (SES), and their primary major. Information regarding their current height and weight was also asked. Based on each participant's reported weight and height information, a BMI was calculated following the formula:  $BMI = \text{weight (lbs.)} * 703 / \text{height}^2 (\text{in}^2)$ , or  $\text{weight (kg)} / \text{height}^2 (\text{m}^2)$ .

**Sociocultural influences.** Three sociocultural influences (i.e., family, peers, and media) were measured using the Family Pressure, Peer Pressure, and Media Pressure subscales from the Sociocultural Attitudes towards Appearance Questionnaire – 4 (SATAQ-4; Schaefer, et al., 2015). Each subscale has four items. The Likert scale ranges from 1 (*definitely disagree*) to 5 (*definitely agree*), with a higher score indicating more perceived pressures from these sociocultural influences to pay attention to one’s weight and body size. Sample items include: “I feel pressure from family members to look thinner,” “I feel pressure from my peers to look in better shape,” and “I feel pressure from the media to decrease my level of body fat.”

In developing and validating this newer version of SATAQ, both exploratory factor analysis and confirmatory factor analysis indicated that these three subscales were distinctive from one another, and the SATAQ-4 subscales were significantly correlated with measures of eating disorder, body dissatisfaction, and self-esteem, providing evidence of validity (Schaefer et al., 2015). In addition, a series of reliability analyses also indicated the factors had high internal consistencies in samples of women from the U.S. and three other Western countries (i.e., Italy, England, and Australia). Specifically in the US female sample, the coefficient alphas ranged from .90 to .95 for the three factors, indicating good internal consistency of this measure when used in the U.S. Since this measure was only recently updated and published in 2015, no evidence for reliability has been reported in the Chinese population. For the present study, the Cronbach’s alphas for the U.S., the Chinese, and the combined samples were .89, .89, and .88, respectively.

**Appearance comparison.** The Physical Appearance Comparison Scale – Revised (PACS-R; Schaefer & Thompson, 2014) is an 11-item measure of an overall tendency to compare one’s physical appearance to others in social interactions and settings. The Likert scale

ranges from 0 (*never*) to 4 (*always*). A higher score indicates a stronger tendency to compare self-appearance to that of others in various contexts (e.g., at work/school, in public, when shopping for clothes, at the gym, etc.). Sample items are “When I’m out in public, I compare my physical appearance to the appearance of others,” and “When I’m with a group of friends, I compare my weight to the weight of others.” In a U.S. sample with 60 percent of participants identifying as European Americans, Schaefer and Thompson (2014) found this measure significantly and positively correlated with measures of eating disorders, internalization of appearance ideals, and sociocultural pressures from family, peers, and the media. They also found significant and negative correlations between this measure and measures of body satisfaction and self-esteem. All these findings provided evidence of convergent validity. In the same sample, Cronbach’s alpha for PACS-R was .97, suggesting good internal consistency. No Chinese sample was used to validate the measure in the Chinese literature. In the current study, the measure also demonstrated good internal consistency. Cronbach’s alphas for the U.S., the Chinese, and the combined samples were .96, .90, and .96, respectively.

**Thin-ideal internalization.** The Ideal-Body Stereotype Scale – Revised (IBSS-R; Stice & Agras, 1998) is a six-item measure that examines the degree to which individuals endorse and internalize the messages related to an ideal body. Participants are asked to respond to each statement on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Simple items include “Slender women are more attractive,” and “Women who are in shape are more attractive.” Higher scores indicate a stronger identification of the thin ideal. Stice and Agras (1998) compared the scores of the stable binge female group and the binge cessation female group in the U.S. They showed a significant difference between the two groups, with the stable binge eaters having higher ratings on this scale, suggesting evidence for convergent validity of this scale.

Additionally, they reported an alpha level of .89, suggesting good internal consistency in this sample. In a sample of over 1000 Chinese students, Chen et al. (2007) found that this scale was positively related to participants' negative feeling about their body size and weight, suggesting good construct validity. Also in their study, the alpha level for internal consistency was .80 for female participants. In the present study, Cronbach's alphas for the U.S., the Chinese, and the combined samples were .75, .88, and .81, respectively.

**Conformity to norms.** The Conformity to Norms subscale of the Asian American Values Scale – Multidimensional (AAVS-M; Kim et al., 2005) is used to assess the value of conformity to norms. This subscale contains seven items, requesting respondents to indicate how much they agree with the value expressed in each statement on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Sample items include “One should recognize and adhere to the social expectations, norms, and practices,” and “Conforming to norms provides one with identity.” A higher score indicates a stronger adherence to this value. Park and Kim (2008) reported evidence of validity of the scale based on the significant positive relationships between this measure and other Asian cultural values such as concerns for losing face. Additionally, Kim et al. (2005) also found the measure was not significantly correlated with the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965), thereby demonstrating good discriminant validity. Park and Kim (2008) reported a coefficient alpha of .74 and .72 for an Asian American college student sample and a European American college student sample, respectively, suggesting adequate internal consistency in both European and Asian American cultures. In the current study, Cronbach's alphas for the U.S., the Chinese, and the combined samples were .77, .70, and .89, respectively.

**Maladaptive perfectionism.** The Almost Perfect Scale – Revised Short Form – Discrepancy Subscale (APS-RS-DS; Rice, Richardson, & Tueller, 2014) is a 12-item measure of

the discrepancy type of perfectionism. The measure requires participants to describe their degree of agreement with each statement on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Sample items are “I often feel frustrated because I can’t meet my goals,” and “Doing my best just never seems to be enough.” Higher scores indicate a stronger tendency to notice the gap between their personal standards and their own evaluation of having met these standards. Rice et al. (2014) presented evidence of criterion-related validity through associations with neuroticism, conscientiousness, academic performance, and depression. Previous researchers reported coefficient alphas of .85 for the Discrepancy scores among American college students, suggesting good internal consistency (Slaney et al., 2001). In a sample of Chinese international students, the Discrepancy Subscale had a coefficient alpha of .95, indicating high internal consistency (Wei et al., 2007). In the present study, Cronbach’s alphas for the U.S., the Chinese, and the combined samples were .96, .89, and .94, respectively.

**Body dissatisfaction.** The Body-Esteem Scale for Adolescents and Adults (BES-AA; Mendelson, Mendelson, & White, 2001) is used as one measure of body dissatisfaction. It contains 23 items on a scale from 0 (*never*) to 4 (*always*), asking respondents to rate how much they agree with each statement in three subscales. The three subscales include appearance (e.g., “I like what I look like in pictures”), weight (e.g., “I am preoccupied with trying to change my body weight”), and attribution (e.g., “People my age like my looks”). In order to present the results in a consistent manner across measures, the scores of BES-AA were reversed so that a higher total score indicates more dissatisfaction with one’s body. In a sample that included American college women, Mendelson et al. (2001) reported a significant negative correlation between the original scores on this measure and weight, suggesting good construct validity. Jung and Forbes (2007) reported that the coefficient alphas of the subscales ranged from .76 to .93 for

the American college women sample, and .81 to .83 for the Chinese college women sample. In this study, Cronbach's alphas for the U.S., the Chinese, and the combined samples were .94, .86, and .91, respectively.

**Disordered eating.** The Eating Attitude Test – Short Version (EAT-26; Koslowsky et al., 1992) is used for the assessment of disordered eating behaviors. The EAT-26 includes 26 items, asking for the symptoms and concerns characteristic of eating disorders on a scale from 1 (*never*) to 6 (*always*). It contains three subscales: (1) Dieting — drive for thinness and dieting behaviors, (2) Bulimia and Food Preoccupation — food thoughts and bulimic behaviors, and (3) Oral Control — perceived pressure from others to gain weight and control eating (Garner, Olmsted, Bohr, & Garfunkel, 1982). Sample items include “Other people think I am too thin” and “I eat diet foods.” A total score is calculated for analysis, with a higher score indicating more symptoms of an eating disorder.

Previous studies have shown evidence for construct validity has been found in European American and Chinese samples (i.e., a significant positive correlation between the BMI and the EAT-26 total score; Kelly et al, 2012; Liao, et al., 2010). In a predominantly European American female college student sample, the test-retest correlation was .86, and the Cronbach's alpha was .91, suggesting good reliability of the EAT-26 measure in the European American population (Mazzeo, 1999). In a Chinese sample of both male and female medical students, researchers found evidence of construct validity indicated by the significant positive correlation between the BMI and the EAT-26 total score (Liao et al., 2010). Also, the reliability coefficient was .73, suggesting adequate internal consistency in a Chinese sample. In the present study, Cronbach's alphas for the U.S., the Chinese, and the combined samples were .90, .91, and .86, respectively.

### **Data Preparation**

Several steps were taken in preparing the raw data for the final dataset. First, the investigator removed cases with very minimal responses (e.g., no response was given, or only completed partial demographic information), which resulted in 487 U.S. participants and 420 Chinese participants. Second, in the U.S. sample, participants who did not meet the recruitment criteria (i.e., male, non-European Americans) were excluded from the final dataset. Approximately 165 cases were removed, resulting in a U.S. sample size of 322 cases. Third, in both U.S. and Chinese samples, participants who did not answer three validity check questions correctly were excluded from the final dataset, as this pattern of errors might indicate a tendency to respond carelessly. A sample validity check question is “Please select ‘strongly disagree’ for this question.” Thus, the sample used for data analysis included 531 participants, with 271 European American female college students and 260 Chinese female college students.

## CHAPTER FOUR. RESULTS

### Preliminary Analysis

Several preliminary analyses were conducted, including: (a) examining normality; (b) testing an order effect; (c) testing equivalency of samples; and (d) examining missing data.

**Examining normality.** In order to examining the normality assumption, all seven main measured variables (one predictor [i.e., sociocultural influences], two mediators [i.e., appearance comparison and thin-ideal internalization], two moderators [i.e., conformity to norms and maladaptive perfectionism], and two outcome variables [i.e., body dissatisfaction and disordered eating]) were examined for their skewness and kurtosis values. A  $p$  value larger than .001 was considered acceptable in order to meet the normality assumption (Tabachnick & Fidell, 2007).

In the U.S. sample, with an exception of thin-ideal internalization, most of the variables have  $p$  values for statistic values greater than .001 for skewness ranging from -.23 to .45 ( $Z$ s = -1.57 to 3.04, all  $p$ s > .001) and for kurtosis ranging from -0.73 to 0.02 ( $Z$ s = -2.47 to 0.05, all  $p$ s > .001). An exception for thin-ideal internalization generated a statistic for skewness of -0.82 ( $Z$  = -5.54,  $p$  < .001) and a statistic for kurtosis of 2.95 ( $Z$  = 7.42,  $p$  < .001).

Similarly, in the Chinese sample, for most variables, the statistics for skewness ranged from -0.35 to 0.51 ( $Z$ s = -2.32 to 3.35, all  $p$ s > .001) and the statistics for kurtosis ranged from -0.27 to 0.95 ( $Z$ s = -0.88 to 3.17, all  $p$ s > .001). Two exceptions are for thin ideal, which generated a statistic for skewness of -0.78 ( $Z$  = -5.19,  $p$  < .001) and a statistic for kurtosis of 2.21 ( $Z$  = 7.34,  $p$  < .001), and for disordered eating, which had a statistic for kurtosis of 3.98 ( $Z$  = 13.24,  $p$  < .001). The results suggest that, with a few exceptions, most of the measured variables were normally distributed in both U.S. and Chinese samples.

**Examining order effect.** Independent samples t-tests were conducted in each culture to examine if there were any significant differences on the seven measured variables between the two different survey orders that were randomly assigned to participants. The appropriate Bonferroni adjustment was applied (i.e.,  $p = 0.05/7 = .007$ ). In the US sample, the following variables revealed no differences between the two different versions: sociocultural influences,  $t(265) = 1.189, p = .24$ ; physical appearance comparison,  $t(269) = -.69, p = .49$ ; conformity to norms,  $t(269) = -1.05, p = .30$ ; maladaptive perfectionism,  $t(269) = -.91, p = .37$ ; body dissatisfaction,  $t(269) = -.58, p = .56$ ; and disordered eating,  $t(269) = .11, p = .92$ . One variable, thin-ideal internalization, demonstrated a significant mean difference between the two versions,  $t(269) = 3.41, p < .001$ . These results suggest that, in general, there was no significant order effect due to the different order of the measures in the U.S. sample.

In the Chinese sample, no significant mean differences were found among all the measured variables between the two orders. Their t-test results were: sociocultural influences,  $t(258) = .41, p = .68$ ; physical appearance comparison,  $t(258) = .50, p = .62$ ; thin-ideal internalization,  $t(258) = 1.03, p = .30$ ; conformity to norms,  $t(258) = 0.46, p = .65$ ; maladaptive perfectionism,  $t(258) = -1.12, p = .26$ ; body dissatisfaction,  $t(258) = -.62, p = .54$ ; and disordered eating,  $t(258) = -0.43, p = .67$ . Thus, no significant order effects were found regarding the order of the measures in the Chinese sample.

**Testing sample equivalence between U.S. and China.** A series of chi-square tests (for the categorical variables: year in school, relationship status, and socioeconomic status [SES]) and independent samples t-test (for the continuous variables: age and BMI) were conducted to determine whether there were any differences between the two cultural groups on any of the

demographic variables (see Table 1 for details regarding the comparisons of the demographic variables between the two samples).

First, significant differences were found between the U.S. and Chinese groups on the year in school variable:  $\chi^2(4, N = 520) = 23.92, p < .001$ . Results of univariate chi-square tests indicate that the proportions of sophomores and seniors in U.S. were significantly greater than those in China ( $ps = .03$ ), whereas the proportions of juniors in China was significantly greater than that in U.S. ( $p < .001$ ). No difference in the proportion of freshmen was found between groups ( $p = .81$ ).

Second, a significant chi-square result,  $\chi^2(3, N = 530) = 34.93, p < .001$ , also indicated proportion differences in the relationship status of U.S. and Chinese participants. Results of univariate chi-square tests indicated that the proportion of European American females who were in a dating or committed relationship was greater than that of their Chinese counterparts ( $p < .001$ ), whereas the proportion of single Chinese females was greater than that of single European American females ( $p < .001$ ). No difference in the proportion of married females was found between groups ( $p = .16$ ).

Third, a significant chi-square result,  $\chi^2(2, N = 526) = 248.21, p < .001$ , suggested differences in the SES between U.S. groups. Results of univariate chi-square tests indicated that the proportions of European Americans in the middle and upper SES were significantly greater than that of Chinese ( $ps < .001$ ), whereas the proportion of Chinese who identify as lower SES was significantly greater than their U.S. counterparts ( $p < .001$ ). Interestingly, the proportion of Chinese participants who filled out the “Other” option was greater than that of European Americans ( $p < .001$ ), and many of them explained that they were not sure how to categorize themselves as students without income.

Fourth, for the age variable, a significant t-test result,  $t(529) = -3.28, p < .001$ , indicated that Chinese participants ( $M = 19.61, SD = 1.21$ ) were older compared to their European American counterparts ( $M = 19.19, SD = 1.69$ ). A Cohen's  $d$  of 0.29 suggested that this difference only represents as a small effect size (Cohen, 1988).

Lastly, for the BMI variable, a significant t-test result,  $t(520) = 11.72, p < .001$ , indicated that European Americans had significantly higher BMI values ( $M = 23.65, SD = 4.53$ ) compared to Chinese participants ( $M = 20.03, SD = 2.02$ ). A Cohen's  $d$  of 1.03 suggested a large effect size.

Table 1.

*Demographic Information and Sample Comparisons*

|   | European<br>Americans<br>( <i>n</i> = 271) | Chinese<br>( <i>n</i> = 260) | Differences between<br>Groups                             |
|---|--|------------------------------|---|
| Categorical Variables                         |  |                              |   |
| Year in School, <i>n</i> (%)                  |  |                              |   |
| Freshman                                      | 151 (56%)                                  | 135 (54%)                    |   |
| Sophomore                                     | <b>73 (27%)</b>                            | 45 (18%)                     | $\chi^2(4, N = 520) = 23.92,$<br>$p < .001$               |
| Junior  | 35 (13%)                                   | <b>67 (27%)</b>              |   |
| Senior  | <b>11 (4%)</b>                             | 2 (1%)                       |   |
| Other   | 1 (0%)                                     | 0 (0%)                       |   |
| Relationship Status, <i>n</i> (%)             |  |                              |   |
| Single  | 137 (51%)                                  | <b>189 (73%)</b>             | $\chi^2(3, N = 530) = 34.93,$<br>$p < .001$               |
| Dating/Committed                              | <b>131 (48%)</b>                           | 65 (25%)                     |   |
| Married                                       | 2 (0.7%)                                   | 0 (0%)                       |   |
| Other   | 1 (0.4%)                                   | 5 (2%)                       |   |
| Socioeconomic Status, <i>n</i> (%)            |  |                              |   |
| Lower   | 27 (10%)                                   | <b>169 (66%)</b>             | $\chi^2(3, N = 526) = 263.67,$<br>$p < .001$              |
| Middle  | <b>135 (50%)</b>                           | 50 (20%)                     |   |
| Upper   | <b>108 (40%)</b>                           | 5 (2%)                       |   |
| Other   | 1 (0%)                                     | <b>31 (12%)</b>              |   |
| Continuous Variables                          |  |                              |   |
| Age (in years), <i>M</i> ( <i>SD</i> )        | 19.19 (1.69)                               | 19.61 (1.21)                 | $t(529) = -3.28, p < .001$<br>Cohen's $d = 0.29$ , medium |
| Body Mass Index (BMI), <i>M</i> ( <i>SD</i> ) | 23.65(4.53)                                | 20.03(2.02)                  | $t(520) = 11.72, p < .001$<br>Cohen's $d = 1.03$ , large  |

*Note.* Bold numbers indicate a significantly greater value compared to the other group.

**Missing data analysis.** The missing data were examined to see whether the missing pattern is completely random. The result from Little's missing completely at random test was found to be non-significant,  $\chi^2(4966, N = 531) = 5027.78, p = .27$ , suggesting that there was no significant difference between the missing and non-missing cases.

### **Descriptive Statistics**

Means, standard deviations, and zero-order correlations among the variables are presented in Table 2.

**Zero-order correlations.** All correlations among seven main measured variables were significant in the expected direction with a few exceptions (see Table 2). That is, the association between thin-ideal internalization and disordered eating was not significant ( $r = -.02, p = .80$ ) for Chinese. One of the moderators, conformity to norms, has either weak or non-significant associations with all other variables in both samples. The other moderator, maladaptive perfectionism, was not significantly associated with sociocultural influence for Chinese. These two moderators were not significantly associated to each other in both European American and Chinese.

In order to know whether these associations are the same or different across these two cultural groups, a series of independent correlations difference tests were conducted using the Fisher  $r$ -to- $Z$  transformation (Lowry, 2015). Because multiple tests were conducted simultaneously, a Bonferroni adjustment was adopted and a  $p$  value was set to  $.05/21 = .00238$  (i.e.,  $.05/21 = .00238$ ) as a critical value for significance tests. Seven pairs of correlations were found to be significantly different in which the European American sample had stronger correlation coefficients than the Chinese sample. In the first two pairs, European Americans ( $r_s = .44$  and  $.49$ ) reported stronger than Chinese ( $r_s = .06$  and  $.23$ ) in the associations of maladaptive

perfectionism with sociocultural influence ( $Z = 4.72, p = .000002$ ) and appearance comparison ( $Z = 3.45, p = .000545$ ). In the next two pairs, European Americans ( $r_s = .61$  and  $.63$ ) continued to report stronger than Chinese ( $r_s = .18$  and  $.29$ ) for the associations of body dissatisfaction with appearance comparison ( $Z = 6.04, p = .00000$ ) and maladaptive perfectionism ( $Z = 5.07, p = .00000$ ). In the final three paired, European Americans ( $r_s = .27, .46,$  and  $.52$ ) still reported stronger than Chinese ( $r_s = -.02, .14,$  and  $.30$ ) for the associations of disordered eating with thin-ideal internalization ( $Z = 3.40, p = .000673$ ), maladaptive perfectionism ( $Z = 4.08, p = .000045$ ), and body dissatisfaction ( $Z = 3.05, p = .002242$ ).

**Mean differences.** A series of independent samples t-tests were performed to identify the differences in the seven measured variables specified in the model between the European American and Chinese samples. As indicated in Table 3, two variables, sociocultural influences and body dissatisfaction, had no significant mean differences between these two groups. However, three variables (i.e., appearance comparison, maladaptive perfectionism, and disorder eating) had higher mean scores for European Americans than for Chinese. In particular, the mean difference in appearance comparison between European Americans ( $M = 2.52$ ) and Chinese ( $M = 1.20$ ) had a large effect size. Conversely, two variables, thin-ideal internalization and conformity to norms, had a higher mean score for Chinese than for European Americans. In particular, the mean difference in conformity to norms between Chinese ( $M = 5.40$ ) and European Americans ( $M = 3.19$ ) had a large effect size.

Table 2.

*Descriptive Statistics and Intercorrelations for Measured Variables*

| Variable                             | <i>M</i> | <i>SD</i> | Possible Range | Sample Range | 1       | 2      | 3      | 4      | 5     | 6      | 7      | 8   |
|--------------------------------------|----------|-----------|----------------|--------------|---------|--------|--------|--------|-------|--------|--------|-----|
| European Americans ( <i>n</i> = 271) |          |           |                |              |         |        |        |        |       |        |        |     |
| 1. BMI                               | 23.65    | 4.53      | N/A            | 16.30-42.90  | ---     |        |        |        |       |        |        |     |
| 2. SATAQ                             | 2.92     | 0.80      | 1-5            | 1.10-4.60    | .33***  | ---    |        |        |       |        |        |     |
| 3. PACS-R                            | 2.52     | 0.90      | 0-4            | 0.00-4.00    | .22***  | .50*** | ---    |        |       |        |        |     |
| 4. IBSS-R                            | 3.60     | 0.56      | 1-5            | 1.00-5.00    | .08     | .23*** | .31*** | ---    |       |        |        |     |
| 5. AAVS-M                            | 3.19     | 0.94      | 1-7            | 1.00-5.70    | -.10    | .08    | .14*   | .14*   | ---   |        |        |     |
| 6. APS-RS                            | 4.15     | 1.40      | 1-7            | 1.00-7.00    | .19**   | .44*** | .49*** | .20**  | .09   | ---    |        |     |
| 7. BES-AA                            | 2.03     | 0.67      | 0-4            | 0.60-3.70    | .49***  | .58*** | .61*** | .22*** | .02   | .63*** | ---    |     |
| 8. EAT-26                            | 2.58     | 0.66      | 1-6            | 1.20-4.60    | .12     | .43*** | .55*** | .27*** | .13*  | .46*** | .52*** | --- |
| Chinese ( <i>n</i> = 260)            |          |           |                |              |         |        |        |        |       |        |        |     |
| 1. BMI                               | 20.03    | 2.02      | N/A            | 15.20-30.10  | ---     |        |        |        |       |        |        |     |
| 2. SATAQ                             | 3.01     | 0.81      | 1-5            | 1.00-5.00    | .48***  | ---    |        |        |       |        |        |     |
| 3. PACS-R                            | 1.20     | 0.66      | 0-4            | 0.00-3.50    | .16*    | .35*** | ---    |        |       |        |        |     |
| 4. IBSS-R                            | 3.82     | 0.64      | 1-5            | 1.00-5.00    | .03     | .27*** | .21**  | ---    |       |        |        |     |
| 5. AAVS-M                            | 5.40     | 0.79      | 1-7            | 2.70-7.00    | -.09    | -.03   | .02    | .10    | ---   |        |        |     |
| 6. APS-RS                            | 3.73     | 1.00      | 1-7            | 1.30-6.90    | -.03    | .06    | .23*** | .13*   | .09   | ---    |        |     |
| 7. BES-AA                            | 1.98     | 0.49      | 0-4            | 0.40-3.70    | .37***  | .51*** | .18**  | .22*** | -.10  | .29*** | ---    |     |
| 8. EAT-26                            | 2.34     | 0.49      | 1-6            | 1.20-5.10    | .19**   | .39*** | .38*** | -.02   | .06   | .14*   | .30*** | --- |
| Combined ( <i>N</i> = 531)           |          |           |                |              |         |        |        |        |       |        |        |     |
| 1. BMI                               | 21.88    | 3.97      | N/A            | 15.20-42.90  | ---     |        |        |        |       |        |        |     |
| 2. SATAQ                             | 3.00     | 0.81      | 1-5            | 1.00-5.00    | .29***  | ---    |        |        |       |        |        |     |
| 3. PACS-R                            | 1.88     | 1.03      | 0-4            | 0.00-4.00    | .43***  | .29*** | ---    |        |       |        |        |     |
| 4. IBSS-R                            | 3.71     | 0.61      | 1-5            | 1.00-5.00    | -.03    | .25*** | .09*   | ---    |       |        |        |     |
| 5. AAVS-M                            | 4.27     | 1.41      | 1-7            | 1.00-7.00    | -.41*** | .06    | -.46*  | .21*** | ---   |        |        |     |
| 6. APS-RS                            | 3.95     | 1.24      | 1-7            | 1.10-7.00    | .19***  | .27*** | .41*** | .13**  | -.08  | ---    |        |     |
| 7. BES-AA                            | 2.01     | 0.59      | 0-4            | 0.40-3.70    | .42***  | .54*** | .38*** | .20*** | -.05  | .52*** | ---    |     |
| 8. EAT-26                            | 2.46     | 0.60      | 1-6            | 1.20-5.10    | .21***  | .39*** | .50*** | .10*   | -.10* | .38*** | .45*** | --- |

*Note.* BMI = Body Mass Index; SATAQ = Sociocultural Attitudes towards Appearance Questionnaire; PACS-R = Physical Appearance Comparison Scale, Revised; IBSS-R = Ideal-Body Stereotype Scale, Revised; AAVS-M = Asian American Values Scale – Multidimensional; APS-RS = Almost Perfect Scale – Revised Short Form; BES-AA = Body-Esteem Scale for Adolescents and Adults; EAT-26 = Eating Attitude Test – Short Version. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

Table 3

*Mean Comparison of Measured Variables between Two Groups*

|  | European Americans<br>(n=271) | Chinese<br>(n=260) | Differences between<br>Groups | Effect Size<br>(Cohen's <i>d</i> ) |
|--|-------------------------------|--------------------|-------------------------------|------------------------------------|
| Measured Variables, <i>M</i> ( <i>SD</i> ) |                               |                    |                               |                                    |
| Sociocultural Influences                   | 2.92 (0.80)                   | 3.01 (0.81)        | $t(529) = -1.185, p = .24$    | -0.11, small                       |
| Appearance Comparison                      | <b>2.52 (0.90)</b>            | 1.20 (0.66)        | $t(529) = 19.24, p < .001$    | 1.67, large                        |
| Thin-Ideal Internalization                 | 3.60 (0.56)                   | <b>3.82 (0.64)</b> | $t(529) = -4.07, p < .001$    | -0.37, small                       |
| Conformity to Norms                        | 3.19 (0.94)                   | <b>5.40 (0.79)</b> | $t(529) = -29.36, p < .001$   | -2.55, large                       |
| Maladaptive Perfectionism                  | <b>4.15 (1.40)</b>            | 3.73 (1.00)        | $t(529) = 3.93, p < .001$     | 0.35, small                        |
| Body Dissatisfaction                       | 2.03 (0.67)                   | 1.98 (0.49)        | $t(529) = 1.00, p = .32$      | 0.09, small                        |
| Disordered Eating                          | <b>2.58 (0.66)</b>            | 2.34 (0.49)        | $t(529) = 4.85, p < .001$     | 0.41, small                        |

*Note.* Bold mean scores indicate a significantly greater value for that group.

### **Test for Measurement Invariance across Groups**

The metric level of measurement invariance for each scale was tested across groups in order to determine whether a scale was interpreted in a conceptually similar manner by participants from U.S. and China. Metric invariance requires relatively equal factor loadings on items or parcels across groups (Dimitrov, 2010). In cross-cultural studies, it is common to run into situations when the assumption of full measurement invariance is difficult to meet. This lack of full measurement invariance may be due to some items loading on different factors in different groups. To compromise, Byrne, Shavelson, and Muthén (1989) suggested the idea of partial measurement invariance, which only requires factor loading invariance of some, rather than all, items of a measure across groups. Therefore, when a measure is proved to be partially invariant with at least one item/parcel being metrically invariant across groups, results from further analyses should still be considered meaningful (Steenkamp & Baumgartner, 1998).

For appearance comparison, thin-ideal internalization, conformity to norms, and maladaptive perfectionism, each item was used as an indicator to create a latent variable. For sociocultural influences (SATAQ-4, 12 items), body dissatisfaction (BES-AA, 23 items), and disordered eating (EAT, 26 items), considering these measures contain subscales and/or have a large number of items, the item parceling technique was adopted. Specifically, items from the SATAQ-4 were paired based on their factor loadings (i.e., pairing items with the highest factor loading and the lowest factor loading, successively) and distributed into three parcels with average loadings. Parcels in the BES-AA and EAT were created based on the subscales of the measure.

In each measure, a free model (i.e., freely estimated factor loadings) and a constrained model (i.e., factor loadings constrained to be equal in two groups) were conducted in an Mplus

multiple group analysis. At least one of the two criteria had to be met for the researchers to conclude invariant factor loadings across the U.S. and Chinese samples: (a) A chi-square difference test between the free and the constrained groups should be non-significant; or (b) the difference in the comparative fit index values (CFIs) between the free and the constrained groups should be less than .01 (Cheung & Rensvold, 2002).

Details about the results of measurement invariance testing are reported in Table 4. The results suggest that, the factor loadings of sociocultural influences and appearance comparison appeared invariant for European American and Chinese participants. The factor loadings of thin-ideal internalization, conformity to norms, maladaptive perfectionism, body dissatisfaction, and disordered eating demonstrated partial invariance after a number of items or parcels were set free in the constrained model.

Table 4  
*Factor Loading Invariance Tests between European Americans and Chinese*

| Model                                  | <i>df</i> | $\chi^2$ | <i>p</i> | CFI   | SRMR | RMSEA(CI)      | $\Delta \chi^2(df)$ | <i>p</i> | $\Delta$ CFI |
|--|-----------|----------|----------|-------|------|----------------|---------------------|----------|--------------|
| Sociocultural Influences (Parcels)     |           |          |          |       |      |                |                     |          |              |
| 1. Free                                | 0         | 0.00     | .00      | 1.000 | .00  | .00 [.00, .00] |                     |          |              |
| 2. Constrained                         | 3         | 7.43     | .06      | 1.000 | .06  | .08 [.00, .14] | 7.43(3)             | .06      | .00          |
| Physical Appearance Comparison (Items) |           |          |          |       |      |                |                     |          |              |
| 1. Free                                | 88        | 569.97   | .00      | .886  | .06  | .14 [.13, .16] |                     |          |              |
| 2. Constrained                         | 99        | 613.00   | .00      | .879  | .14  | .14 [.13, .15] | 43.03(11)           | .00      | .007         |
| Thin-Ideal Internalization (Items)     |           |          |          |       |      |                |                     |          |              |
| 1. Free                                | 18        | 79.84    | .00      | .947  | .05  | .11 [.09, .14] |                     |          |              |
| 2. Constrained                         | 24        | 99.77    | .00      | .935  | .14  | .11 [.09, .13] | 19.93(6)            | .003     | .012         |
| 3. Partially Constrained               | 23        | 85.30    | .00      | .947  | .10  | .10 [.08, .12] | 5.46(5)             | .36      | .00          |
| Conformity to Norms (Items)            |           |          |          |       |      |                |                     |          |              |
| 1. Free                                | 28        | 138.92   | .00      | .866  | .06  | .12 [.10, .14] |                     |          |              |
| 2. Constrained                         | 35        | 175.00   | .00      | .831  | .16  | .12 [.11, .14] | 36.08(7)            | .00      | .10          |
| 3. Partially Constrained               | 32        | 144.62   | .00      | .864  | .07  | .12 [.10, .14] | 5.70(4)             | .22      | .002         |
| Perfectionism (Items)                  |           |          |          |       |      |                |                     |          |              |
| 1. Free                                | 108       | 544.13   | .00      | .897  | .05  | .12 [.11, .13] |                     |          |              |
| 2. Constrained                         | 120       | 603.76   | .00      | .885  | .15  | .12 [.11, .13] | 59.63(12)           | .00      | .012         |
| 3. Partially Constrained               | 118       | 586.20   | .00      | .889  | .14  | .12 [.11, .13] | 42.07(11)           | .00      | .008         |
| Body Dissatisfaction (Parcels)         |           |          |          |       |      |                |                     |          |              |
| 1. Free                                | 0         | 0.00     | .00      | 1.000 | .00  | .00 [.00, .00] |                     |          |              |
| 2. Constrained                         | 3         | 31.56    | .00      | .930  | .23  | .19 [.13, .25] | 31.56(3)            | .00      | 0.07         |
| 3. Partially Constrained               | 1         | 3.96     | .05      | .993  | .06  | .11 [.01, .22] | 3.96(1)             | .05      | 0.007        |
| Disordered Eating (Parcels)            |           |          |          |       |      |                |                     |          |              |
| 1. Free                                | 0         | 0.00     | .00      | 1.000 | .00  | .00 [.00, .00] |                     |          |              |
| 2. Constrained                         | 3         | 32.69    | .00      | .860  | .21  | .19 [.14, .26] | 32.69(3)            | .00      |              |
| 3. Partially Constrained               | 2         | .673     | .71      | 1.000 | .02  | .00 [.00, .09] | 0.67(2)             | .71      | .00          |

### **Test of the Path Model with Mediation**

The first set of hypotheses specified that appearance comparison and thin ideal internalization would mediate the associations between sociocultural influences and body dissatisfaction/disordered eating in U.S. and Chinese samples, as suggested by the Tripartite Influence Model. BMI was controlled for as a covariate. Mplus Version 7.3 program (Muthén & Muthén, 2010) was used to first test this mediated path model for the U.S. and Chinese samples, separately. Three fit indices were used to evaluate the goodness-of-fit of the models. The comparative fit index ( $CFI \geq .90$ ), the root-mean-square-error of approximation (RMSEA), and the standardized root-mean-square residual ( $SRMR \leq .10$ ) indicate an acceptable fit; a  $CFI \geq .95$ ,  $RMSEA \leq .06$ , and  $SRMR \leq .08$  indicate an excellent fit (e.g., Hu & Bentler, 1999).

Since the mediated path model is a fully saturated model, in both European American and Chinese samples, the model demonstrated a perfect fit. Specifically, as indicated in Figure 5, in the European American sample, the associations among most variables were significant and followed the hypothesized directions, with a few exceptions. First, thin-ideal internalization did not significantly predict body dissatisfaction ( $\beta = .004, p = .93$ ). Second, thin-ideal internalization did not significantly predict disordered eating ( $\beta = .09, p = .08$ ). In addition, the model explained 39% of the variance in disordered eating and 56% of the variance in body dissatisfaction among European Americans.

For the Chinese sample, similarly, most of the associations were significant and confirmed the hypothesized directions, with two exceptions (see Figure 6). First, thin-ideal internalization did not significantly predict body dissatisfaction ( $\beta = .10, p = .06$ ). Second, appearance comparison did not significantly predict body dissatisfaction ( $\beta = -.01, p = .83$ ).

Moreover, the model explained 26% of the variance in disordered eating and 29% of the variance in dissatisfaction among Chinese participants.

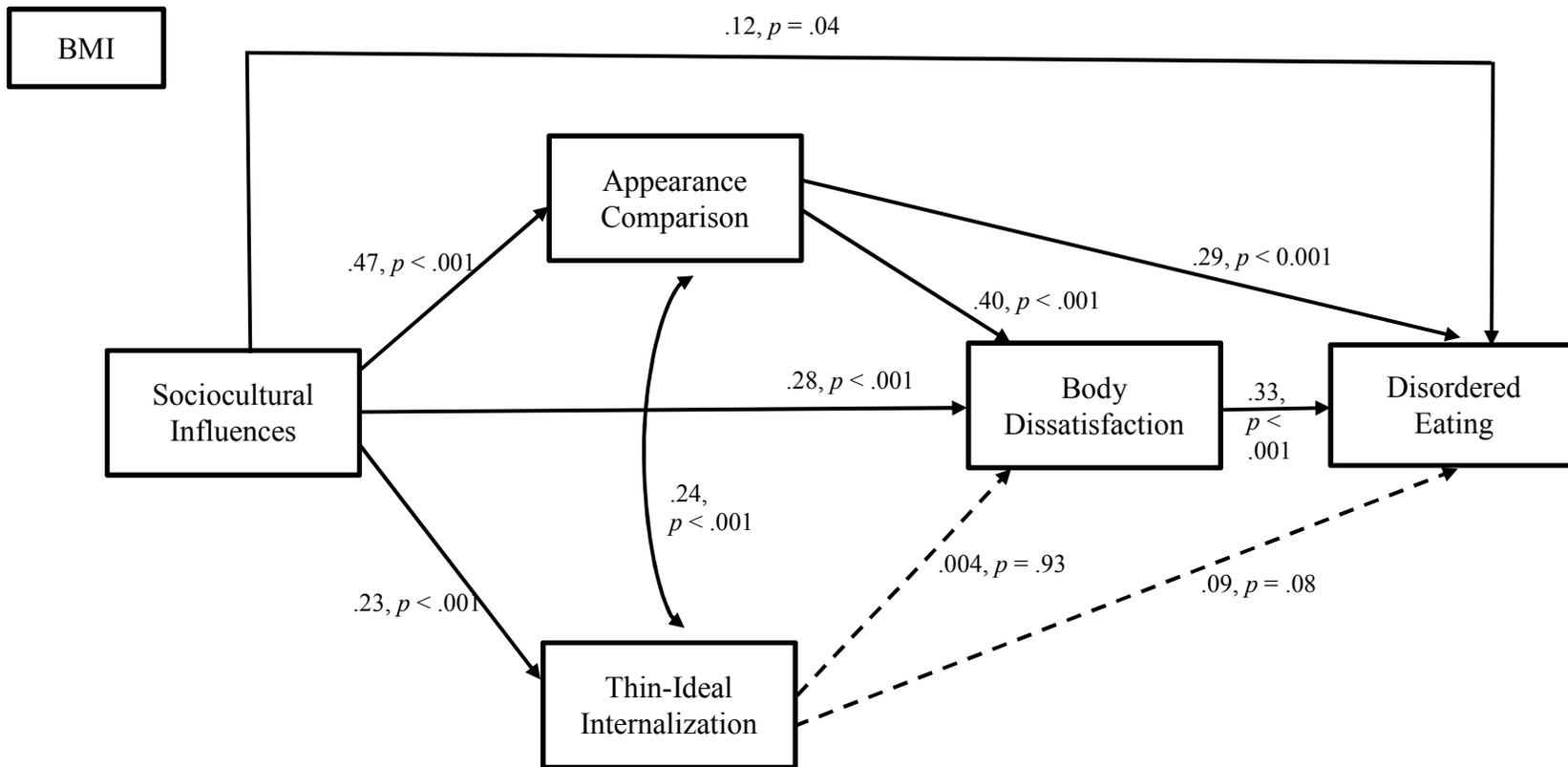


Figure 5. The Mediated Path Model with Standardized Path Coefficients for the European American Sample (The effect of BMI was statistically controlled for). Dashed line represent non-significant paths.

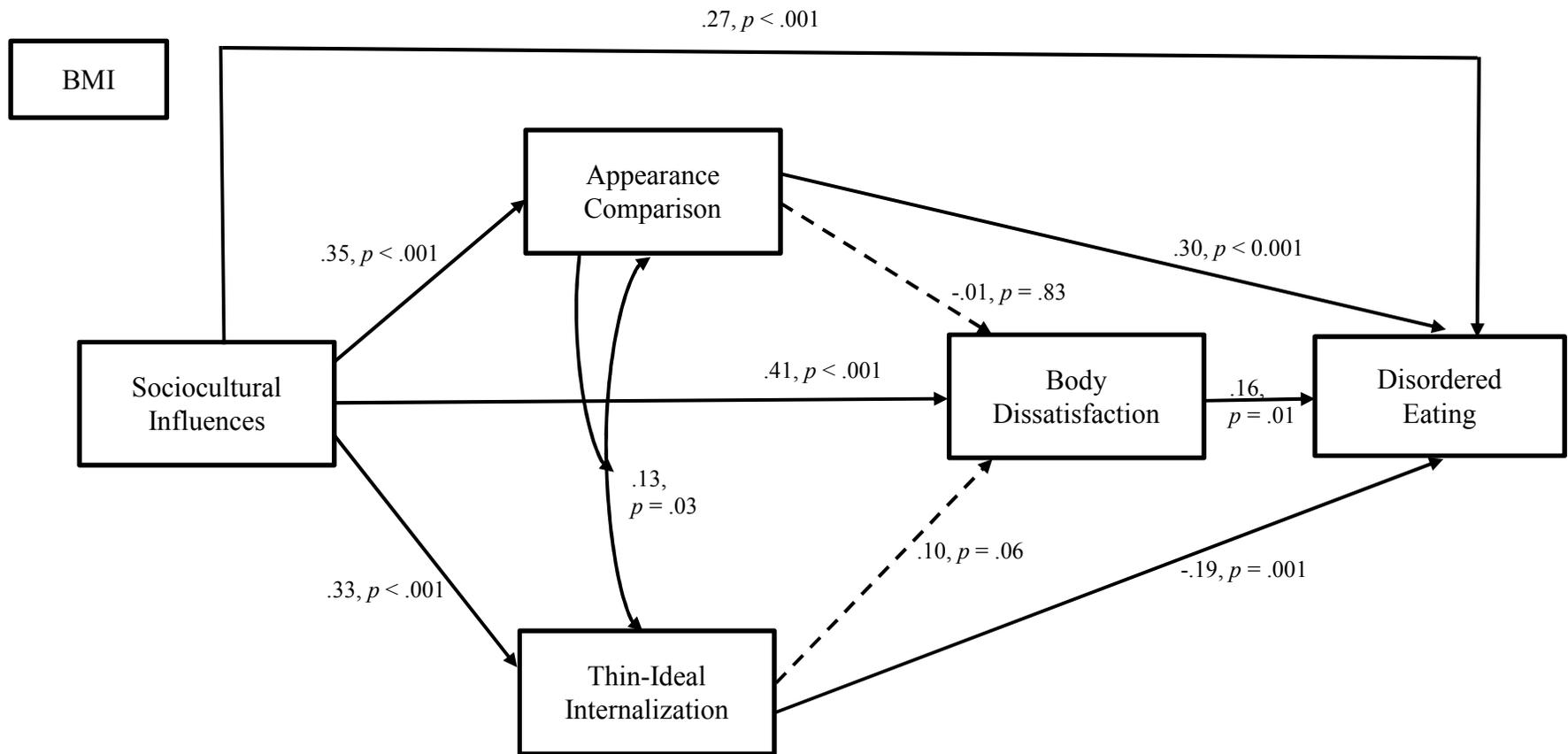


Figure 6. The Mediated Path Model with Standardized Path Coefficients for the Chinese Sample (The effect of BMI was statistically controlled for). Dashed lines represent non-significant paths.

Next, a multiple group analysis was used to examine whether the path coefficients were invariant across two samples. The freely estimated model was conducted to allow the path coefficients to vary between the two samples. The constrained model was conducted to have all path coefficients of the same model set to be equal across two groups. The constrained model was then compared to the freely estimated model to determine if these two models were statistically significantly different from each other. If a chi-square difference test suggests no difference between these two models, it may be concluded that there was no difference in the path coefficients between the two countries. Conversely, if a chi-square difference test suggests a significant difference in the path coefficients, modification indices would be used to identify which path coefficients were different across two samples.

The freely estimated model is a fully saturated model, so it had a perfect fit with a chi-square value of zero. The results for the constrained model were  $\chi^2(10, N = 531) = 63.99, p < .05$ , CFI = .92, RMSEA = .14, 90% confidence interval (CI) [.11, .18], SRMR = .11. Therefore, the chi-square difference test revealed a significant difference between the freely estimated model and the constrained model,  $\Delta \chi^2(10, N = 531) = 63.99, p < .01$ , suggesting differences in path coefficients of the hypothesized model between the U.S. and Chinese samples.

To identify which paths differ in the coefficients between groups, we examined the modification indices provided by the Mplus output of the constrained path model. Modification indices are the amount of chi-square value that would drop if a parameter is freely estimated as part of the model rather than constrained to be equal (Muthén & Muthén, 2010). Following the suggestions of the modification indices, three paths, one at a time, were identified as to be not invariant and needed to be freely estimated, including: (a) appearance comparison  $\rightarrow$  body dissatisfaction (U.S.:  $\beta = .40, p < .001$ ; China:  $\beta = -.01, p = .83$ ); (b) thin-ideal internalization  $\rightarrow$

disordered eating (U.S.:  $\beta = .09, p = .08$ ; China:  $\beta = -.186, p < .01$ ); and (c) sociocultural influences  $\rightarrow$  appearance comparison (U.S.:  $\beta = .47, p < .001$ ; China:  $\beta = .35, p < .001$ ). After removing constraints on these three paths, the chi square of the partial constrained model was  $\chi^2(7, N = 531) = 9.01, p = .25$ , indicating that there was no difference in the rest of the path coefficients of this partially constrained model between the U.S. and Chinese groups.

The significance of the indirect effects was tested using the bootstrap procedure (Mallinckrodt, Abraham, Wei, & Russell, 2006) for the freely estimated mediated path model. One thousand bootstrap samples were requested in the Mplus program to estimate five mean indirect effects (e.g., sociocultural influences  $\rightarrow$  appearance comparison  $\rightarrow$  body dissatisfaction  $\rightarrow$  disordered eating; see Table 3 for all five indirect effects). The bootstrap method created 1,000 samples by randomly sampling the actual sample, with replacement. Therefore, 1,000 path coefficient estimates were obtained. Next, the 1,000 pairs of path coefficients were multiplied from the independent variable (i.e., sociocultural influences) to the mediator variables (i.e., appearance conformity and thin ideal internalization); then they were multiplied from the mediator variables to the dependent variable (i.e., body dissatisfaction and disordered eating). The 95% CI was used to examine the significant level of the indirect effect estimates. If the 95% CI does not include zero, they would be considered significant at the .05 level.

The results of indirect effect testing are located in Table 5. First, with respect to appearance comparison, the first indirect effect (sociocultural influences  $\rightarrow$  appearance comparison  $\rightarrow$  disordered eating) was significant in both European American and Chinese samples, providing support for the mediation effect of appearance comparison in the association between sociocultural influences and disordered eating in both countries.

However, the second indirect effect (sociocultural influences → appearance comparison → body dissatisfaction → disordered eating) was only significant in the U.S. group, suggesting that appearance comparison mediates the association between sociocultural influences and body dissatisfaction and disordered eating only for European Americans, not for Chinese. Therefore, the mediation role of appearance comparison was partially supported.

Second, with respect to thin-ideal internalization, the third indirect effect (sociocultural influences → thin-ideal internalization → disordered eating) was only significant in the Chinese sample, suggesting that thin-ideal internalization mediates the association between sociocultural influence and disordered eating only among Chinese; however, the negative direction for indirect effect was contrary to the hypothesized direction due to the negative association between thin-ideal internalization and disordered eating ( $r = -.19, p = .001$ ). When comparing the zero order correlation for this association ( $r = -.02, p = .80$ , see Table 2), changes from non-significance to significance for this association may suggest a possible suppression effect. Therefore, it is premature to conclude that thin-ideal was a significant mediator in the path from sociocultural influences to disordered eating for Chinese.

Surprisingly, no significance was found in either group for the fourth indirect effect (sociocultural influences → thin-ideal internalization → body dissatisfaction → disordered eating), even though thin-ideal internalization has been recognized as a robust risk factor in body dissatisfaction and disordered eating in the literature (e.g., Thompson et al., 1999). This result suggests that thin-ideal internalization does not mediate the associations among sociocultural influences and body dissatisfaction and disordered eating in either group. Therefore, the hypothesized mediation role of thin-ideal internalization was not supported in the current finding.

Third, with respect to body dissatisfaction, the fifth indirect effect (sociocultural influences → body dissatisfaction → disordered eating) were significant in both U.S. and Chinese groups, providing additional support to the literature for the mediation effect of body dissatisfaction on the association between sociocultural influences and disordered eating.

Table 5  
 Bootstrap Analysis of Magnitude and Statistical Significance of Indirect Effects

| Indirect Effect   | $\beta$ (Standardized Path Coefficient and Product) | Mean Indirect Effect (b) <sup>a</sup> | SE of Mean <sup>a</sup> | 95% CI of bootstrap with bias correction for Mean Indirect Effect (lower, upper) |
|---|---|---------------------------------------|-------------------------|--|
| European Americans ( <i>n</i> = 271)  |   |                                       |                         |  |
| 1. Sociocultural Influences → Comparison → Disordered Eating                        | .47×.29=.14   | .14                                   | .033                    | .06, .17*  |
| 2. Sociocultural Influences → Comparison → Body Dissatisfaction → Disordered Eating | .47×.40×.33 = .06                                   | .06                                   | .017                    | .03, .09*  |
| 3. Sociocultural Influences → Ideal → Disordered Eating                             | .23×.09=.02   | .02                                   | .014                    | -.001, .04   |
| 4. Sociocultural Influences → Ideal → Body Dissatisfaction → Disordered Eating      | .23×.004×.33 = .00                                  | .00                                   | .004                    | -.01, .01  |
| 5. Sociocultural Influences → Body Dissatisfaction → Disordered Eating              | .28×.33=.10   | .10                                   | .027                    | .04, .13*  |
| Chinese ( <i>n</i> = 260)   |   |                                       |                         |  |
| 1. Sociocultural Influences → Comparison → Disordered Eating                        | .35×.30=.11   | 0.11                                  | .028                    | .03, .11*  |
| 2. Sociocultural Influences → Comparison → Body Dissatisfaction → Disordered Eating | .35×(-.01)×.16=-.001                                | -0.001                                | .004                    | -.01, .01  |
| 3. Sociocultural Influences → Ideal → Disordered Eating                             | .33×(-.19)=-.06                                     | -0.06                                 | .030                    | -.08, -.01*  |
| 4. Sociocultural Influences → Ideal → Body Dissatisfaction → Disordered Eating      | .33×.10×.16=.01                                     | 0.01                                  | .004                    | .00, .01   |
| 5. Sociocultural Influences → Body Dissatisfaction → Disordered Eating              | .41×.16=.07   | 0.07                                  | .029                    | .01, .08*  |

Note. \*95% Confidence Interval does not include zero and therefore is significant at  $p < .05$ .

<sup>a</sup>These values are based on the unstandardized path coefficients.

### Test for Moderated Mediation in Path Analysis

In testing two moderators (conformity to norms and perfectionism), all participants from two countries were combined as a whole sample. The method of path analysis was again used to test for two moderating variables using Mplus, following the suggestions by Little, Card, Bovaird, Preacher, and Crandall (2007). All variables were centered on their grand means to control for issues of multi-collinearity (Aiken & West, 1991; Frazier, Tix, & Barron, 2004).

To test the moderation effects, one interaction term (i.e., comparison  $\times$  conformity) was created by calculating the product of the predictor (i.e., appearance comparison) and the moderator (i.e., conformity to norms). Similarly, the other interaction term was created as internalization  $\times$  maladaptive perfectionism. The moderators and interaction terms were added to the previous mediated path model (see the hypothesized model in Figure 2).

The new moderated mediation model demonstrated a reasonably good fit to the data ( $\chi^2 = 61.07, p < .001, CFI = .95, SRMR = .05, RMSEA = .11, 95\% CI [.09, .14]$ ). A significant interaction of appearance comparison with conformity to norms on body dissatisfaction was found ( $\beta = -.11, p < .01$ ); however, no significant interaction effect on body dissatisfaction was found for thin-ideal internalization and maladaptive perfectionism ( $\beta = .04, p = .25$ ), which was not expected in the hypothesis.

A simple effect analysis indicated that the association between appearance comparison and body dissatisfaction was significantly positive for those who indicated a low tendency to conform to norms ( $b = 0.1, p < .01$ ); the same association was negative for those who indicated a high tendency to conform to norms, though the simple slope was non-significant ( $b = -.03, p = .28$ ). Line graphs indicating the simple effects are plotted (see Figure 7).

In addition, even though the interaction between thin-ideal internalization and maladaptive perfectionism was not significant, a simple effect analysis illustrated that for individuals with either low or high maladaptive perfectionism, their body dissatisfaction did not significantly change as their thin-ideal internalization increased. The simple slope for low maladaptive perfectionism was not significant and close to zero ( $b = 0.01, p = .82$ ). However, the simple slope for high maladaptive perfectionism was approaching significance ( $b = 0.08, p = .06$ ), suggesting that there is a tendency for high perfectionism individuals to experience more body dissatisfaction as they internalize more thin-ideal, though such tendency is not statistically significant (see Figure 8).

**Post hoc analysis.** In order to know whether the significant moderation would hold for one or both samples, a post hoc, hierarchical multiple regression analysis was conducted in IBM SPSS Statistics (Version 22). The moderating effect of conformity to norms for body dissatisfaction was examined in each sample. In the first step, BMI, sociocultural influences, and thin-ideal internalization were entered as covariates. In the second step, appearance comparison and conformity to norms were entered. Next, the interaction term between comparison and conformity was entered to the regression model. In the European American sample, the result indicated that the interaction term was not significant,  $\Delta R^2 = .00, \Delta F(1, 260) = 11.53, p < .001; b = 0.01, t(260) = 0.17, p = .87$ .

The last step accounted for a significant proportion of the variance in body dissatisfaction among the Chinese participants,  $\Delta R^2 = .02, \Delta F(1, 254) = 19.30, p < .001; b = 0.12, t(254) = 2.36, p = .02$ . The significant pattern for simple slopes is consistent with that in the combined sample. Such result suggests conformity to norms may have a more salient interaction effect in the Chinese sample.

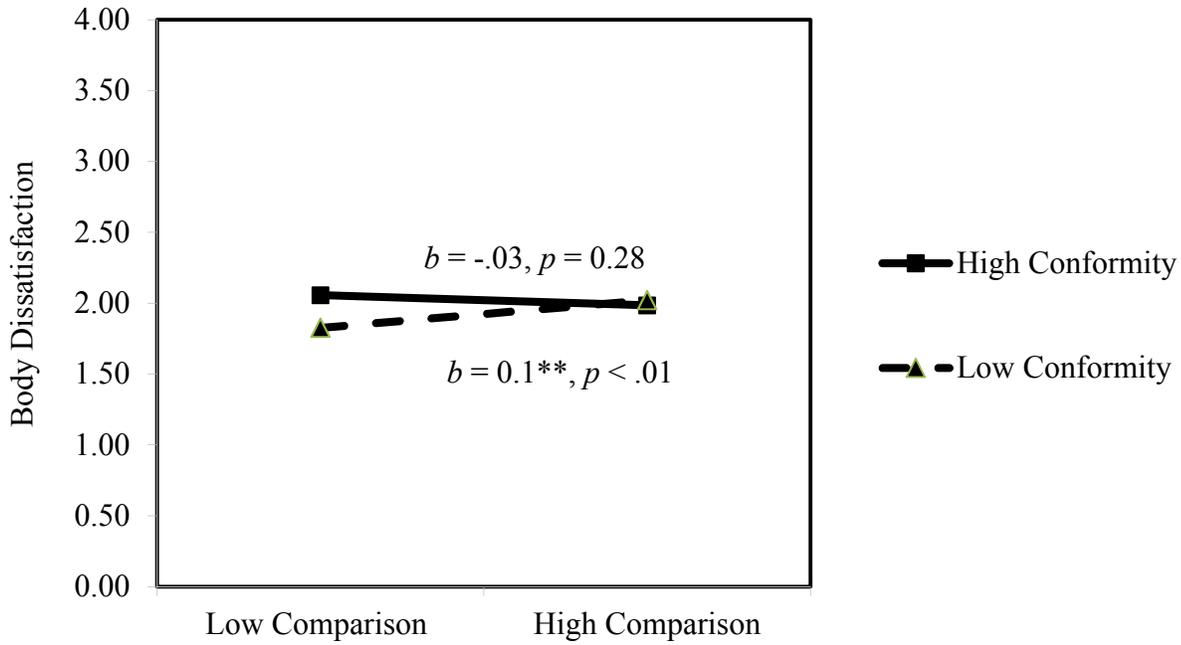


Figure 7. Interaction between conformity to norms and appearance comparison in a combined sample.

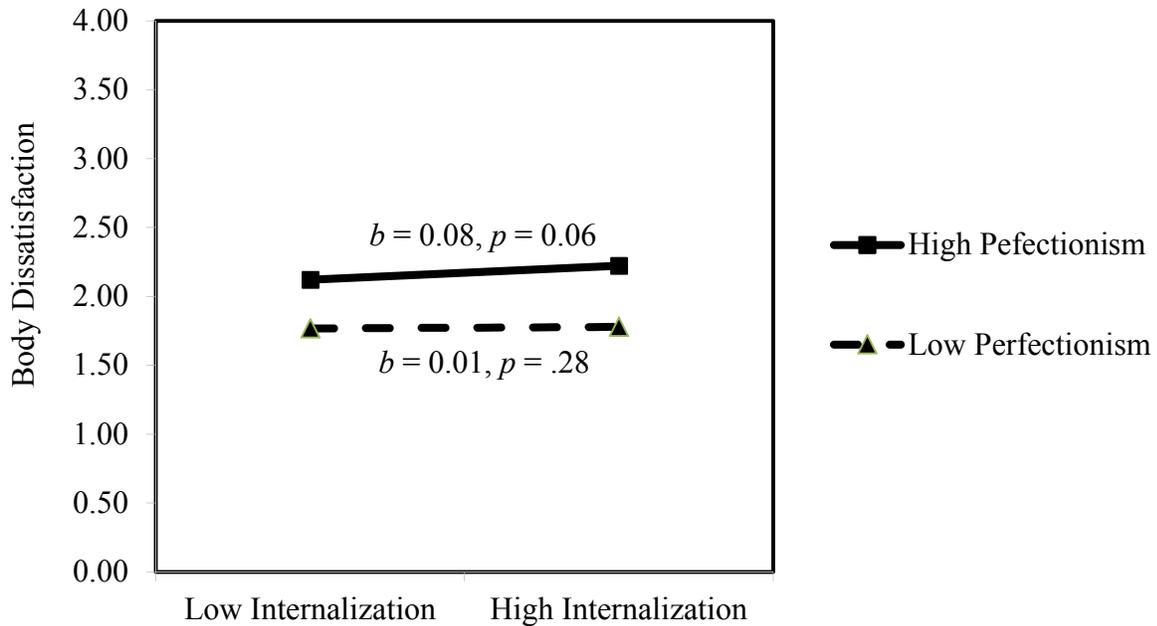


Figure 8. Interaction between maladaptive perfectionism and thin-ideal internalization in a Combined Sample.

## **CHAPTER FIVE. DISCUSSION**

In the last two decades, the Tripartite Influence Model has received increasing attention in the literature to understand the development of concerns related to body image and disordered eating. It specifies the impacts of sociocultural influences (i.e., family, peers, and media) on body dissatisfaction and disordered eating. It also outlines the indirect, mediating effects of appearance comparison and thin-ideal internalization on the associations among these variables (Thompson et al., 1991). This model has been validated in the western countries, especially among the European American samples (e.g., Keery et al., 2004; Shroff & Thompson, 2006; van den Berg, et al., 2002). However, to my knowledge, this is the first study that aims to validate the Tripartite Influence Model in a Chinese female college student population and compare this sample with a European American sample. Moreover, this study takes one step further by exploring the potential moderating effects of a cultural value variable, conformity to norms, and a personality trait variable, maladaptive perfectionism in the associations between the mediators and outcome variables in both the U.S. and Chinese populations.

### **Test of Tripartite Influence Model**

The first purpose of the study was to apply and validate the Tripartite Influence Model among European American and Chinese samples; specifically, my interest was to focus on the mediation paths. Both appearance comparison and thin-ideal internalization were expected to mediate the association between sociocultural influences and body dissatisfaction/disordered eating. In addition, body dissatisfaction was expected to mediate the association between sociocultural influences and disordered eating. Direct path coefficients among all variables were also hypothesized to be positive and significant.

**Appearance comparison as a mediator.** Results of multiple group path analyses partially supported part of the hypothesized mediating effects of appearance comparison in both samples. First, appearance comparison was found to significantly mediate the association between sociocultural influence and disordered eating for European Americans and Chinese. In other words, when individuals perceived greater influences from family, peers, and the media, they reported more disordered eating through a higher tendency to compare their physical appearance with others' appearance. Thompson, Coovert, and Stormer (1999) found that appearance-based social comparison mediated the effect of appearance-related teasing on eating disturbance in a sample of female college students in U.S. The findings of the present study not only provide more support for this indirect effect of appearance comparison, but they also suggests that this effect remains significant in a Chinese sample, thus providing evidence for cultural similarity.

Second, appearance comparison significantly mediated the association among sociocultural influences and body dissatisfaction only among European Americans. The significant finding in the European American sample parallels with that of a number of studies conducted using U.S. samples. For example, van den Berg et al. (2002) found that the influence of family and the media on body dissatisfaction was mediated by social appearance comparison in a sample of U.S. female undergraduate students. Experiments conducted in the U.S. also discovered that women tended to report less satisfaction with their bodies after being told to engage in appearance comparison with ideal body types (e.g., in a commercial), suggesting that appearance comparison mediates the impact of social pressure on body dissatisfaction.

Interestingly, the same mediation path (sociocultural influences → appearance comparison → body dissatisfaction → disordered eating) was not significant among the Chinese

female college students. A closer look at the direct effect shows that the path coefficients from appearance comparison to body dissatisfaction was surprisingly close to zero and not positive as expected. This unexpected non-significant direct association might imply a possibility of moderation effect (e.g., conformity to norms). As reported earlier, conformity to norms may be more salient for Chinese; it has a significantly greater mean in the Chinese sample with a large effect size. The current study also revealed that when conformity to norms was added to the model as a moderator, the path from appearance comparison to body dissatisfaction was significant only for individuals who were at a lower conformity level. Thus, this non-significant indirect effect may suggest the need to include other culturally moderators in the Tripartite Influence Model to improve its cross-cultural applicability. In other words, the Tripartite Influence Model may be more complex than having the original mediation effects. Possible moderation effects may explain changes in the mediation model, thus having a moderated mediation effect.

Moreover, the current measures of appearance comparison may be more salient to Americans (i.e., weight, size, body fat) since these measures were mostly developed and validated using the western samples. Indeed, it is true that appearance comparison is more salient for Americans than for Chinese, as evidenced by a significant mean difference with a large effect size. Chinese individuals, however, tend to have a smaller body size and lower weight. For example, the average BMI for Chinese participants was significantly lower in this study, with more than 95% of participants falling in the underweight or healthy range. Therefore, they may not be as sensitive to weight or body size differences compared to other parts of physical appearance. Jackson and Chen (2007) found that facial appearance emerged as a strong individual factor discriminating between Chinese individuals with more or less eating disorder

symptoms. Therefore, the non-significant indirect effect of sociocultural influences on body dissatisfaction through appearance comparison may also suggest a need to use cultural-specific measures when testing the Tripartite Influence Model in China. For example, measures that reflect Chinese people's concerns regarding different aspects of appearance comparison may be more appropriate than using a general comparison measure on weight and body size.

**Thin-ideal internalization as a mediator.** Results of the present study did not support the original hypotheses regarding the mediation effect of thin-ideal internalization. First, thin-ideal internalization was found to only significantly mediate the indirect effects of sociocultural influence on body dissatisfaction among Chinese; however, this indirect effect was negative, and thus it did not support the original hypothesis of a positive indirect effect. Also, a possible suppression effect deserves further examination. Second, thin-ideal internalization did not significantly mediate the association between sociocultural influences and disordered eating in either sample.

These results are surprising because it has been widely established that thin-ideal internalization significantly mediates the relationship between sociocultural influences and body dissatisfaction/disordered eating. (e.g., Stice, 1994; Thompson et al., 1999). These inconsistencies may point to the possibility of using a measure that may not accurately reflect the construct that the present study intended to measure. Karazsia, van Dulmen, Wong, and Crowther (2013) discovered that thin-ideal internalization has been conceptualized either as a trait or a state in the existing literature. While state internalization refers to momentary beliefs about socially-dominant ideals related to thinness, trait internalization refers to a relatively more stable individual characteristic in relation to one's long-held belief of the thin ideal. Karazsia et al (2013) argued that state internalization is more likely to operate as a mediator, whereas trait

internalization is more likely to moderate associations between sociocultural influences and body dissatisfaction or body change behaviors (e.g., disordered eating). In the present study, the measure used for thin-ideal internalization is regarded as a trait measure of the construct, rather than a state measure, since it does not specify a period of time (e.g., “In the last month/week...”) for participants to indicate their short-term identification of the thin ideal. Perhaps a state measure of internalization may be more likely to reveal the mediation effect.

**Sociocultural influences, body dissatisfaction, and disordered eating.** Besides testing the two major mediators in the model, results also confirmed that body dissatisfaction significantly mediated the association between sociocultural influences and disordered eating among European Americans and Chinese. In other words, these individuals who perceived greater influences from family, peers, and the media reported more disordered eating through higher dissatisfaction with their body. This mediation path has been recognized and validated in western literature (e.g., Keery et al., 2004). In Chinese literature, however, while it has been established that sociocultural influences are predictive of body image and eating disturbances (mostly among adolescents; e.g., Chen & Jackson, 2009), this study is the first to show how sociocultural influences would be associated with disordered eating through body dissatisfaction in a group of Chinese female college students.

**Direct effects.** Results of multiple group comparisons also provided meaningful findings regarding the direct paths. First, the significant and positive direct effect of sociocultural influences on disordered eating was confirmed in both groups. Previous researchers have commented on ways to improve the Tripartite Influence Model, one of which is to add a direct path from sociocultural influences to disordered eating (such as diet restriction; Keery et al., 2004). This direct path in the current finding provides additional evidence that, besides indirect

effects on disordered eating through other mediators, sociocultural influences can also be directly associated with one's eating behavior. In addition, the significant direct effect might also suggest other possible mediators (e.g., global psychological functioning, van den Berg et al., 2002) that can also explain the association between sociocultural influences and disordered eating.

Second, the direct effect of appearance comparison on disordered eating was also found significant in both U.S. and Chinese samples. While most studies have focused on the indirect effect of appearance comparison on the association between sociocultural influences and disordered eating (i.e., sociocultural influences → appearance comparison → body dissatisfaction → disordered eating; van den Berg et al., 2002), few studies have confirmed its direct effect on disordered eating behaviors. Muir, Wertheim, and Paxton (1999) found that adolescents girls reported appearance comparison with others as the most frequent trigger for their first diets. In the present study, appearance comparison was directly and positively associated with disordered eating, thus suggesting that individuals who tend to compare their physical appearance with others may be at greater risk for engaging in disordered eating behaviors. Moreover, similar to an earlier point, this significant direct effect might also imply that another mediator (e.g., self-criticism; Dunkley, Masheb, Robin, & Grilo, 2010) besides body dissatisfaction might be a mediator for the association between appearance comparison and disordered eating.

**Other results to highlight.** Results of mean and correlation coefficient comparison between two samples also deserve some discussion. European American female college students who participated in this study reported larger BMIs compared to their Chinese peers, and the strengths of correlations among seven measured variables were generally stronger for European Americans as well. This pattern of associations may suggest a strong influence of BMI on

variables in the model, but it also raises a concern regarding whether variables proposed in the Tripartite Influence Model (a mediation model) are more salient for European Americans; if so, it may contribute to stronger associations among these variables for European Americans than for Chinese.

### **Testing of Moderating Effects**

The second goal of this study was to identify possible moderating effects of two variables of interest: conformity to norms and maladaptive perfectionism. Research is limited in testing moderating factors that may explain individual differences when people are exposed to same amount of social pressure but affected differently. Using a larger sample combining both European American and Chinese participants, conformity to norms, as a cultural-value variable, was hypothesized to moderate the effect of appearance comparison on body dissatisfaction, whereas maladaptive perfectionism was hypothesized to moderate the effect of thin-ideal internalization on body dissatisfaction.

**Conformity to norms.** Results confirmed the hypothesis that conformity to norms would significantly moderate the path from appearance comparison to body dissatisfaction. However, the pattern of simple effects is slightly different from what was expected. Originally, I expected that individuals who place high value in conformity to norms would report feeling significantly more dissatisfied with their body than those who place low value in conformity to norms as they engage in more appearance comparison. The current results suggested, though, that for those who reported a higher level of conformity to norms, the association between appearance comparison and body dissatisfaction was not significant. Yet, their body dissatisfaction actually remains high, regardless of the level of appearance comparison. As suggested by Lau et al. (2006), a stronger adherence to conformity to norms (as a dimension of Asian cultural values) is

predictive of overall body image disturbance among Asian American college women. The current finding provides additional support that, for individuals at a higher level of conformity, their body dissatisfaction would remain high, regardless of the level of appearance comparison for European American and Chinese female college students.

Second, the effect of appearance comparison on body dissatisfaction was hypothesized to be significantly for lower conformity individual but the significant level would be weaker than that for lower conformity individuals. The current results showed that, for these female students with a lower level of conformity, appearance comparison was positively and significantly associated with body dissatisfaction. These female students may experience more body dissatisfaction as they engage more frequently in comparing their appearance with that of others. This finding suggests that, addressing appearance comparison is important to help those with body dissatisfaction, it may be more effective for low conforming individuals.

**Maladaptive perfectionism.** No differences between female students who were high and low in maladaptive perfectionism were found with respect to the association between thin-ideal internalization and body dissatisfaction. However, an examination of the result pattern suggests a significant main effect of maladaptive perfectionism on body dissatisfaction; individuals with higher maladaptive perfectionism generally reported higher dissatisfaction with their body. Though this present study did not focus on the direct association between maladaptive perfectionism and body dissatisfaction, it provided additional support that perfectionism serves as a robust risk factor in predicting body dissatisfaction (e.g., Pokrajac-Bulian, Ambrosi-Randic, & Kukic 2008; Wade & Tiggemann, 2013).

### **Contribution to Literature**

The current study contributes to the existing literature in several important ways. First, it supports the Tripartite Influence Model among Chinese female college students in explaining the development of disordered eating. Even though previous studies have been conducted to compare the mean differences in body image concerns and disordered eating between European American and Chinese college students (e.g., Baillie & Copeland, 2013), few have attempted to identify variables that may be strongly associated with the development of body dissatisfaction and disordered eating in China. The current study suggests that, just as the model specifies, Chinese college females experience disordered eating symptoms when receiving pressure from their family, peers, and the media, and such association is mediated by their tendency to compare their appearance with others. It also confirmed that body dissatisfaction mediates the relationship between sociocultural influences and disordered eating. Even though thin-ideal internalization was not supported as a significant mediator, our results at least partially supported the notion that the Tripartite Influence Model may serve as a meaningful theoretical framework in China.

Second, this is the first study to compare the model results between European American and Chinese college students. On the one hand, information regarding cultural similarities gained in this study may provide rich information on how to apply an existing, well-established theory in China. It may also help identify effective and culturally adaptive prevention programs to be used on Chinese individuals. For example, addressing a tendency to engage in appearance comparison might be a possible intervention while working with female college students who have disordered eating concerns in U.S. and China.

On the other hand, differences identified in cross-cultural comparison provide great insight on the development of specific interventions to treat body image concerns and disordered

eating symptoms. For example, appearance comparison mediated the association between sociocultural influences and body dissatisfaction among European Americans and possibly among Chinese who are less likely to conform to norms. Thus, an intervention designed to target on comparison tendency may work well for European American females, but it may not be as effective for Chinese who are more likely to conform to norms.

Third, the current moderated mediation model contributes to literature by going over and beyond the original mediation effect specified in the Tripartite Influence Model. An addition of conformity to norms as a moderator into the model might demonstrate a few directions in applying this model cross-culturally. One, it implies the importance of considering culturally relevant variables into the original model. Doing so would allow researchers to understand the dynamics of body dissatisfaction and disordered eating specifically among Chinese. Two, this study sets a good start for future research to comprehensively re-think about this model in cross-cultural studies. As we know, cultural differences are complex, thus a simple mediation model may not be sufficient to understand the whole picture of the complicated phenomenon of body image concerns and disordered eating in a different culture. Therefore, a more complex, moderated mediation model is needed in this area of research.

### **Limitation and Suggestions for Future Research**

Despite the significant contributions, the current study also has several limitations, thus suggestions for future research need to be addressed. First, data were collected using self-report measures, thus it was subject to problems related to participants' own interpretation of the questionnaire statements. Future studies using experimental designs and/or observation approaches may reduce the potential biases caused by subjectivity.

Second, because this study is cross-sectional in nature, the findings cannot generate conclusions on the cause-effect relationship among variables. Moreover, the lack of mediation effect of thin-ideal internalization may also be explained by the fact that a trait measure of internalization was used at one time point. Future study may consider to use a longitudinal design to reflect changes in variables between time points, as this way may predict causal relationships or recognize significant mediating effect of state internalization in the relationship between sociocultural influences and body dissatisfaction.

Third, the measures used in the present study were mostly developed and normed using western samples, thus they may not reflect culturally-specific constructs that are important to Chinese individuals. For example, as discussed previously, because the measure of body dissatisfaction mostly focused on weight and body size, it may not reflect other body parts that are more of a concern for Chinese females. Mintz and Kashubeck (1998) suggested that this problem is typical in cross-cultural research, thus it is imperative that future researchers develop culturally sensitive measures.

Fourth, when testing the group differences in mediating effects, significant differences were found in the demographic variables between both samples. For example, a majority of the Chinese participants identified themselves as being of lower or lower-middle SES ( $n = 169$ , 65%), while only 27 (10%) European American participants identified using the same categories. With respect to relationship status, almost three quarters of Chinese participants ( $n = 189$ ) reported being single, while half of the European ( $n = 137$ ) American participants reported the same. Future research may consider selecting a set of cross-cultural samples made up of participants with similar backgrounds and identities.

Fifth, path models in the current study were estimated using manifest variables that were directly measured from single surveys. Such models assumed all variables are measured without error, which may not always be the case. Since data were collected in two different countries, challenges were imposed on the sample size and the lengths of the survey, causing it difficult to conduct structural equation modeling and create latent variables to account for measurement error. Future research may consider using multiple measures to predict one latent variable and recruit more participants to reach enough statistical power to conduct SEM using similar models.

### **Clinical Implications**

The findings of the current study provide valuable information for mental health professionals in the U.S. and China to understand the development of body dissatisfaction and disordered eating among female college students. First, the results highlight how sociocultural factors (i.e., family, peers, and the media) impact body image concerns and eating disturbances. Therefore, it is important for clinicians to ask their clients questions about the pressure they receive from their environment, especially when they present with body dissatisfaction and disordered eating concerns.

Second, clinicians may apply the mediation and moderation results to the etiology of body image concerns and eating disorders, thereby developing an indirect approach to alleviate the symptoms. For example, European American clients may report a higher tendency to compare their physical appearance to others and a strong disliking of their body size. This piece of information may suggest that by reducing the tendency to compare appearance, clients may experience less distress caused by feeling dissatisfied with their own bodies. Thus, the clinicians may consider focusing on exploring and recognizing the motivation behind the tendency to compare oneself to others, as well as addressing alternative ways to approach oneself to others.

Third, results from the multiple group comparisons emphasized the importance of multicultural awareness and sensitivity in cross-cultural counseling. As more Chinese international students come to U.S. for counseling training and return to China to practice, it is important for them to consider cultural differences while applying the western-based Tripartite Influence Model to understand their Chinese clients' concerns. For example, addressing issues with appearance comparison can be an intervention to understand the dynamics of how sociocultural pressures are related to body dissatisfaction for European American clients; however, this intervention may or may not apply for all Chinese female students for their body dissatisfaction, since results did not support this mediation hypothesis.

Fourth, findings from this current study may also inform outreach program developers' working at university counseling centers. For example, outreach personnel may consider educating the general student population and their parents on the negative effects of social or cultural pressures on thinness. Moreover, social justice advocates may consider having conversations with administrators and policy makers about the impact of media on body dissatisfaction and disordered eating through appearance comparison. In this way, messages that empower women to own and accept their body shape and size may circulate.

## REFERENCES

- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Sage.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin, 103*, 411-423.
- Arkoff, A., & Weaver, H. B. (1966). Body image and body dissatisfaction in Japanese-Americans. *Journal of Social Psychology, 68*, 323-330.
- Baillie, L. E., & Copeland, A. L. (2013). Disordered eating and body image in Chinese and Caucasian students in the United States. *Eating behaviors, 14*, 314-319.
- Bailey, S. D., & Ricciardelli, L. A. (2010). Social comparisons, appearance related comments, contingent self-esteem and their relationships with body dissatisfaction and eating disturbance among women. *Eating behaviors, 11*, 107-112.
- Bardone-Cone, A. M., Wonderlich, S. A., Frost, R. O., Bulik, C. M., Mitchell, J. E., Uppala, S., et al. (2007). Perfectionism and eating disorders: Current status and future directions. *Clinical Psychology Review, 27*, 384-405.
- Blackmer, V., Searight, H. R., & Ratwik, S. H. (2011). The Relationship between Eating Attitudes, Body Image and Perceived Family-of-Origin Climate among College Athletes. *North American Journal of Psychology, 13*, 435-446.
- Brislin, R. W. (1980). Translation and content analysis of oral and written material. *Handbook of cross-cultural psychology, 2*, 349-444.

- Boone, L., Soenens, B., & Braet, C. (2011). Perfectionism, body dissatisfaction, and bulimic symptoms: The intervening role of perceived pressure to be thin and thin-ideal internalization. *Journal of Social and Clinical Psychology, 30*, 1043-1068.
- Burns, G. L., & Farina, A. (1992). The role of physical attractiveness in adjustment. *Genetic, social, and general psychology monographs, 118*, 157-194.
- Byrne, B. M., Shavelson, R. J., & Muthén, B. (1989). Testing for the equivalence of factor covariance and mean structures: The issue of partial measurement invariance. *Psychological Bulletin, 105*, 456-466.
- Cattarin, J. A., Thompson, J. K., Thomas, C., & Williams, R. (2000). Body image, mood, and televised images of attractiveness: The role of social comparison. *Journal of Social and Clinical Psychology, 19*, 220-239.
- Centers for Disease Control and Prevention (2015). Information about Adult BMI. Retrieved on May 31<sup>st</sup>, 2015, from [http://www.cdc.gov/healthyweight/assessing/bmi/adult\\_bmi/](http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/).
- Chan, Z. C., & Ma, J. L. (2004). Aetiology of anorexia nervosa in Hong Kong: a social work qualitative inquiry. *Child & Family Social Work, 9*, 177-186.
- Chang, F. C., Lee, C. M., Chen, P. H., Chiu, C. H., Pan, Y. C., & Huang, T. F. (2013). Association of thin-ideal media exposure, body dissatisfaction and disordered eating behaviors among adolescents in Taiwan. *Eating behaviors, 14*, 382-385.
- Chen, H., & Jackson, T. (2008). Prevalence and sociodemographic correlates of eating disorder endorsements among adolescents and young adults from China. *European Eating Disorders Review, 16*, 375-385.
- Chen, H., & Jackson, T. (2009). Predictor of body image concerns among adolescent girls and boys in China: a nine month prospective study. *Journal of Adolescents, 32*, 977-994.

- Chen, H., Gao, X., & Jackson, T. (2007). Predictive models for understanding body dissatisfaction among young males and females in China. *Behaviour research and therapy, 45*, 1345-1356.
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9*, 233–255.
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd Edition). Hillsdale, NJ: Lawrence Earlbaum Associates.
- Cummins, L. H., Simmons, A. M., & Zane, N. W. (2005). Eating disorders in Asian populations: A critique of current approaches to the study of culture, ethnicity, and eating disorders. *American Journal of Orthopsychiatry, 75*, 553-574.
- Dittmar, H., Halliwell, E., & Ive, S. (2006). Does Barbie make girls want to be thin? The effect of experimental exposure to images of dolls on the body image of 5-to 8-year-old girls. *Developmental psychology, 42*, 283-292.
- Dimitrov, D. M. (2010). Testing for factorial invariance in the context of construct validation. *Measurement and Evaluation in Counseling and Development, 43*, 121-149.
- Dunkley, D. M., Masheb, R. M., & Grilo, C. M. (2010). Childhood maltreatment, depressive symptoms, and body dissatisfaction in patients with binge eating disorder: The mediating role of self-criticism. *International Journal of Eating Disorder, 43*, 274-281.
- Fallon, E. A., & Hausenblas, H. A. (2004). Transtheoretical model of behavior change: Does it take five years to reach termination? *American Journal of Health Studies, 19*, 35-44.
- Fan, Y., Li, Y., Liu, A., Hu, X., Ma, G., & Xu, G. (2010). Associations between body mass index, weight control concerns and behaviors, and eating disorder symptoms among non-clinical Chinese adolescents. *BMC Public Health, 10*, 314-325.

- Ferreiro, F., Seoane, G., & Senra, C. (2012). Gender-related risk and protective factors for depressive symptoms and disordered eating in adolescence: A 4-year longitudinal study. *Journal of youth and adolescence, 41*, 607-622.
- Festinger, L. (1954). A theory of social comparison processes. *Human relations, 7*, 117-140.
- Forney, K. J. & Ward, R. M. (2012). Examining the moderating role of social norms between body dissatisfaction and disordered eating in college students. *Eating Behaviors, 14*, 73-78.
- Franzoi, S. L. (1994). Further evidence of the reliability and validity of the body esteem scale. *Journal of Clinical Psychology, 50*, 237-239.
- Franzoi, S. L., & Shields, S. A. (1984). The body esteem scale: Multidimensional structure and sex differences in a college population. *Journal of Personality Assessment, 48*, 173-178.
- Frazier, P. A., Tix, A. P., & Barron, K. E. (2004). Testing moderator and mediator effects in counseling psychology research. *Journal of counseling psychology, 51*(1), 115.
- Garner, D. M., Olmsted, M. P., Bohr, Y., & Garfinkel, P. E. (1982). The eating attitudes test: psychometric features and clinical correlates. *Psychological medicine, 12*, 871-878.
- Gilbert, L. A., & Scher, M. (1999). *Gender and sex in counseling and psychotherapy*. Neidham Heights, MA: Allyn and Bacon.
- Gordon, R. A. (2000). *Eating disorders: anatomy of a social epidemic*. Blackwell Publishers.
- Grogan, S., Williams, Z., & Conner, M. (1996). The effects of viewing same-gender photographic models on body-esteem. *Psychology of Women Quarterly, 20*, 569-575.

- Heinberg, L. J., Thompson, J. K., & Stormer, S. (1995). Development and validation of the sociocultural attitudes towards appearance questionnaire. *International Journal of Eating Disorders, 17*, 81-89.
- Hu, L. T., & 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.
- Huon, G. F., Mingyi, Q., Oliver, K., & Xiao, G. (2002). A large-scale survey of eating disorder symptomatology among female adolescents in the People's Republic of China. *International Journal of Eating Disorders, 32*, 192-205.
- Huon, G. F., Walton, C. J., Lim, J., & Zheng, R. (1999). Dieting among adolescent girls in Beijing. *Eating Disorders, 7*, 271-278.
- Jackson, T., & Chen, H. (2007). Identifying the eating disorder symptomatic in China: the role of sociocultural factors and culturally defined appearance concerns. *Journal of Psychosomatic Research, 62*, 241-249.
- Jackson, T., & Chen, H. (2008). Predicting changes in eating disorder symptoms among Chinese adolescents: a 9-month prospective study. *Journal of Psychosomatic Research, 64*, 87-95.
- Jones, D. C., & Crawford, J. K. (2005). Adolescent boys and body image: Weight and muscularity concerns as dual pathways to body dissatisfaction. *Journal of Youth and Adolescence, 34*, 629-636.
- 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.
- Jung, J., & Forbes, G. B. (2007). Body dissatisfaction and disordered eating among college women in China, South Korea, and the United States: Contrasting predictions from sociocultural and feminist theories. *Psychology of Women Quarterly, 31*, 381-393.
- Karazsia, B.T., van Dulmen, M.H.M., Wong, K., & Crowther, J. H. (2013). Thinking meta-theoretically about the role of internalization in the development of body dissatisfaction and body change behaviors. *Body Image: An International Journal of Research, 10*, 433-441.
- Kaye, W. H., Bulik, C. M., Thornton, L., Barbarich, N., Masters, K., & Price Foundation Collaborative Group. (2004). Comorbidity of anxiety disorders with anorexia and bulimia nervosa. *American Journal of Psychiatry, 161*, 2215-2221.
- 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, 1*, 237-251.
- Kelly, N. R., Mitchell, K. S., Gow, R. W., Trace, S. E., Lydecker, J. A., Bair, C. E., & Mazzeo, S. (2012). An evaluation of the reliability and construct validity of eating disorder measures in white and black women. *Psychological assessment, 24*, 608-617.
- Kim, B. S. K. Li, L. C. Ng, G. F. (2005). The Asian American Values Scale: Multidimensional development, reliability, and validity. *Cultural Diversity and Ethnic Minority Psychology, 11*, 187-201.

- Koslowsky, M., Scheinberg, Z., Bleich, A., Mark, M., Apter, A., Danon, Y., & Solomon, Z. (1992). The factor structure and criterion validity of the short form of the Eating Attitudes Test. *Journal of Personality Assessment, 58*, 27-35.
- Lake, A. J., Staiger, P. K., & Glowinski, H. (2000). Effect of Western Culture on Women's Attitudes to Eating and Perceptions of Body Shape. *International Journal of Eating Disorders, 27*, 83-89.
- Lam, T. H., Lee, S. W., Fung, S., Ho, S. Y., Lee, P. W., & Stewart, S. M. (2009). Sociocultural influences on body dissatisfaction and dieting in Hong Kong girls. *European Eating Disorders Review, 17*, 152-160.
- Lau, A. S., Lum, S. K., Chronister, K. M., & Forrest, L. (2006). Asian American college women's body image: a pilot study. *Cultural Diversity and Ethnic Minority Psychology, 12*, 259.
- Leahey, T. M., Crowther, J. H., & Mickelson, K. D. (2007). The frequency, nature, and effects of naturally occurring appearance-focused social comparisons. *Behavior Therapy, 38*, 132-143.
- Lee, S., & Lee, A. M. (2000). Disordered eating in three communities of China: A comparative study of female high school students in Hong Kong, Shenzhen, and rural Hunan. *International Journal of Eating Disorders, 27*, 317-327.
- Lee, S., Lee, A. M., Leung, T., & Yu, H. (1997). Psychometric properties of the eating disorders inventory (EDI-1) in a nonclinical Chinese population in Hong Kong. *International Journal of Eating Disorders, 21*, 187-194.

- Liao, Y., Knoesen, N. P., Castle, D. J., Tang, J., Deng, Y., Bookun, R., ... & Liu, T. (2010). Symptoms of disordered eating, body shape, and mood concerns in male and female Chinese medical students. *Comprehensive psychiatry, 51*, 516-523.
- Little, T. D., Card, N. A., Bovaird, J. A., Preacher, K. J., & Crandall, C. S. (2007). Structural equation modeling of mediation and moderation with contextual factors. *Modeling Contextual Effects in Longitudinal Studies*, 207-230.
- Lowry, R. (2015). *Significance of the difference between two correlation coefficients*. Retrieved from <http://vassarstats.net/rdiff.html>
- Mahalik, J. R., Morray, E. B., Coonerty-Femiano, A., Ludlow, L. H., Slattery, S. M., & Smiler, A. (2005). Development of the conformity to feminine norms inventory. *Sex Roles, 52*, 417-435.
- Makino, M., Tsuboi, K., & Dennerstein, L. (2004). Prevalence of eating disorders: A comparison of Western and non-Western countries. *Medscape General Medicine, 6*, 49-61.
- Mazzeo, S.E. (1999). Modification of an existing measure of body image preoccupation and its relationship to disordered eating in female college students. *Journal of Consulting Psychology, 46*, 42-50.
- McCabe, M. P., Ricciardelli, L. A., Stanford, J., Holt, K., Keegan, S., & Miller, L. (2007). Where is all the pressure coming from? Messages from mothers and teachers about preschool children's appearance, diet and exercise. *European Eating Disorders Review, 15*, 221-230.
- Mendelson, B. K., Mendelson, M. J., & White, D. R. (2001). Body-esteem scale for adolescents and adults. *Journal of Personality Assessment, 76*, 90-106.

- Mintz, L. B., & Kashubeck, S. (1999). Body Image and Disordered Eating Among Asian American and Caucasian College Students: An Examination of Race and Gender Differences. *Psychology of Women Quarterly, 23*, 781-796.
- Minuchin, S., Rosman, B. L., & Baker, L. (1978). *Psychosomatic families: anorexia nervosa in context*. Harvard University Press: Cambridge, MA.
- Muthén, L. K., & Muthén, B. O. (2010). *Mplus: Statistical analysis with latent variables: User's guide*. Muthén & Muthén.
- Nasser, M. (1988). Culture and weight consciousness. *Journal of Psychosomatic Research, 32*, 573-577.
- National Eating Disorders Institution. (2014). Get the facts on eating disorders. Retrieved from <https://www.nationaleatingdisorders.org/get-facts-eating-disorders>
- Oliver, K. K., & Thelen, M. H. (1997). Children's perceptions of peer influence on eating concerns. *Behavior Therapy, 27*, 25-39.
- Papp, I., Urbán, R., Czeglédi, E., Babusa, B., & Túry, F. (2013). Testing the Tripartite Influence Model of body image and eating disturbance among Hungarian adolescents. *Body image, 10*, 232-242.
- Park, Y. S., & Kim, B. S. (2008). Asian and European American cultural values and communication styles among Asian American and European American college students. *Cultural Diversity and Ethnic Minority Psychology, 14*, 47-56.
- Phan, T., & Tylka, T. L. (2006). Exploring a model and moderators of disordered eating with Asian American college women. *Journal of Counseling Psychology, 53*, 36-47.
- Pokrajac-Bulian, A., Ambrosi-Randić, N., & Kukic, M. (2008). Thin-ideal internalization and comparison process as mediators of social influence and psychological functioning in

- the development of disturbed eating habits in Croatian college females. *Psychological Topics*, 17, 221–245.
- Prince, M. A., & Carey, K. B. (2010). The malleability of injunctive norms among college students. *Addictive Behaviors*, 35, 940-947.
- Rice, K. G., Richardson, C. M., & Tueller, S. (2014). The short form of the revised Almost Perfect Scale. *Journal of Personality Assessment*, 96, 368-379.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University.
- Sanders, N. M., & Heiss, C. J. (1998). Eating attitudes and body image of Asian and Caucasian college women. *Eating Disorders*, 6, 15-27.
- Muir, S.L., Wertheim, E.H., & Paxton, S.J. (1999). Adolescent girls' first diets: triggers and the role of multiple dimensions of self-concept. *Eating Disorders: Journal of Treatment and Prevention*.
- Shaw, H., Ramirez, L., Trost, A., Randall, P., & Stice, E. (2004). Body image and eating disturbances across ethnic groups: more similarities than differences. *Psychology of Addictive Behaviors*, 18, 12.
- Shroff, H., & Thompson, J. K. (2006). Peer influences, body-image dissatisfaction, eating dysfunction and self-esteem in adolescent girls. *Journal of Health Psychology*, 11, 533-551.
- Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods*, 7, 422-445.

- Slaney, R. B., Rice, K. G., Mobley, M., Trippi, J., & Ashby, J. (2001). The Revised Almost Perfect Scale. *Measurement and Evaluation in Counseling and Development, 34*, 130-145.
- Slater, A.E. & Tiggemann, M. (2011). Gender differences in adolescent sport participation, teasing, self-objectification and body image concerns. *Journal of Adolescence, 34*, 455-463.
- Soper, D.S. (2014). A-priori Sample Size Calculator for Structural Equation Models [Software]. Available from <http://www.danielsoper.com/statcalc>
- Stice, E. (1994). Review of the evidence for a sociocultural model of bulimia nervosa and an exploration of the mechanisms of action. *Clinical Psychology Review, 14*, 633-661.
- Stice, E. (2002). Risk and maintenance factors for eating pathology: a meta-analytic review. *Psychological Bulletin, 128*, 825-848.
- Stice, E., & Agras, W. S. (1998). Predicting onset and cessation of bulimic behaviors during adolescence: A longitudinal grouping analysis. *Behavior Therapy, 29*, 257-276.
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5<sup>th</sup> ed.). Needham Heights, MA: Allyn & Bacon.
- Tam, C. K., Ng, C. F., Yu, C. M., & Young, B. W. (2007). Disordered eating attitudes and behaviours among adolescents in Hong Kong: Prevalence and correlates. *Journal of Paediatrics and Child Health, 43*, 811-817.
- Tanofsky-Kraff, M., Bulik, C. M., Marcus, M. D., Striegel, R. H., Wilfley, D. E., Wonderlich, S. A., & Hudson, J. I. (2013). Binge eating disorder: The next generation of research. *International Journal of Eating Disorders, 46*, 193-207.

- Thompson, J. K., & Smolak, L. (2001). *Body image, eating disorders, and obesity in youth: Assessment, prevention, and treatment*. Taylor & Francis.
- Thompson, J. K., Heinberg, L. J., Altabe, M., & Tantleff-Dunn, S. (1999). *Exacting beauty: Theory, assessment, and treatment of body image disturbance*. Washington, DC: American Psychological Association.
- Thompson, J. K., Heinberg, L., & Tantleff-Dunn, S. (1991). The physical appearance comparison scale. *The Behavior Therapist, 14*, 174.
- Thompson, J. K., van den Berg, P., Roehrig, M., Guarda, A. S., & Heinberg, L. J. (2004). The sociocultural attitudes toward appearance questionnaire (SATAQ-3): Development and validation. *International Journal of Eating Disorders, 35*, 293–304.
- Tong, J., Shi, J., Wang, J., Zhang, H., Zhang, S. F., Wu, X. Y., & Hsu, L. K. (2011). Validity and reliability of the Chinese language version of the eating disorder examination (CEDE) in mainland China: Implications for the identity and nosology of the eating disorders. *International Journal of Eating Disorders, 44*, 76-80.
- van den Berg, P., Thompson, J. K., Obremski-Brandon, K., & Covert, M. (2002). The tripartite influence model of body image and eating disturbance: A covariance structure modeling investigation testing the mediational role of appearance comparison. *Journal of Psychosomatic Research, 53*, 1007-1020.
- Vartanian, L. R., & Dey, S. (2013). Self-concept clarity, thin-ideal internalization, and appearance-related social comparison as predictors of body dissatisfaction. *Body image, 10*, 495-500.
- Vohs, K. D., Heatherton, T. F., & Herrin, M. (2001). Disordered eating and the transition to college: A prospective study. *International Journal of Eating Disorders, 29*, 280–288.

- Wade, T. D., Keski-Rahkonen, A., Hudson, J. I., Tsuang, M. T., Tohen, M., & Jones, P. B. (2011). Epidemiology of eating disorders. *Textbook in Psychiatric Epidemiology (Ed. 3<sup>rd</sup>)*, 343-360.
- Wade, T. D. & Tiggemann, M. (2013). The role of perfectionism in body dissatisfaction. *Journal of Eating Disorder, 1*, 1-6.
- Warren, C. S., Gleaves, D. H., & Rakhkovskaya, L. M. (2013). Score reliability and factor similarity of the Sociocultural Attitudes towards Appearance Questionnaire-3 (SATAQ-3) among four ethnic groups. *Journal of Eating Disorders, 1*, 1-8.
- Wei, M., Heppner, P. P., Mallen, M., Ku, T.-Y., Liao, K. Y. -H., & Wu, T. -F. (2007). Acculturative stress, perfectionism, years in the United States, and depression among Chinese international students. *Journal of Counseling Psychology, 54*, 385-394.
- Westland, J.C. (2010). Lower bounds on sample size in structural equation modeling. *Electronic Commerce Research and Applications, 9*, 476-487.
- Xu, X., Mellor, D., Kiehne, M., Ricciardelli, L. A., McCabe, M. P., & Xu, Y. (2010). Body dissatisfaction, engagement in body change behaviors and sociocultural influences on body image among Chinese adolescents. *Body image, 7*, 156-164.
- Zhu, H., Cai, T., Chen, G., & Zhang, B. (2013). Validation of the Emotional Eating Scale among Chinese undergraduates. *Social Behavior and Personality: An International Journal, 41*, 123-134.

**APPENDIX A. DEMOGRAPHIC VARIABLES**

1. Gender: 1. Male 2. Female
2. Year in school:
  - 1 = Freshman
  - 2 = Sophomore
  - 3 = Junior
  - 4 = Senior
  - 5 = Exchange student/non-degree
  - 6 = Other
3. Relationship Status:
  - 1 = single
  - 2 = in a dating/committed relationship
  - 3 = married
  - 4 = divorced or separated
  - 5 = widowed
  - 6 = other
4. Socioeconomic Status
  - 1 = lower
  - 2 = lower middle
  - 3 = middle
  - 4 = upper middle
  - 5 = upper
  - 6 = other
5. Please indicate the college of your primary major:
  - 1 = Agriculture and Life Sciences
  - 2 = Business
  - 3 = Design
  - 4 = Engineering
  - 5 = Human Sciences
  - 6 = Liberal Arts and Sciences
  - 7 = Veterinary Medicine
  - 8 = Undeclared
  - 9 = other
6. Age: Years \_\_\_ Months \_\_\_
7. Height: Feet \_\_\_\_\_ Inches \_\_\_\_\_
8. Current Weight (lbs.) \_\_\_\_\_
9. Highest Weight (excluding pregnancy for females) \_\_\_\_\_
10. Lowest Adult Weight \_\_\_\_\_
11. Ideal Weight \_\_\_\_\_

**APPENDIX B. SOCICULTURAL INFLUENCES (PREDICTOR)****Sociocultural Attitudes towards Appearance Scale – 4**

Directions: Please read each of the following items carefully and indicate the number that best reflects your agreement with the statement.

|                            |                        |                                   |                     |                         |
|----------------------------|------------------------|-----------------------------------|---------------------|-------------------------|
| 1                          | 2                      | 3                                 | 4                   | 4                       |
| <b>Definitely Disagree</b> | <b>Mostly Disagree</b> | <b>Neither Agree Nor Disagree</b> | <b>Mostly Agree</b> | <b>Definitely Agree</b> |

Answer the following questions with relevance to your Family (include: parents, brothers, sisters, relatives):

1. I feel pressure from family members to look thinner.
2. I feel pressure from family members to improve my appearance.
3. Family members encourage me to decrease my level of body fat.
4. Family members encourage me to get in better shape.

Answer the following questions with relevance to your Peers (include: close friends, classmates, other social contacts):

5. My peers encourage me to get thinner.
6. I feel pressure from my peers to improve my appearance.
7. I feel pressure from my peers to look in better shape.
8. I get pressure from my peers to decrease my level of body fat.

Answer the following questions with relevance to the Media (include: television, magazines, the Internet, movies, billboards, and advertisements):

9. I feel pressure from the media to look in better shape.
10. I feel pressure from the media to look thinner.
11. I feel pressure from the media to improve my appearance.
12. I feel pressure from the media to decrease my level of body fat.

### APPENDIX C. APPEARANCE COMPARISON (MEDIATOR)

Physical Appearance Comparison Scale – Revised (PACS –R ; Schaefer & Thompson, 2014), 11 items.

#### Physical Appearance Comparison Scale

|       |        |           |       |        |
|-------|--------|-----------|-------|--------|
| 0     | 1      | 2         | 3     | 4      |
| Never | Seldom | Sometimes | Often | Always |

1. When I'm out in public, I compare my physical appearance to the appearance of others.
2. When I meet a new person (same sex), I compare my body size to his/her body size.
3. When I'm at work or school, I compare my body shape to the body shape of others.
4. When I'm out in public, I compare my body fat to the body fat of others.
5. When I'm shopping for clothes, I compare my weight to the weight of others.
6. When I'm at a party, I compare my body shape to the body shape of others.
7. When I'm with a group of friends, I compare my weight to the weight of others.
8. When I'm eating in a restaurant, I compare my body fat to the body fat of others.
9. When I'm with a group of friends, I compare my body size to the body size of others.
10. When I'm at the gym, I compare my physical appearance to the appearance of others.
11. When I'm out in public, I compare my body size to the body size of others.

**APPENDIX D. THIN-IDEAL INTERNALIZATION (MEDIATOR)**

Ideal-Body Stereotype Scale – Revised (IBSS-R; Sstice & Agras, 1998), six items.

**Ideal Body Stereotype Scale – revised**

Based on your gender, please rate how much you agree with these statements below. For example, if you are male, only consider these statements applying to males.

How much do you agree with these statements?

|                      |          |         |       |                   |
|----------------------|----------|---------|-------|-------------------|
| 1                    | 2        | 3       | 4     | 5                 |
| Strongly<br>Disagree | Disagree | Neutral | Agree | Strongly<br>Agree |

1. Slender women are more attractive.
2. Women who are in shape are more attractive.
3. Tall women are more attractive.
4. Women with toned (lean) bodies are more attractive.
5. Shapely women are more attractive.
6. Women with long legs are more attractive.

**APPENDIX E. CONFORMITY TO NORMS (MODERATOR)**

Asian American Values Scale – Multidimensional (AAVS-M; Kim et al., 2005) – Conformity to Norms Subscale, seven items.

**Asian American Values Scale – Multidimensional**

**INSTRUCTIONS:** Use the scale below to indicate the extent to which you agree with the value expressed in each statement.

| 1                 | 2                   | 3               | 4                         | 5            | 6                | 7              |
|-------------------|---------------------|-----------------|---------------------------|--------------|------------------|----------------|
| Strongly Disagree | Moderately Disagree | Mildly Disagree | Neither Agree or Disagree | Mildly Agree | Moderately Agree | Strongly Agree |

1. One should recognize and adhere to the social expectations, norms and practices.
2. One should adhere to the values, beliefs and behaviors that one's society considers normal and acceptable.
3. One need not blend in with society.
4. Conforming to norms provides order in the community.
5. Conforming to norms provides one with identity.
6. One should not do something that is outside of the norm.
7. Conforming to norms is the safest path to travel.

## APPENDIX F. MALADAPTIVE PERFECTIONISM (MODERATOR)

The Almost Perfect Scale – Revised Short Form (APS-RS; Rice, Richardson, & Tueller, 2014) – Discrepancy Subscale, 12 items.

### Almost Perfect Scale – Revised Short Form Discrepancy Subscale

Instructions: The following items are designed to measure attitudes people have toward themselves, their performance, and toward others. There are no right or wrong answers. Please respond to all of the items. Use your first impression and do not spend too much time on individual items in responding.

Respond to each of the items using the scale below to describe your degree of agreement with each item. Fill in the appropriate number circle on the computer answer sheet that is provided.

|                      |          |                      |         |                   |       |                   |
|----------------------|----------|----------------------|---------|-------------------|-------|-------------------|
| 1                    | 2        | 3                    | 4       | 5                 | 6     | 7                 |
| Strongly<br>Disagree | Disagree | Slightly<br>Disagree | Neutral | Slightly<br>Agree | Agree | Strongly<br>Agree |

1. I often feel frustrated because I can't meet my goals.
2. My best just never seems to be good enough for me.
3. I rarely live up to my high standards.
4. Doing my best never seems to be enough.
5. I am never satisfied with my accomplishments.
6. I often worry about not measuring up to my own expectations.
7. My performance rarely measures up to my standards.
8. I am not satisfied even when I know I have done my best.
9. I am seldom able to meet my own high standards of performance.
10. I am hardly ever satisfied with my performance.
11. I hardly ever feel that what I've done is good enough.
12. I often feel disappointment after completing a task because I know I could have done better.

## APPENDIX G. BODY DISSATISFACTION (OUTCOME)

Body-Esteem Scale for Adolescents and Adults (BES-AA; Mendelson, Mendelson, & White, 2001), 23 items;

### Body-Esteem Scale for Adolescents and Adults

Instructions: Indicate how often you agree with the following statements: Ranging from *never* to always, circle the appropriate number beside each statement.

| Never | Seldom | Sometimes | Often | Always |
|-------|--------|-----------|-------|--------|
| 1     | 2      | 3         | 4     | 5      |

1. I like what I look like in pictures
2. Other people consider me good looking
3. I'm proud of my body
4. I am preoccupied with trying to change my body weight
5. I think my appearance would help me get a job
6. I like what I see when I look in the mirror
7. There are lots of things I'd change about my looks if I could
8. I am satisfied with my weight
9. I wish I looked better
10. I really like what I weigh
11. I wish I looked like someone else
12. People my own age like my looks
13. My looks upset me
14. I'm as nice looking as most people
15. I'm pretty happy about the way I look
16. I feel I weigh the right amount for my height
17. I feel ashamed of how I look
18. Weighing myself depresses me
19. My weight makes me unhappy
20. My looks help me to get dates
21. I worry about the way I look
22. I think I have a good body
23. I'm looking as nice as I'd like to

**APPENDIX H. DISORDERED EATING (OUTCOME)**

Eating Attitude Test – Short Version (EAT-26; Koslowsky et al., 1992), 26 items.

**Eating Attitude Test-26**

Part A: Check a response for each of the following statements:

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

1. Am terrified about being overweight.
2. Avoid eating when I am hungry.
3. Find myself preoccupied with food.
4. Have gone on eating binges where I feel that I may not be able to stop.
5. Cut my food into small pieces.
6. Aware of the calorie content of foods that I eat.
7. Particularly avoid food with a high carbohydrate content (i.e., bread, rice, potatoes, etc.)
8. Feel that others would prefer if I ate more.
9. Vomit after I have eaten.
10. Feel extremely guilty after eating.
11. Am preoccupied with a desire to be thinner.
12. Think about burning up calories when I exercise.
13. Other people think that I am too thin.
14. Am preoccupied with the thought of having fat on my body.
15. Take longer than others to eat my meals.
16. Avoid foods with sugar in them.
17. Eat diet foods.
18. Feel that food controls my life.
19. Display self-control around food.
20. Feel that others pressure me to eat.
21. Give too much time and thought to food.
22. Feel uncomfortable after eating sweets.
23. Engage in dieting behavior.
24. Like my stomach to be empty.
25. Have the impulse to vomit after meals.
26. Enjoy trying new rich foods.

Part B: In the past 6 months have you:

| Never | Once a month or less | 2-3 times a month | Once a week | 2-6 times a week | Once a day or more |
|-------|----------------------|-------------------|-------------|------------------|--------------------|
| 1     | 2                    | 3                 | 4           | 5                | 6                  |

- A. Gone on eating binges where you feel that you may not be able to stop?
- B. Ever made yourself sick (vomited) to control your weight or shape?
- C. Ever used laxatives, diet pills, or diuretics (water pills) to control your weight or shape?
- D. Exercised more than 60 minutes a day to lose or to control your weight?

E. Lost 20 pounds or more in the past 6 months? Yes \_\_\_ No \_\_\_

## APPENDIX I. INSTITUTIONAL REVIEW BOARD (IRB) APPROVAL

**IOWA STATE UNIVERSITY**  
OF SCIENCE AND TECHNOLOGY

Institutional Review Board  
Office for Responsible Research  
Vice President for Research  
1138 Pearson Hall  
Ames, Iowa 50011-2207  
515 294-4566  
FAX 515 294-4267

**Date:** 3/19/2015

**To:** Yi Du  
W112 Lagomarcino Hall

**CC:** Dr. Meifen Wei  
W112 Lagomarcino Hall

**From:** Office for Responsible Research

**Title:** Sociocultural Influences and Body Image

**IRB ID:** 14-432

**Approval Date:** 3/19/2015

**Date for Continuing Review:** 10/14/2016

**Submission Type:** New

**Review Type:** Expedited

The project referenced above has received approval from the Institutional Review Board (IRB) at Iowa State University according to the dates shown above. Please refer to the IRB ID number shown above in all correspondence regarding this study.

To ensure compliance with federal regulations (45 CFR 46 & 21 CFR 56), please be sure to:

- **Use only the approved study materials** in your research, including the recruitment materials and informed consent documents that have the IRB approval stamp.
- **Retain signed informed consent documents for 3 years after the close of the study**, when documented consent is required.
- **Obtain IRB approval prior to implementing any changes** to the study by submitting a Modification Form for Non-Exempt Research or Amendment for Personnel Changes form, as necessary.
- **Immediately inform the IRB of (1) all serious and/or unexpected adverse experiences** involving risks to subjects or others; and (2) any other unanticipated problems involving risks to subjects or others.
- **Stop all research activity if IRB approval lapses**, unless continuation is necessary to prevent harm to research participants. Research activity can resume once IRB approval is reestablished.
- **Complete a new continuing review form** at least three to four weeks prior to the **date for continuing review** as noted above to provide sufficient time for the IRB to review and approve continuation of the study. We will send a courtesy reminder as this date approaches.

Please be aware that IRB approval means that you have met the requirements of federal regulations and ISU policies governing human subjects research. **Approval from other entities may also be needed.** For example, access to data from private records (e.g. student, medical, or employment records, etc.) that are protected by FERPA, HIPAA, or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. **IRB approval in no way implies or guarantees that permission from these other entities will be granted.**

Upon completion of the project, please submit a Project Closure Form to the Office for Responsible Research, 1138 Pearson Hall, to officially close the project.

Please don't hesitate to contact us if you have questions or concerns at 515-294-4566 or IRB@iastate.edu.