

**Disentangling the Relationships Between Upward Social Comparison Frequency,
Weight-loss Dieting, External Body Shame and Fear of Negative Evaluation in College
Women: A Moderated Mediation Analysis**

Niklas B. Lange

s4377311

Department of Psychology, University of Groningen

Mentor group number: 28

First evaluator: Dr. Simon E. Dalley

Second evaluator: Franziska Schutzeichel

7th of July, 2023

Abstract

The present study aimed to explore the relationship between the frequency of upward social comparisons and the intent for restrictive weight-loss dieting among a sample of college women. We hypothesized that this relationship would be mediated by external body shame and further moderated by the fear of negative evaluation. In this proposed moderated mediation model, we anticipated that higher frequencies of upward social comparisons and a greater fear of negative evaluation would result in increased external body shame, subsequently leading to a higher intent for restrictive weight-loss dieting. A total of 227 female international college students participated in the study by completing an online self-report questionnaire via Qualtrics. The bootstrapping analysis conducted via PROCESS in SPSS did not significantly support the hypothesized moderated mediation model. However, in an exploratory analysis, external body shame was found to mediate the relationship between fear of negative evaluation and restrictive weight-loss dieting. Additionally, external body shame mediated the relationship between upward social comparison frequency and restrictive weight-loss dieting, but only when body dissatisfaction was not controlled for. These findings suggest that women with a high fear of negative evaluation are particularly susceptible to the development of external body shame and its subsequent impact as a motivator for weight-loss dieting. Moreover, frequent engagement in upward social comparisons may elicit a range of emotional responses, including external body shame, but predominantly leads to self-directed discontent as manifested in body dissatisfaction. Future research should further look into the mechanisms that make women with high fear of negative evaluation vulnerable to the development of external body shame and develop suitable interventions.

Keywords: upward social comparison, external body shame, fear of negative evaluation, weight-loss dieting, disordered eating

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In a nationwide cross-sectional study of female U.S. college students ($n = 23,678$), it was found that 60% of participants were actively attempting to lose weight, and among them, 47% engaged in weight-loss dieting behaviors. Alarmingly, despite having a normal BMI, 71% of these female college students were still pursuing weight loss (Wharton, Adams & Hampl, 2008). These findings are consistent with similar studies that have reported comparable trends (Fayet, Samman & Petocz, 2012; Neumark-Sztainer et al., 2011).

Weight-loss dieting has consistently been found as a common onset symptom in clinical levels of disordered eating behavior and has been identified as a risk factor for these respectively (Hilbert et al., 2014). Especially younger women are at risk to experience body image-related disturbances (Fiske et al., 2014).

Given these findings, it is crucial to focus research on the psychological mechanisms that motivate females to engage in restrictive weight-loss dieting, to facilitate the development of effective interventions. A substantial body of research has pointed towards upward social comparisons as a central mechanism that contributes to the development of disordered eating and weight-loss dieting intention (Thompson et al., 1999; Tylka et al., 2010; Keery, van den Bergh & Thompson, 2004). However, the emotional impact of these comparisons, particularly body shame, is under-researched. Body shame, a common emotion in disordered eating, is linked to weight-loss dieting (Nechita, Bud & David, 2021; Dakanalis et al., 2015), but not all women who make upward social comparisons experience negative consequences (Fardouly et al., 2017). The intensity of body shame may be amplified by social fears, such as fear of negative evaluation, which is associated with thin-ideal internalization and external appearance pressures (Gilbert & Miles, 2002; Utschig et al., 2010; Maraldo et al., 2016;

Biderman et al., 2023). This fear is also a known risk factor for eating disorders (Trompeter et al., 2019). The current study aims to explore the relationship between upward social comparison frequency and weight-loss dieting, considering the potential mediating and moderating roles of body shame and fear of negative evaluation.

How is Upward Social Comparison Linked to Weight-loss Dieting?

Upward social comparison refers to the process of comparing oneself to others who are perceived as superior or better in a certain quality (Festinger, 1954). Humans commonly employ upward social comparisons as a tool to navigate and make sense of their social world (Gibbons & Buunk, 1999). These comparisons offer insights into societal values, personal performance relative to others in these valued areas, and potential strategies for success. Essentially, they function as a mechanism for comprehending and navigating our social environment (Gibbons & Buunk, 1999). In the realm of body image and physical appearance, upward social comparison particularly serves as a tool to evaluate one's own attractiveness compared to others (Thompson et al., 1999). Women, especially, are often subjected to societal pressures that emphasize thinness as the ideal body type. This cultural ideal is perpetuated through various media outlets, including television, magazines, and increasingly, social media platforms (Pedalino & Camerini, 2021). As a result, women are frequently exposed to images of thin, attractive, and often unattainable bodies, which might lead to an internalization of unattainable beauty standards (Thompson et al., 1999; Thompson & Stice, 2001; Keery, van den Bergh & Thompson, 2004). When women frequently engage in these upward social comparisons, this can lead to a heightened awareness of their own bodies and how they deviate from this ideal. In other words, they are constantly reminded of the discrepancies between what society is expecting of them and how they actually look. It is reasonable to assume that this constant reminder of not being able to fulfill unattainable societal standards will have emotional consequences and it is these upward social

comparisons that manifest these emotional responses based on that realization. The persistent exposure to idealized images and the subsequent upward social comparisons can lead to feelings of inadequacy, low self-esteem, and dissatisfaction with one's own body (Keery, van den Bergh & Thompson, 2004; Fardouly et al., 2017; van den Bergh et al., 2002; Heinberg & Thompson, 1995). Another prevalent emotional process that has been identified in the context of disordered eating is body shame (Tylka & Sabik, 2010; Noll & Fredrickson, 1998; Doran & Lewis, 2012; Nechita, Bud & David, 2021). We suspect that these emotional processes might influence the relationship between upward social comparison frequency and weight-loss dieting. Therefore, a closer look into the specifics of these emotional processes is warranted.

The experience of (external) body shame in an upward social comparison context

Body shame can be characterized by an intense and negative evaluation of one's body and self (internal), as well as the belief that others will judge or reject one based on appearance (external) (Gilbert, 1998; Keith et al., 2009; Duarte et al., 2015). From a social-functional perspective, shame is the result of failure to live up to an ideal and informs the individual of their shortcomings to that ideal and therefore lower social standing on an intrapersonal level (Keltner & Haidt, 1999; Tangney et al., 1996). This is especially important in the body image domain, where the failure to live up to societal beauty standards is then experienced as either internal body shame (negative evaluation of self) or external body shame (anticipation of social rejection). In the context of upward social comparisons, women might especially be prone to experience external body shame, as the experience of shame acts as the informant that they have failed to meet societal expectations (Keltner & Haidt, 1999; Tangney et al., 1996). Therefore, it is an externally oriented form of shame motivated by the fear of being judged negatively by others. Therefore, individuals who engage in upward social comparisons and perceive a discrepancy between their own bodies and the societal ideal may experience external body shame (Higgins, 1987; Slater & Tiggemann, 2010; Mustapic,

Marcinko & Vargek, 2015). They may believe they are failing to meet societal expectations and are concerned about negative evaluations from others. Furthermore, external body shame might be particularly intensified by the usage of filters and engaging in self-idealization tactics on social media (Kleemans et al., 2018). In a study by Kleemans et al. (2018) it was shown that adolescent girls with higher upward social comparison tendencies are more susceptible to the negative body image effects these filters can have.

Because of the information mentioned above, it is important to understand if women that are prone to frequently engaging in upward social comparison will be more at risk for developing external body shame. Consequently, this paper is going to examine the relationship between upward social comparison and external body shame. We predict that with increasing upward social comparison frequency women will experience more frequent episodes of external body shame.

(External) Body Shame and its Role as a Mediator Between Upward Social Comparison and Weight-loss Dieting

External body shame is a potent emotional response characterized by feelings of inadequacy, worthlessness, and humiliation (Gilbert, 1998). In the context of upward social comparisons, women may turn to restrictive dieting as a means to narrow the perceived gap between their physical appearance and societal expectations (Mustapic, Marcinko & Vargek, 2015; Higgins, 1987; Slater & Tiggemann, 2010). In a social-functional context, shame serves as a signal of deviation from an ideal, thereby acting as a catalyst for motivation to conform to this ideal and heighten one's social standing (Keltner & Haidt, 1999; Tangney et al., 1996). Moreover, restrictive dieting aligns with the cultural thin-ideals and has been culturally accepted as the preferred method of weight loss (Paxton et al., 1999). As a result, women may gravitate towards this accessible and socially acceptable approach. Existing research has consistently shown a link between body shame and disordered or abnormal eating behaviors,

observed in clinical and non-clinical samples of women and men respectively (Doran & Lewis, 2012; Keery et al., 2004; Mustapic, Marcinko & Vargek, 2017). Additionally, body shame has been identified as a mediator in the relationship between body comparisons and disturbed eating behaviors (Tylka & Sabik, 2010). These findings support the notion that external body shame may be directly associated with weight-loss dieting within the context of upward social comparisons.

Consequently, this paper will examine the relationship between external body shame and weight-loss dieting. We predict that women with more frequent episodes and higher levels of body shame will in turn engage in more restrictive weight-loss dieting behaviors. Overall, we predict that external body shame will mediate the relationship between upward social comparison frequency and weight-loss dieting.

How High Fear of Negative Evaluation Might Exacerbate The Relationship Between Upward Social Comparisons and External Body Shame

Building on the existing research on the relationship between upward social comparisons, eating behavior, and body shame, it is important to consider other factors that might moderate the mediation pathway of external body shame between upward social comparison frequency and weight-loss dieting. The role of external body shame in the relationship between upward social comparisons and disordered eating behavior may be influenced by various factors such as personality traits or cognitive biases that might exacerbate the development of external body shame in the context of upward social comparisons.

As research in eating disorders moves from a categorical approach to a more comprehensive, transdiagnostic perspective, as proposed by Fairburn et al. (2003), several key features have been identified within the spectrum of eating disorders. Examples include the over-evaluation of weight and shape, which represents cognitive biases, and perfectionism,

indicative of maladaptive personality traits. Given this shift, it is logical to explore transdiagnostic factors that may influence the relationship between social comparisons and external body shame. Eating disorders seem to have a high comorbidity with anxiety-related disorders, especially social anxiety (Pallister & Waller, 2008). Therefore, recent theoretical advancements have proposed a new transdiagnostic factor in eating-related disorders.

Fear of negative evaluation (FNE) can be described as the fear of being negatively evaluated by others and is a key component of social anxiety disorder (Watson & Friend, 1969). Women with high fear of negative evaluation consistently experience concern about how others evaluate them (Weeks et al., 2005). External body shame and fear of negative evaluation appear to be closely related theoretical concepts, with the primary distinction being that fear of negative evaluation is a stable trait influencing an individual's perceptions, while external body shame is an episodic emotion. As a result, fear of negative evaluation has been proposed as a transdiagnostic factor in eating disorders, and studies have shown that FNE predicts eating-related disorders, particularly those with weight and shape concerns (Trompeter et al., 2019). Higher fear of negative evaluation has been linked to a stronger internalization of the thin-ideal, especially for women with high BMI (DeBoer et al., 2013; Utschig et al., 2010; Maraldo et al., 2016). Furthermore, women high in fear of negative evaluation experience stronger external appearance pressure to conform to cultural appearance norms (Biderman et al., 2023). Thus, as women high in fear of negative evaluation are more preoccupied with the judgment of others and therefore experience a stronger drive to conform to the cultural thin-ideal and higher pressures to conform to this ideal, they might in turn experience more external body shame.

An additional argument for why fear of negative evaluation might boost body shame is its role in heightening self-consciousness (Clark & Wells, 1995; Monfries & Kafer, 1994). Individuals with high FNE are more likely to be overly focused on their own perceived flaws

and imperfections and are more likely to be self-conscious (Clark & Wells, 1995; Monfries & Kafer, 1994). This heightened self-consciousness can lead to an increased vulnerability to negative self-evaluation and body shame, particularly when engaging in upward social comparisons. As these individuals compare themselves to others who may embody societal beauty standards, their heightened self-consciousness and fear of negative evaluation can exacerbate feelings of body shame, as they are more aware of certain discrepancies between their own body and their comparison target.

Consequently, it is expected that fear of negative evaluation might moderate the relationship between upward social comparison frequency and external body shame. Women with high fear of negative evaluation are not only more prone to internalize the thin ideal but also more likely to experience stronger external appearance pressures, as well as a heightened self-consciousness of their flaws (DeBoer et al., 2013; Utschig et al., 2010; Maraldo et al., 2016; Biderman et al., 2023; Clark & Wells, 1995; Monfries & Kafer, 1994). These factors contribute to increased external body shame as they engage in upward social appearance comparisons. Therefore, we expect that fear of negative evaluation will moderate the relationship between upward social comparison frequency and external body shame.

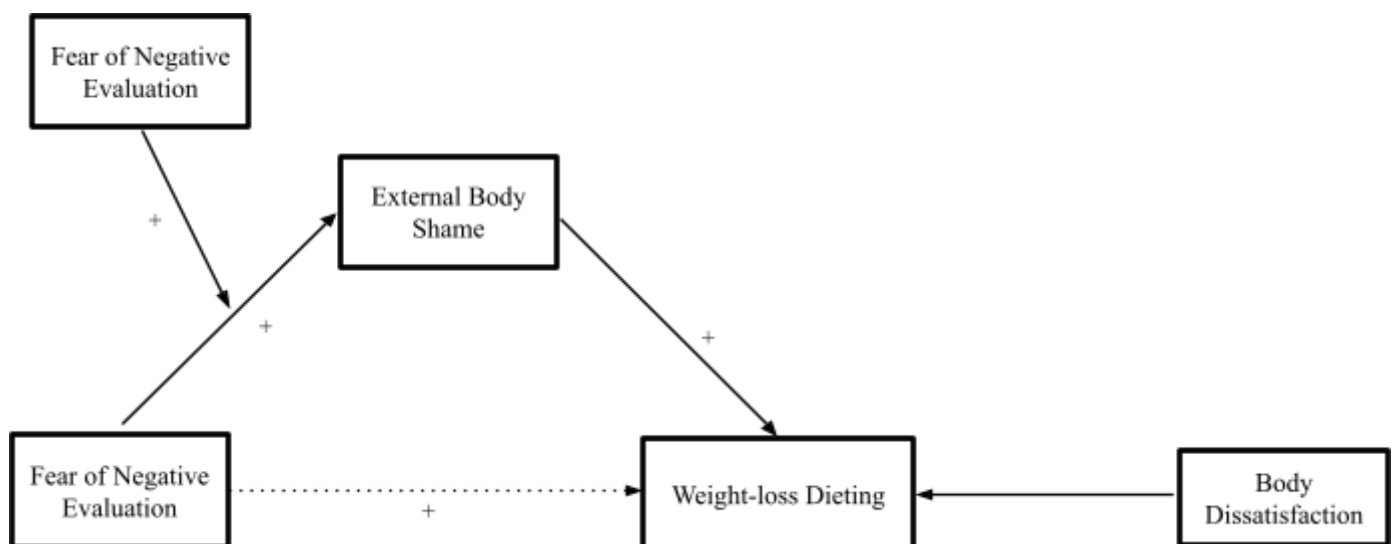
The current study

The current study aims to investigate the association between upward social comparison frequency, external body shame, and weight-loss dieting in a sample of college women, as they are a population commonly affected by body image concerns. Additionally, we will explore the potential moderating role of fear of negative evaluation in the relationship between upward social comparison frequency and external body shame. Accordingly, we hypothesize a moderated mediation model wherein external body shame serves as a mediator between upward social comparison frequency and weight-loss dieting. We further predict that fear of negative evaluation will amplify the link between upward social comparison and

external body shame, ultimately leading to a greater engagement in restrictive weight-loss dieting behavior (see Figure 1). To isolate the emotional components of shame relevant to comparison processes, we will control for trait body dissatisfaction in our analysis, as we are particularly interested in the emotional processes following upward social comparison, as these give more insight into the specific causes and experiences that lead to weight-loss dieting and would therefore provide more insight from a therapeutic perspective, instead of the mere discontent body dissatisfaction is characterized by (Lazarus & Lazarus, 1995).

Figure 1

Predicted moderated mediation model



Methods

Participants

A sample of 347 female participants was initially obtained through convenience sampling methods, which included both online recruitment via social media platforms and

direct recruitment on the campus of the University of Groningen. The inclusion criteria for the study specified that participants must be female, currently enrolled or previously enrolled in an English-language university program, and have no history of an eating disorder diagnosis. Following the exclusion of participants who did not meet the study criteria, failed to complete the study, or did not correctly answer the validation questions, the final sample consisted of 227 participants.

Measures

Upward Social Comparison Frequency

To operationalize upward comparison tendency/frequency, the Upward Physical Appearance Comparison Scale (UPACS) by O'Brien et al. (2009) was used. This 10-item scale was used to measure the frequency of engagement in physical appearance comparison with individuals who are viewed as subjectively better looking (i.e., "I tend to compare myself to people I think look better than me."). Responses are made on a 5-point Likert scale ranging from "Strongly disagree" to "Strongly agree". The participants respond to a total of 10 questions and higher total scores indicate greater engagement in upward social comparison. The internal consistency of the UPACS has previously been reported as $\alpha = 0.93$ (O'Brien et al., 2009). In the current study, Cronbach's alpha was $\alpha = 0.912$.

External Body Shame

External body shame was assessed using the external body shame subscale of the Body Image Shame Scale (BISS) (Duarte et al., 2015). Participants were instructed to respond to 7 items on a 5-point Likert scale ranging from "Never" to "Always" (e.g. "*I avoid social situations (e.g., going out, parties) because of my physical appearance.*"). Higher total scores indicate higher external body shame. The BISS has been previously validated with a Cronbach's alpha of $\alpha = 0.92$ for the external subscale (Duarte et al., 2015). In the current study, Cronbach's alpha was $\alpha = 0.864$.

Fear of Negative Evaluation

Fear of negative evaluation was assessed by using the 12-Item Brief Fear of Negative Evaluation Scale-Revised (BFNE-R) (Carleton et al., 2006), in which reverse-coded items of the original BFNE were positively coded (e.g. *"I worry about what other people will think of me even when I know it doesn't make any difference."*). Answers were recorded on a 5-point Likert-Scale ranging from 0 "not at all characteristic of me" to 4 "extremely characteristic of me". Scores were added up to obtain a total score ranging from 0 to 48. Higher total scores indicate higher fear of negative evaluation. Internal consistency was previously found to be excellent with a Cronbach's Alpha of $\alpha = 0.95$ (Carleton et al., 2006). In the current study, Cronbach's alpha was $\alpha = 0.955$.

Restrictive Weight-loss Dieting

Restrictive weight-loss dieting was assessed using the 9-item Dietary Intent Scale (DIS) (Stice, 1998), measuring the restrictive dieting intent of an individual (e.g. *"I take small portions of food in an effort to control my weight."*). Answers were assessed on a 5-point Likert scale, ranging from "Never" to "Always". Higher total scores indicate that one has a greater drive to restrictively diet. The internal reliability of the DIS has previously been reported as $\alpha = 0.94$ (Stice, 1998). In the current study, Cronbach's alpha was $\alpha = 0.93$.

Body Dissatisfaction

Body dissatisfaction was assessed using the body dissatisfaction subscale of the Eating Disorder Inventory (EDI) (Garner et al., 1983). The 9-Items asked questions about the individual's satisfaction with particular body parts (e.g. *"I think that my stomach is too big."*). Answers were assessed on a 6-point Likert Scale ranging from "Never" to "Always". Higher scores indicate higher trait body dissatisfaction. Internal consistency was previously found high with Cronbach's alpha $\alpha = 0.91$. In the current study, Cronbach's alpha was $\alpha = 0.88$.

Procedure

The study was approved by The Ethics Committee of the Department of Psychology at the University of Groningen. After providing informed consent, a set of demographic questions and psychological self-report measures were combined into an online test questionnaire, which was called "Social Comparisons and Dieting Behaviour", using Qualtrics. Qualtrics is a widely used online survey platform that allows researchers to design and distribute comprehensive surveys (Cushman et al., 2021). Only participants who were female and had at least level B2 of English or were enrolled in an English university program could partake in the questionnaire. Participants with a previous history of eating disorders were excluded from the study.

Statistical Analysis

Hayes Process Macro was used in SPSS (V29) to analyze the predicted moderated mediation model. Instead of relying on theoretical assumptions of the sampling distributions of our estimates using the central limit theorem, the bootstrapping technique was used to empirically generate the sampling distributions. This is done by resampling with replacement 5000 times from our sample with the same initial sample size in order to derive a bootstrap distribution which is used to calculate standard errors for the confidence intervals and hypothesis testing.

It has been shown that bootstrapping technique is robust against possible non-normality of the residuals and better accounts for irregularities of the sampling distributions than a normal theory approach (Hayes, 2013; Jose, 2013; Wright et al., 2011; MacKinnon et al., 2004). Subsequently, this results in more accurate estimates of the standard error and therefore the inference done by the confidence intervals and hypothesis testing of simulations studies with bootstrapping tends to be more accurate and have higher power than the normal theory approach (Hayes, 2013; Jose, 2013; Wright et al., 2011; MacKinnon et al., 2004).

The model 7 moderated mediation model (Hayes, 2013) included upward social comparison frequency as the predictor variable, body shame as the mediator, fear of negative evaluation as the moderator, and restrictive weight-loss dieting as the outcome variable. In the analysis trait body dissatisfaction was used as a control variable.

Results

Assumption Checks for Regression Analysis

As a moderated mediation analysis is essentially similar to several multiple regression analyses being combined, the same assumptions hold for the analysis. Therefore, linearity and normality of the predictors, as well as homoscedasticity need to be respected for the analysis to be valid (Ernst & Albers, 2017). To check for linearity, a number of scatterplots were used to check for any irregularities (See Figures 1, 2, and 3 in Appendix A). Visual inspection of the residual vs predicted graph indicates that there is an equal spread of data points around the horizontal line creating a “blob” shape. More importantly, there certainly isn’t any sort of curve shape in the graph (Field, 2018). Based on this evidence and the P-P plots (See Figures 5, 7, and 9 in Appendix A), the assumption of linearity has been met: there is no strong evidence of a systematic relationship between the errors in the model and what the model predicts. To check for normality violations, the P-P plots were used. The data points are distributed close to the line of normal distribution and therefore, no violations of normality could be detected. To assess homoscedasticity, we conducted single linear regression analyses of the predictors against the dependent variable. Scatterplots of the residuals against the predicted values were used to check for irregularities (See Figures 4, 6, and 8 in Appendix A). The scatterplots showed slight irregularities in the distribution of residuals across different values of independent variables. Bootstrapping is a very robust method against normality violations and was therefore used in the statistical analysis to counter slight violations. A variance inflation factor between 1 and 5 is indicative of acceptable correlation levels between

variables. Therefore no multicollinearity is present (see Table 2 in Appendix A). A heteroscedasticity-consistent standard error HC4 (Cribari-Neto and Lima, 2014) was used to counter the violations in homoscedasticity. Casewise diagnostics suggested no cases present with a value more than +/- 3 standard deviations from Y (Wiggins, 2000).

Descriptive and Correlation Analysis

After excluding participants with incomplete questionnaires, 227 participants were left for statistical analysis. Descriptive statistics and zero-order correlations were calculated and are represented in Table 1.

Table 1

Descriptive Statistics and Zero-order Correlations for Study Variables

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	1	2	3	4	5
USCF	227	3.68	0.82	—				
FNE	227	26.75	11.71	0.484*	—			
EBS	227	2.19	0.78	0.558*	0.450*	—		
RWLD	227	2.19	0.91	0.456*	0.255*	0.492*	—	
BD	227	2.73	0.81	0.505*	0.406*	0.659*	0.603*	—

Note. USCF = upward social comparison frequency, FNE = fear of negative evaluation, EBS = external body shame, RWLD = restrictive weight-loss dieting, BD = body dissatisfaction

* $p < .01$

Moderated Mediation Analysis

Using PROCESS after Hayes (2013), a model 7 moderated mediation analysis was conducted. The moderated mediation model combines all parameters of moderation- and

mediation analysis into one single model. The index of moderated mediation represents the slope of the association between the moderator and the indirect mediation effect (Hayes, 2013) (See Figure 1). The moderated mediation index, in this case the effect of fear of negative evaluation on the indirect mediation effect through external body shame, was not significant ($B = 0.007$, $SE = 0.007$, 95% CI $[-0.0007, 0.0023]$). Furthermore, the conditional indirect effect of upward social comparison frequency on weight-loss dieting, through external body shame, was not significant at low (-1SD; $B = 0.0204$, $SE = 0.0210$, 95% CI $[-0.0164, 0.0667]$), moderate (Mean; $B = 0.0282$, $SE = 0.0262$, 95% CI $[-0.0241, 0.0821]$) and high (+1SD; $B = 0.0360$, $SE = 0.0329$, 95% CI $[-0.0311, 0.1027]$) levels of fear of negative evaluation. This indicates that the hypothesized moderated mediation was not supported, irrespective of the levels of fear of negative evaluation.

Exploratory Analysis

Because no significant effects of a moderated mediation were found, but zero-order correlations warranted further investigation, two separate mediation analyses were conducted. These concerned the relationships between fear of negative evaluation, restrictive weight-loss dieting, and external body shame, as well as the relationships between upward social comparison, weight-loss dieting, and external body shame independently.

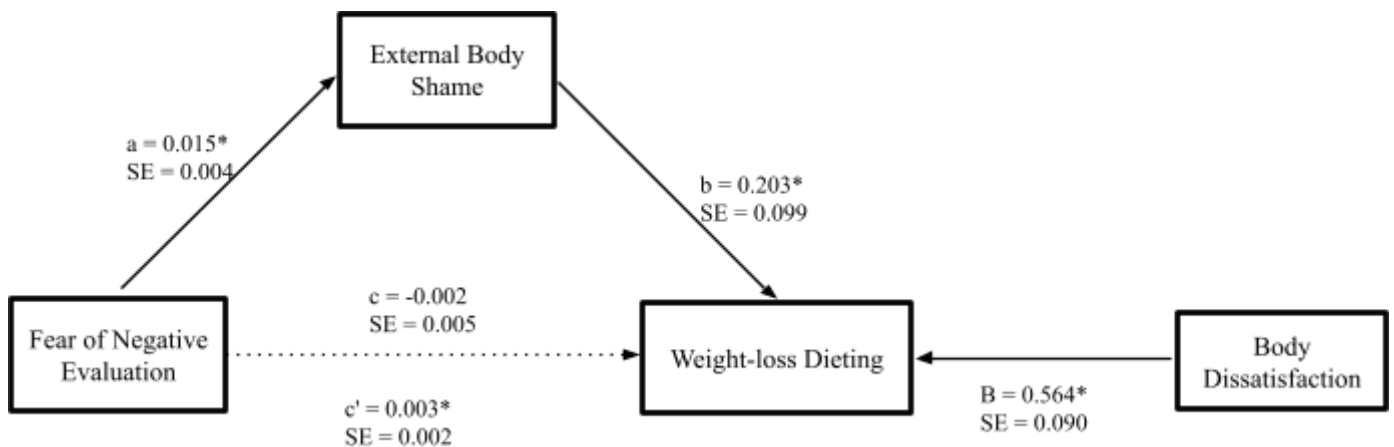
Is the relationship between fear of negative evaluation and weight-loss dieting mediated by external body shame?

Using PROCESS model 4, a mediation analysis was conducted. This time, analyzing the effect of fear of negative evaluation on restrictive weight-loss dieting intent, mediated through external body shame, whilst controlling for body dissatisfaction (See Figure 2). The overall model was significant [$F(3, 223) = 50.006$, $p < 0.001$] and explained 38.02% of the overall variance in restrictive weight-loss dieting intent. The indirect mediation effect of fear of negative evaluation on weight-loss dieting through external body shame was significant (B

= 0.003, SE = 0.002, CI [0.0002, 0.0065]). Fear of negative evaluation had a significant direct effect on external body shame ($B = 0.015$, SE = 0.004, CI [0.007, 0.022], $p < 0.001$). There was no significant direct effect of fear of negative evaluation on weight-loss dieting ($B = -0.002$, SE = 0.005, CI [-0.012, 0.008], $p = 0.683$). Therefore, external body shame fully mediated the relationship between fear of negative evaluation and weight-loss dieting. Furthermore, external body shame had a significant direct effect on weight-loss dieting ($B = 0.203$, SE = 0.099, CI [0.008, 0.398], $p = 0.042$). Body dissatisfaction had significant direct effects on both external body shame ($B = 0.554$, SE = 0.066, CI [0.424, 0.684], $p < 0.001$) and weight-loss dieting ($B = 0.564$, SE = 0.090, CI [0.386, 0.742], $p < 0.001$).

Figure 2

Mediation Pathway of External Body Shame between the Relationship of Fear of Negative Evaluation and Weight-loss Dieting, whilst controlling for Body Dissatisfaction



Note. Indicated are the unstandardized coefficients. Standard Errors are corrected via HC4.

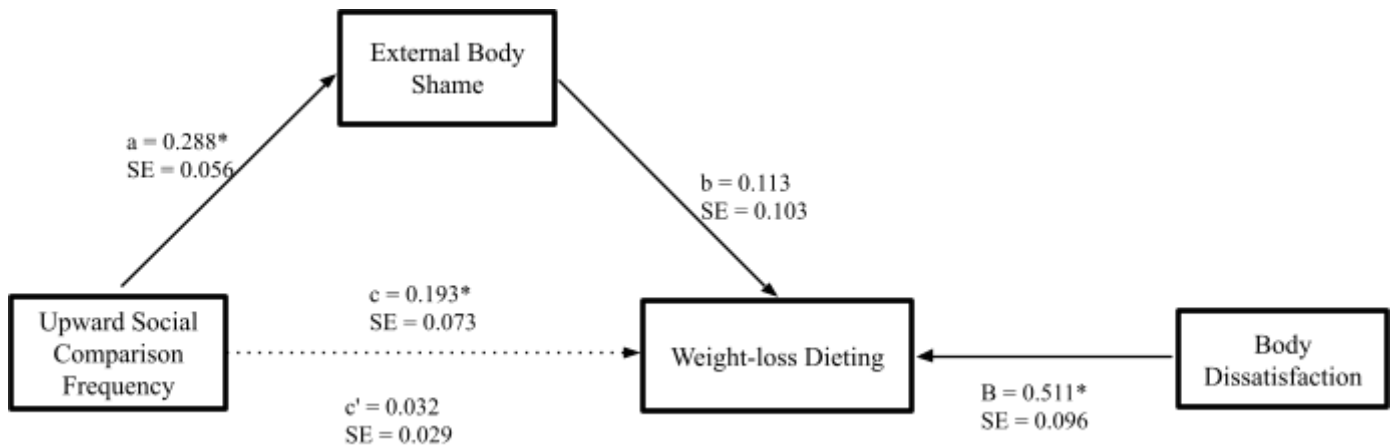
* $p < .05$

Is the relationship between upward social comparison frequency and weight-loss dieting mediated by external body shame?

Again, using PROCESS model 4 (Hayes, 2013), a mediation analysis on the effects of upward social comparison on weight-loss dieting through external body shame was conducted, while controlling for body dissatisfaction (See Figure 3). The overall model was significant [$F(3, 223) = 59.878, p < 0.001$]. The overall model explained 39.95% of the overall variance in restrictive weight-loss dieting intent. When controlling for body dissatisfaction, the indirect mediation effect of upward social comparison frequency on weight-loss dieting through external body shame was not significant ($B = 0.032, SE = 0.029, CI [-0.026, 0.094]$). Upward social comparison frequency had significant direct effects on external body shame ($B = 0.288, SE = 0.056, CI [0.177, 0.398], p < 0.001$) and weight-loss dieting ($B = 0.193, SE = 0.073, CI [0.049, 0.337], p = 0.009$). Furthermore, external body shame had no direct effect on weight-loss dieting ($B = 0.113, SE = 0.103, CI [-0.092, 0.316], p = 0.277$). Body dissatisfaction had significant direct effects on both external body shame ($B = 0.492, SE = 0.066, CI [0.362, 0.622], p < 0.001$) and weight-loss dieting ($B = 0.511, SE = 0.096, CI [0.321, 0.700], p < 0.001$). In conclusion, body dissatisfaction was a significantly more valuable direct predictor of restrictive weight-loss dieting intent than external body shame.

Figure 3

Mediation Pathway of External Body Shame between the Relationship of Upward Social Comparison Frequency and Weight-loss Dieting, whilst controlling for Body Dissatisfaction



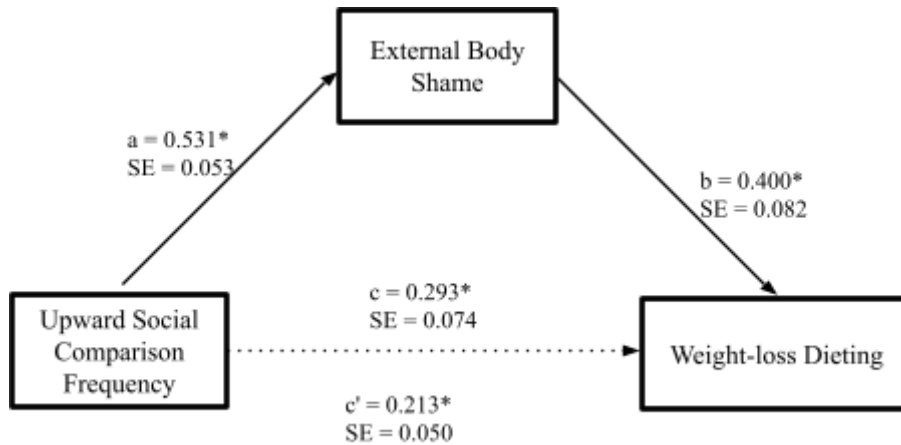
Note. Indicated are the unstandardized coefficients. Standard Errors are corrected via HC4.

* $p < .05$

Due to the theoretical overlap between body shame and body dissatisfaction, we decided to rerun the analysis without including body dissatisfaction as a control variable. When leaving body dissatisfaction out of the analysis, the overall model was significant [$F(2, 224) = 49.990, p < 0.001$]. The overall model explained 29% of the overall variance in weight-loss dieting. The indirect mediation effect of upward social comparison frequency on weight-loss dieting through external body shame was significant ($B = 0.213, SE = 0.050, CI [0.117, 0.315]$). Upward social comparison frequency had significant direct effects on external body shame ($B = 0.531, SE = 0.053, CI [0.427, 0.636], p < 0.001$) and weight-loss dieting ($B = 0.293, SE = 0.074, CI [0.148, 0.438], p < 0.001$). Furthermore, external body shame had a significant direct effect on weight-loss dieting ($B = 0.400, SE = 0.082, CI [0.238, 0.563], p < 0.001$). In conclusion, external body shame partially mediated the relationship between upward social comparison frequency and weight-loss dieting.

Figure 4

Mediation Pathway of External Body Shame between the Relationship of Upward Social Comparison Frequency and Weight-loss Dieting, without controlling for Body Dissatisfaction



Note. Indicated are the unstandardized coefficients. Standard Errors are corrected via HC4.

* $p < .05$

Discussion

In a sample of college women, we predicted a moderated mediation model in which external body shame would mediate the relationship between upward social comparison frequency and weight-loss dieting, and that fear of negative evaluation would moderate the relationship between upward social comparison frequency and external body shame. Thus, with increasing upward social comparison frequency and increasing fear of negative evaluation, women would experience more external body shame episodes and in turn, develop a greater intent to engage in weight-loss dieting. Furthermore, we predicted that this model would be significant, whilst controlling for body dissatisfaction. The moderated mediation model was not supported by the statistical analysis. Because zero-order correlations warranted further investigation, two individual mediation analyses were conducted. For the first mediation model, it was expected that external body shame would mediate the relationship between upward social comparison frequency and weight-loss dieting. The first mediation

was not supported when controlling for body dissatisfaction. Without controlling for body dissatisfaction, external body shame partially mediated the relationship between upward social comparison frequency and weight-loss dieting. The second mediation model proposed that the relationship between fear of negative evaluation and weight-loss dieting would be mediated by external body shame. Thus, with increasing fear of negative evaluation, women would experience more external body shame and therefore greater weight-loss dieting intent. Results showed that external body shame fully mediated the relationship between fear of negative evaluation and weight-loss dieting and therefore confirmed the mediation model.

The statistical analysis did not substantiate the proposed moderated mediation model, where fear of negative evaluation was hypothesized to influence the relationship between upward social comparison frequency, external body shame, and restrictive weight-loss dieting intent. Specifically, the data revealed that fear of negative evaluation did not modify the indirect effect of upward social comparison frequency on weight-loss dieting intent via external body shame. One potential explanation for the failure of our predicted model could be an insufficient level of fear of negative evaluation in our non-clinical sample. Fear of negative evaluation has been linked with disordered eating symptomatology (Gilbert & Meyer, 2003; Trompeter et al., 2019). The current sample had a relatively moderate level of fear of negative evaluation. Consequently, it is possible that in samples displaying clinical levels of eating disorders, where overall fear of negative evaluation is expected to be higher, the influence of fear of negative evaluation on the mediation pathway would be more substantial. Moreover, individuals with clinical eating disorders may possess more pronounced cognitive biases, e.g. strong negative self-schemas (Pringle et al., 1999) that further reinforce the negative influence of high fear of negative evaluation on the relationship between upward social comparison frequency and external body shame. Future research should explore these hypotheses by examining samples with clinically diagnosed eating

disorders and comparing them to non-clinical samples. Such investigations would help elucidate the differential impacts of fear of negative evaluation and the relationship between upward social comparisons and external body shame across varying levels of severity.

Furthermore, we conducted two additional exploratory mediation analyses. The first exploratory mediation analysis examined the direct and indirect effects of upward social comparison frequency on restrictive weight-loss dieting intent, mediated through body shame, whilst controlling for body dissatisfaction. The indirect effect of upward social comparison frequency on weight-loss dieting, through external body shame, was not found to be significant. Thus, body shame did not mediate the relationship between upward social comparison frequency and restrictive weight-loss dieting intent, when controlling for body dissatisfaction. The direct effect of upward social comparison frequency on restrictive weight-loss dieting intent was significant, aligning with previous research that has demonstrated the association of upward social comparison and weight-loss dieting, as predicted in the sociocultural model (Thompson et al., 1999). When examining the mediation more closely, one could see that the direct relationship between upward social comparison frequency and external body shame was still significant, even whilst controlling for body dissatisfaction. Consequently, women with higher upward social comparison frequency did experience higher external body shame in the current sample, but external body shame was not associated with higher levels of weight-loss dieting. Rather, it was observed that body dissatisfaction took over most of the explained variance in the mediation pathway through external body shame and had a significant effect on weight-loss dieting.

These findings align with previous research indicating a connection between the frequency of upward social comparisons and the development of body shame (Tylka & Sabik, 2010; Doran & Lewis, 2012; Keery et al., 2004; Mustapic, Marcinko & Vargek, 2017).

Women who engage in frequent upward social comparisons are regularly made aware of their

own perceived disparities when comparing their bodies to those of others who are subjectively considered more attractive and are adhering closely to cultural beauty standards.

Consequently, these women experience a continual reminder of their failure to adhere to cultural standards, which serves as a catalyst for the development of greater and more frequent feelings of external body shame. External body shame in this context is associated with the expectation of being judged or rejected by others due to not conforming to societal beauty standards (Keith et al., 2009; Duarte et al., 2015). From a social-functional perspective, the experience of shame acts as an informant that, due to their failure to adhere to the cultural beauty standards, are at risk for a lower social standing (Keltner & Haidt, 1999; Tangney et al., 1996). This process might perpetuate a cycle of comparison and self-evaluation, where women consistently assess their own bodies against these cultural norms, further reinforcing their sense of inadequacy and shame.

Still, when controlling for body dissatisfaction, external body shame did not significantly predict weight-loss dieting. This finding invites further exploration into the nuanced differences between body dissatisfaction and body shame, and their respective influences on weight-loss behaviors. Because body dissatisfaction encompasses a broader sense of self-directed discontentment than body shame, it is a more common sensation than body shame (Andrews, 1997; Mills et al., 2022). It is an expression of general discontent with one's outward appearance (Mills et al., 2022), brought on by perceived shortcomings in terms of social beauty standards. Comparatively, body shame is a more complex and multidimensional experience that includes emotional, behavioral, and interpersonal elements (Mills et al., 2022). Furthermore, it involves intense feelings of inadequacy, worthlessness, and humiliation (Gilbert, 1998), in this case triggered by perceived failures to meet societal expectations. Body shame encompasses a more profound sense of self-directed negativity and self-devaluation than simple discontent with one's physical appearance (Gilbert & Miles,

2002). These differences suggest that when body dissatisfaction was controlled for, the effects of external body shame on weight-loss dieting might have been overshadowed. It is possible that body shame's more complicated and subtle effects were hidden by how broad and widespread the experience of body dissatisfaction can be. Future studies should add emphasis on the delineation of these two constructs, as well as if there is a difference between external body shame and body dissatisfaction as a motivator for weight-loss dieting between clinical and non-clinical samples.

In the second exploratory analysis, we tried to assess whether external body shame mediated the relationship between fear of negative evaluation and weight-loss dieting. The results revealed that external body shame fully mediated the impact of fear of negative evaluation on weight-loss dieting, demonstrating a significant indirect effect through body shame. Thus, women with a higher fear of negative evaluation tended to develop more external body shame, leading to a greater intention for weight-loss dieting. Women with high fear of negative evaluation consistently experience concern about how others evaluate them (Weeks et al., 2005). Consequently, they are concerned about the appearance of their body, as it is a culturally prevalent target of social evaluation. The results suggest that the emergence of external body shame stems from their innate fear of social rejection and their heightened susceptibility to experiencing negative emotions (Clark & Wells, 1995). This could explain why fear of negative evaluation has been linked to increased pressures regarding external appearance (Biderman et al., 2023), as well as an association with the internalization of the thin ideal in certain studies (Utschig et al., 2010; Maraldo et al., 2016; DeBoer et al., 2013). The persistent concern of being judged by others and the continuous evaluation of one's appearance towards others seem to foster a desire to internalize the thin ideal among women with high levels of fear of negative evaluation. This desire arises from their need for a societal reference regarding beauty standards. However, the primary reason for the development of

external body shame seems to lie in the external pressure to conform to societal standards and the influence of individuals in their social environment, coupled with their ongoing worries about judgment and social acceptance from peers. Consequently, when women high in fear of negative evaluation experience external body shame, they seem to become even more susceptible to the intensely negative experiences associated with shame. Moreover, individuals with high levels of fear of negative evaluation (FNE) tend to exhibit a heightened focus on their perceived flaws and imperfections, accompanied by increased self-consciousness (Clark & Wells, 1995; Monfries & Kafer, 1994). This heightened self-consciousness renders them more vulnerable to the experience of external body shame, particularly when engaging in upward social comparisons, as they are even more aware of the discrepancies between their own bodies and their comparison targets.

Furthermore, the results showed that women that experience higher fear of negative evaluation and in turn also higher levels of external body shame are also more motivated to engage in restrictive weight-loss dieting. One potential explanation might be that women with high fear of negative evaluation are even more susceptible to the strong emotional responses characterized by feelings of inadequacy, worthlessness, and humiliation, when they experience external body shame, they (Gilbert, 1998). Because restrictive dieting aligns with the cultural thin-ideals and has been culturally accepted as the preferred method of weight loss (Paxton et al., 1999), women may turn to restrictive dieting as a means to narrow the perceived gap between their physical appearance and societal expectations. This, in turn, is hoped to alleviate the strong negative experience of external body shame. Moreover, for women with high fear of negative evaluation, external body shame acts as an informant about a lower social standing (Keltner & Haidt, 1999; Tangney et al., 1996). Therefore, as described in past research, women high in fear of negative evaluation might use restrictive dieting to raise their social status among peers (Gilbert & Meyer, 2003). This is an important finding, as

proper interventions targeting fear of negative evaluation might buffer its effects on the development of external body shame. One example might be the implementation of self-compassion exercises, as self-compassion has been shown to buffer the effects of shame on eating pathology (Ferreira et al., 2014). Future research is needed to look deeper into the potential benefits of such interventions.

After these analyses, the question still remains why external body shame significantly predicted weight-loss dieting in the mediation model with fear of negative evaluation, but not in the context of upward social comparisons, when controlling for body dissatisfaction? Because body dissatisfaction might have clouded the effects of external body shame in the mediation, we again ran the mediation analysis looking at the relationship between upward social comparison frequency and weight-loss dieting and if this relationship might be mediated by external body shame, but without controlling for body dissatisfaction. The statistical analysis showed that this time, external body shame partially mediated the relationship between upward social comparison frequency and weight-loss dieting. Thus, women with higher upward social comparison frequency did experience more external body shame, and in turn, were more motivated to engage in restrictive dieting behavior.

The different psychological processes at play in these relationships may account for the different mediation effects of external body shame in the relationships between fear of negative evaluation and weight loss dieting as well as between upward social comparison frequency and weight loss dieting, whilst controlling for body dissatisfaction. Fear of negative evaluation is a trait-like quality that reflects an individual's persistent worry about receiving poor judgment from others (Weeks et al., 2005). As explained above, it therefore chronically heightens the susceptibility for the negative experiences related to external body shame. In this situation, external body shame acts as an emotional reaction to the constantly perceived threat of unfavorable social evaluation. As opposed to this, upward social comparison is

merely a tool that is used to evaluate one's social standing (Gibbons & Buunk, 1999). Women that frequently engage in upward social comparisons might experience more external body shame to some degree as a consequence of these comparisons, as they are made aware of their shortcomings towards societal standards (Keltner & Haidt, 1999; Tangney et al., 1996), but they are not inherently more vulnerable to the negative feelings and fear that motivates women high in fear of negative evaluation to eventually diet. High fear of negative evaluation underlies a more emotionally charged state driven by persistent and constant fears, as well as heightened sensitivity to social cues (Weeks et al., 2005), thus resulting in a more direct pathway to external body shame. Upward social comparisons, on the other hand, represent a more sober process, where the connection between body shame and dieting is less obvious and more dependent on how the individual feels about their shortcomings in comparison to societal norms. Previous studies showed that body shame mediated the relationship between body dissatisfaction and disordered eating (Mustapic, Marcinko & Vargek, 2015). Thus, it might be that the relationship between upward social comparison frequency and body shame is further mediated by body dissatisfaction. Future research is needed to more clearly delineate the constructs of body dissatisfaction and body shame, as well as their different roles as motivators for dieting behavior in clinical and non-clinical samples. Moreover, longitudinal designs would shed light on the temporal sequence and causal relationships between these variables, clarifying the role of body dissatisfaction and the influence of fear of negative evaluation, as well as upward social comparisons, on the development of body shame.

Practical Implications

The results of the current study have a variety of applications that are important to consider for the development of successful interventions for the prevention and treatment of disordered eating. The results show that external body shame and weight-loss dieting behaviors can be influenced by high upward social comparison frequencies and high fear of

negative evaluation. Therefore, interventions that aim to lower the effects of these could be beneficial. One such approach could be to incorporate self-compassion exercises into therapeutic interventions and furthermore to use them as preventive measures. High fear of negative evaluation and frequent upward social comparisons may be countered by practicing self-compassion, which is treating oneself with kindness, accepting one's shared humanity, and keeping a balanced awareness of negative feelings (Ferreira et al., 2014). People may be less inclined to participate in harsh self-evaluations and more likely to reject the urge to adhere to conventional beauty standards if they cultivate a kinder and more welcoming attitude toward themselves.

Limitations

The above-mentioned significant findings need to be taken into account with some consideration. First, the cross-sectional design used prevents establishing causal relationships or determining the temporal order of variables. Future research employing longitudinal designs would provide stronger evidence for understanding the causal and temporal nature of the relationships between fear of negative evaluation, external body shame, and restrictive weight-loss dieting intent. Secondly, the use of convenience sampling introduces potential selection bias, limiting the generalizability of findings to broader populations. Future studies should employ more representative sampling methods to enhance diversity and improve generalizability. Thirdly, focusing on a non-clinical population of college women may restrict the generalizability of findings to clinical populations or individuals with more severe disordered eating behaviors. External body shame may serve as a stronger motivator in clinical populations, whereas body dissatisfaction may be the primary motivator to engage in restrictive weight-loss behaviors in non-clinical groups. Lastly, the sample used in this study consisted of only international students with several different cultural backgrounds. It is important to keep in mind that body image concerns can differ between cultures, even though

recent research has shown the thin-ideal to be more prevalent across all cultures (Bakhshi, 2011).

Conclusion

All in all, this study provides insights into the emotional processes involved in the development of eating disorders. While fear of negative evaluation did not moderate the relationship between upward social comparison frequency and external body shame, external body shame partially mediated its effect on restrictive weight-loss dieting intent, when not controlling for body dissatisfaction. Furthermore, external body shame fully mediated the relationship between fear of negative evaluation and weight-loss dieting. The findings contribute to the growing body of research on the impact of upward social comparisons, fear of negative evaluation, body shame, and body dissatisfaction on disordered eating behaviors, shedding light on the complex interplay of these factors in the development of eating disorders. Further investigations are needed to expand our understanding of these relationships and to aid the development of targeted interventions for individuals at risk of developing eating disorders.

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Appendix A

Table 2

Collinearity Statistics including Tolerance and Variance Inflation Factor (VIF)

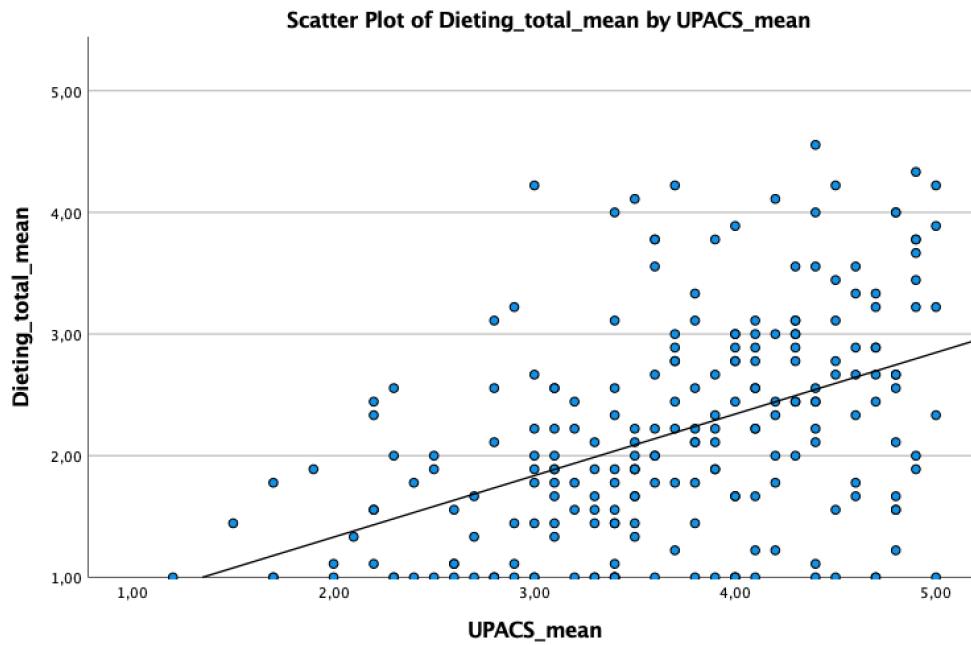
Variable	<i>Tolerance</i>	<i>VIF</i>
USCF	.600	1.665
FNE	.712	1.405
EBS	.485	2.064
BD	.532	1.878

Note. A variance inflation factor between 1 and 5 indicates that no multicollinearity is present.

USCF = upward social comparison frequency, FNE = fear of negative evaluation, EBS = external body shame, RWLD = restrictive weight-loss dieting, BD = body dissatisfaction

Figure 1

Scatterplot of Upward social comparison and dieting

**Figure 2**

*Scatterplot of Interaction Effect of USC * FNE and BS_external*

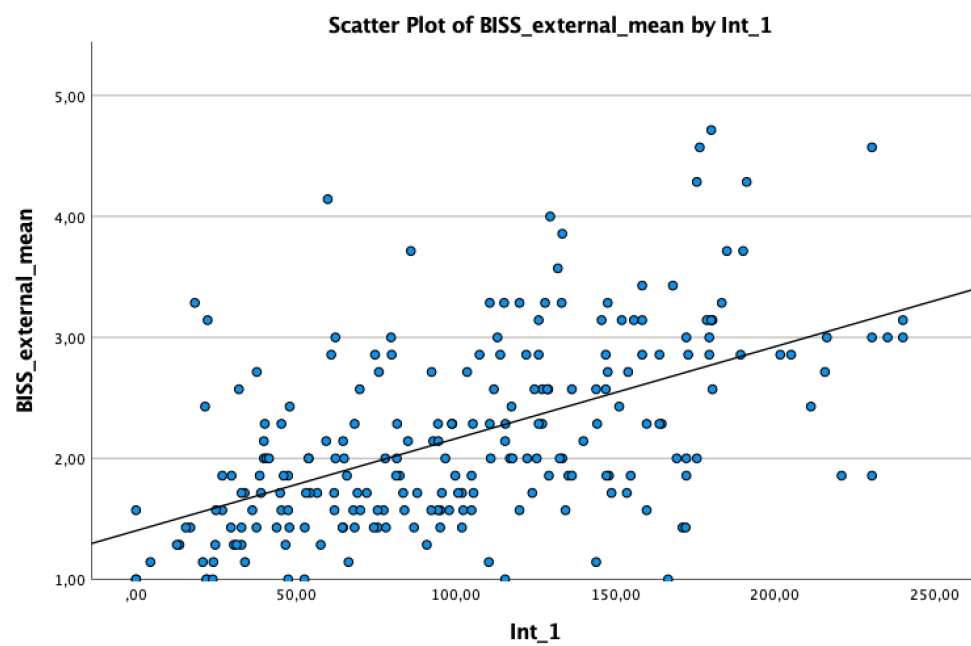
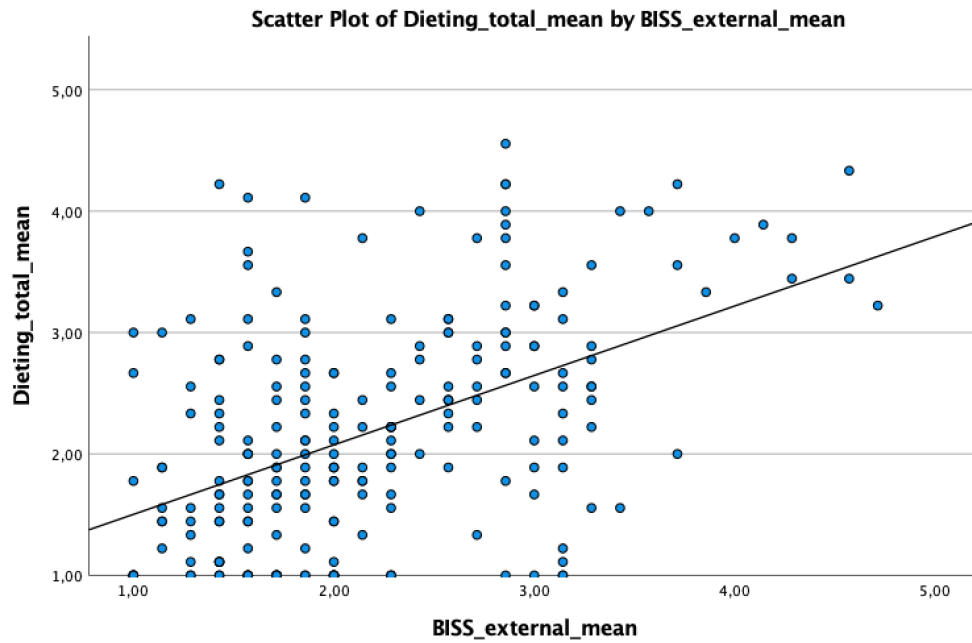


Figure 3

Scatterplot of BS_external and Dieting

**Figure 4**

Scatterplot of Standardized Residuals of Linear Regression with USC and Dieting

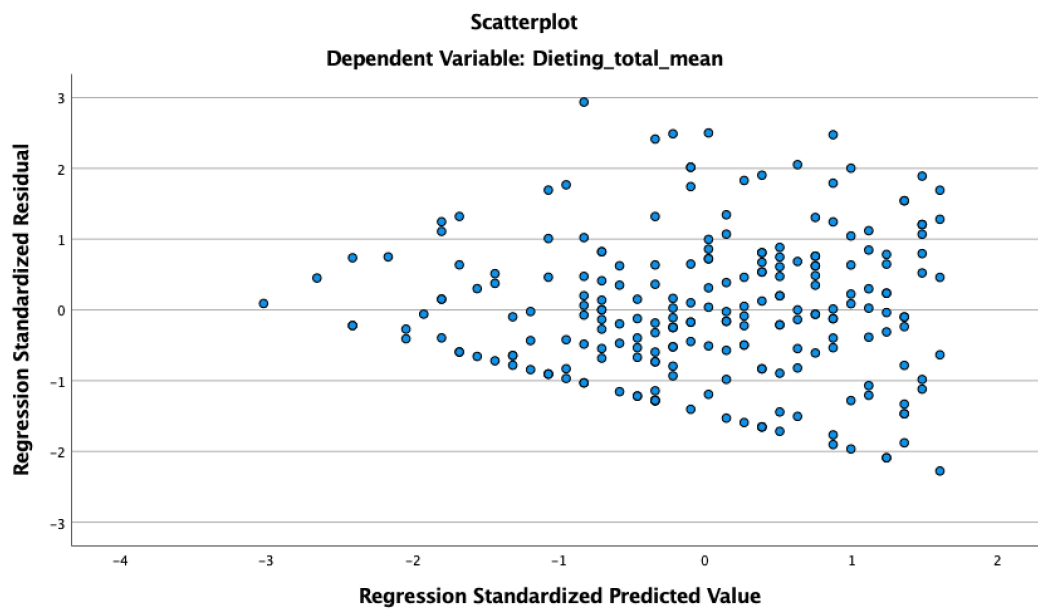
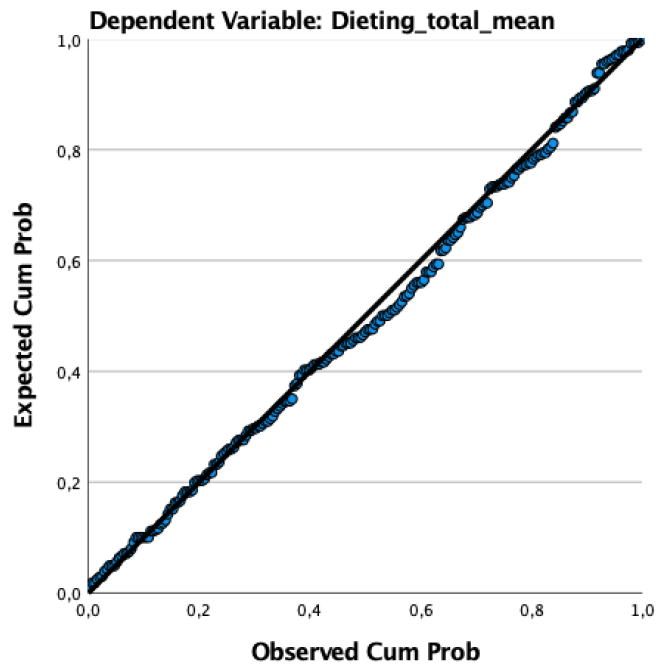


Figure 5

P-P plots of the Standardized Residuals of Linear Regression with USC and Dieting

**Figure 6**

Scatterplot of Standardized Residuals of Linear Regression with the Interaction Effect of USC

** FNE and BS_external*

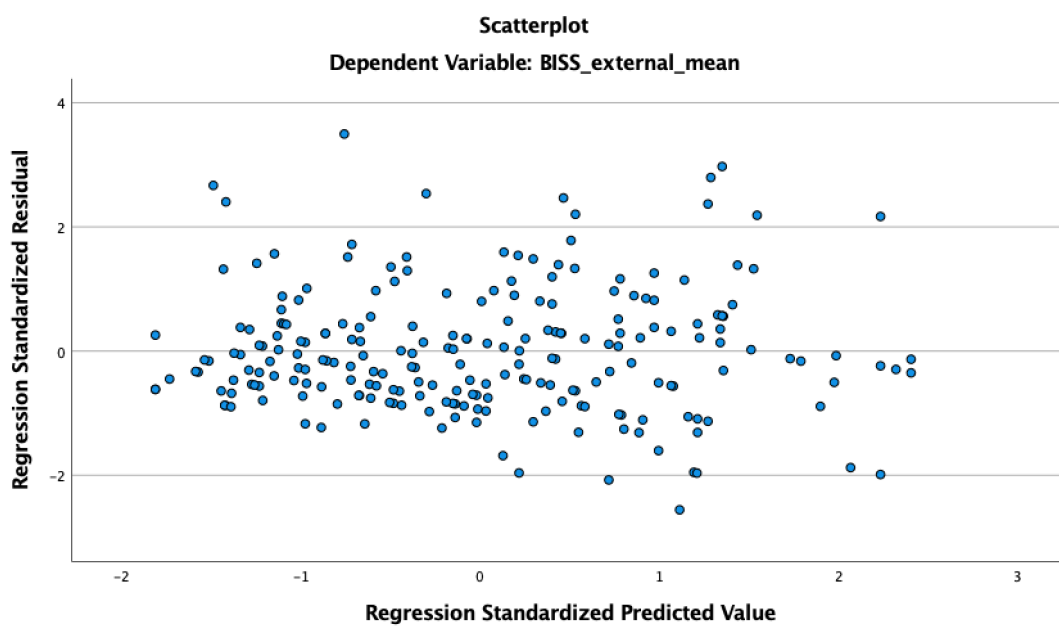
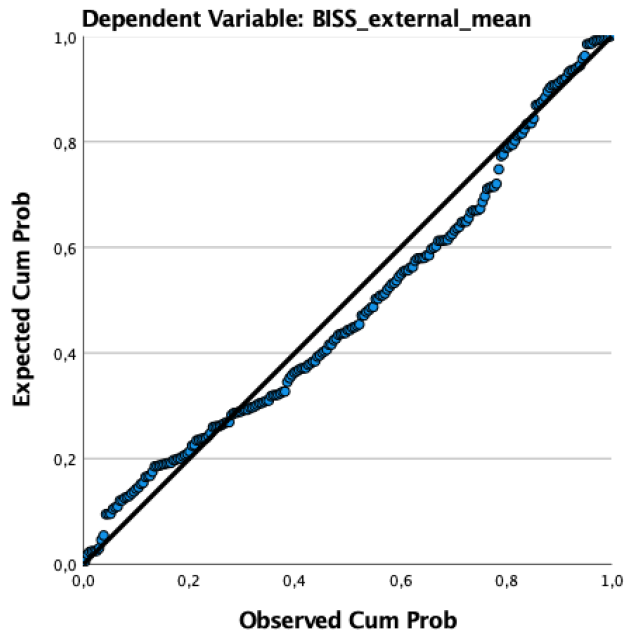


Figure 7

*P-P Plot of Standardized Residuals of Linear Regression with the Interaction Effect of USC **

FNE and BS_external

**Figure 8**

Scatterplot of Standardized Residuals of Linear Regression with BS_external and Dieting

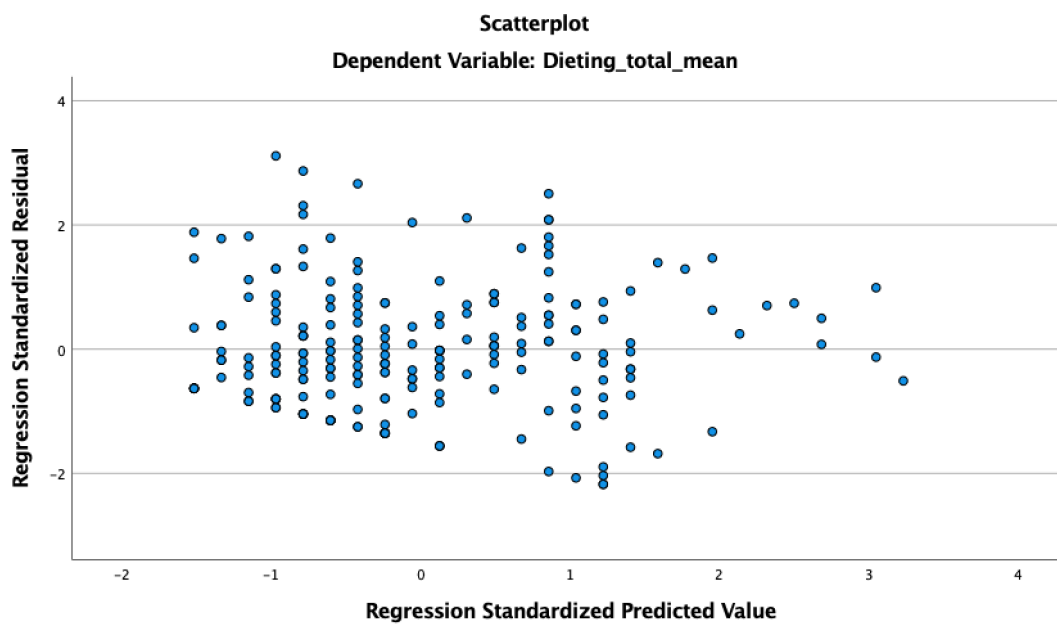
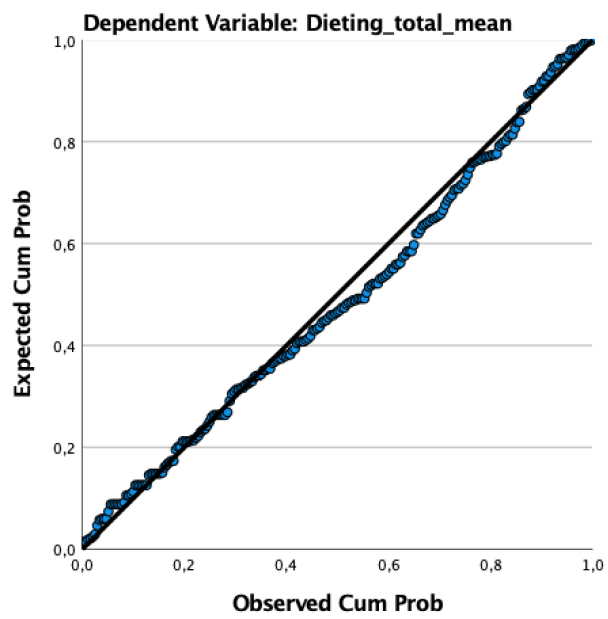


Figure 9

P-P Plot of Standardized Residuals of Linear Regression with BS_external and Dieting



Appendix B

Following are the self-report scales used to measure the study variables, as displayed in the online questionnaire.

Upward Social Appearance Comparison Scale

1. I compare myself to those who are better looking than me rather than those who are not.
2. I tend to compare my own physical attractiveness to that of magazine models.
3. I find myself thinking about whether my own appearance compares well with models and movie stars.
4. At the beach or athletic events (sports, gym, etc.) I wonder if my body is as attractive as the people I see there with very attractive bodies.
5. I tend to compare myself to people I think look better than me.
6. When I see a person with a great body, I tend to wonder how I 'match up' with them.
7. When I see good-looking people I wonder how I compare to them.
8. At parties or other social events, I compare my physical appearance to the physical appearance of the very attractive people.
9. I find myself comparing my appearance with people who are better looking than me.
10. I compare my body to people who have a better body than me.

Brief Fear of Negative Evaluation Scale - Revised

1. I worry about what other people will think of me even when I know it doesn't make any difference.
2. It bothers me when people form an unfavorable impression of me.
3. I am frequently afraid of other people noticing my shortcomings.
4. I worry about what kind of impression I make on people.
5. I am afraid that others will not approve of me.
6. I am afraid that other people will find fault of me.

7. I am concerned about other people's opinions of me.
8. When I am talking to someone, I worry about what they may be thinking about me.
9. I am usually worried about what kind of impression I make.
10. If I know someone is judging me, it tends to bother me.
11. Sometimes I think I am too concerned with what other people think of me.
12. I often worry that I will say or do wrong things.

Body Image Shame Scale - External Body Shame Subscale

1. I avoid social situations (e.g., going out, parties) because of my physical appearance.
2. The relationship I have with my body prevents me from having an intimate relationship with someone.
3. I avoid moving my body (for example, dancing) in public places because I feel I am exposing my physical appearance to the criticism of others.
4. I feel uncomfortable in social situations because I feel that people may criticize me because of my body shape.
5. My physical appearance makes me feel inferior in relation to others.
6. I do not like to exercise in front of others because I am afraid of how they might evaluate me.
7. The relationship I have with my physical appearance makes it difficult for me to feel comfortable in social situations.

Dietary Intent Scale

1. I take small portions of food in an effort to control my weight.
2. I hold back at meals in an attempt to avoid weight gain.
3. I limit the amount of food I eat in an effort to control my weight.
4. I sometimes avoid eating in an attempt to control my weight.
5. I skip meals in an effort to control my weight.

6. I sometimes eat only one or two meals a day to try to limit my weight.
7. I eat diet foods in an effort to control my weight.
8. I count calories to try to prevent weight gain.
9. I eat low-calorie foods in an effort to avoid weight gain.

Eating Disorder Inventory - Body Dissatisfaction Subscale

1. I think that my stomach is too big.
2. I think that my thighs are too large.
3. I think that my stomach is just the right size.
4. I feel satisfied with the shape of my body.
5. I like the shape of my buttocks.
6. I think that my hips are too big.
7. I think that my thighs are just the right size.
8. I think that my buttocks are too large.
9. I think that my hips are just the right size.