

**Disentangling the relationship between neuroticism, upward social comparison frequency, body-shame and weight-loss dieting in college women: A moderated mediation analysis**

Isabelle R. Buschman

S4380169

Department of Psychology, University of Groningen

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Mentorgroup: 28

Supervisor: S. E. Dalley

Second evaluator: F. Schutzeichel (MSc)

In collaboration with: D. Elskamp, N. Lange, S. Lortz, E. Stroemer

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## Abstract

Weight-loss dieting has been identified as a strong predictor for eating pathology. Previous research has established a link between upward social comparison, body image concerns and weight-loss dieting. Additionally, some studies have touched upon the role of neurotic personality traits and its effect on weight-loss dieting. The present study aims to explore the mediating relationship between body-shame on upward social comparison frequency and weight-loss dieting across greater levels of neuroticism among college women. We propose that in a moderated mediation model, the emotion body-shame resulting from upward social comparison frequency will positively predict the motivation to engage in weight-loss dieting among college women, and that the mediating effect of body-shame will be stronger for women with higher levels of neuroticism. A sample of 251 female college students (N = 251) was recruited and participated by completing an online questionnaire with measures of upward social comparison frequency, body-image shame, weight-loss dieting, neuroticism, and trait body dissatisfaction using Qualtrics. Bootstrapping inference via PROCESS in SPSS was used to test the moderated mediation model. Contrary to expectations, the proposed moderated mediation model was not supported by significant findings. However, exploratory analysis revealed two significant independent mediation models. Body-shame was found to positively mediate the relationship between upward comparison frequency and weight-loss dieting, as well as between neuroticism and weight-loss dieting. Specifically, more frequent upward social comparison tendency increased episodes of body-shame which subsequently positively predicted engagement in weight-loss dieting. Similarly, higher levels of neuroticism increased episodes of body-shame which in turn positively predicted increased engagement in weight-loss dieting. The findings suggest that women who frequently engage in upward social comparison, and women who experience body-shame due to having higher

levels of neuroticism are vulnerable to significant engagement in weight-loss dieting.

Theoretical and practical implications are discussed.

*Keywords:* neuroticism, upward social comparison tendency, body-shame, weight-loss dieting

**Disentangling the relationship between neuroticism, upward social comparison frequency, body-shame and weight-loss dieting in college women: A moderated mediation analysis**

Fear of gaining weight is most common among young women between the ages of 16 and 25, and this fear, coupled with their young age is associated with increased dieting (Slof-Op 't Landt et al., 2017). Furthermore, it's reported that the prevalence of dieting among young women rises from 56% in adolescence to 65% in adulthood (Haynos et al., 2018). This high prevalence of dieting in Western countries among this demographic present an alarming risk factor, as dieting is known to be one of the strongest predictors for the development of eating disorders (National Eating Disorders Collaboration, 2021). Therefore, it's crucial to examine the psychological mechanisms that underlie the motivation to engage in weight-loss dieting.

Previous research suggests that social comparison processes play an influential role in women's weight-loss dieting. For instance, among young women, comparing their own weight to that of thinner individuals led to increased thoughts of dieting and exercising, and weight comparisons to friends amplified these effects (Rancourt et al., 2015). Additionally, the tendency to diet is more strongly influenced by perceptions of peer's body weight and weight control behavior among women compared to men (Miething et al., 2018). Although these social comparison processes have been suggested to play a role in weight-loss dieting among young women, limited research has explored the role of aversive emotional motivating factors. With this in mind, the primary aim of the present study is to investigate the mediating role of body-shame, and emotion linked with both dieting and eating pathology, on social comparison theory and weight-loss dieting. The second aim is whether this relationship is moderated by neuroticism, a personality trait that enhances negative emotions in the context

of upward comparisons (Van der Zee et al., 1996).

### **Upward social comparison**

A principal source of acquiring knowledge about one's identity and social worth is through comparison with other people (Festinger, 1954). Within the domain of social comparison, an important component is upward social comparison, which involves comparing oneself to individuals perceived as superior (Wheeler, 1966). As apparent from previous research, individuals are more interested in assessing how they compare in relation to perceived superior others rather than perceived inferior others (Nosanchuk & Erickson, 1985; Wood 1989). Some motives that have been proposed explaining why individuals engage in upward social comparison, are for the purpose of self-evaluation, self-enhancement, and self-improvement (Wood, 1989). When an individual is self-evaluating, they may seek to comprehend the meaning of their social standing by comparing themselves to others who are proximal on the dimension (Wood, 1989). Additionally, if an individual assesses themselves against successful individuals, one's self-evaluative comparisons may lead to the desire for self-improvement (Wood, 1989). This concept aligns with what Festinger defined as an "upward drive", which represents the pressure individuals in Western culture feel to continually improve themselves (Festinger, 1954). In other words, through upward social comparison, one can assess what the societal ideal is, what the discrepancy is between their current self and this ideal, and this can motivate one to reduce this discrepancy (Festinger, 1954).

Through upward social comparison online, young women often meet the sociocultural determined beauty ideal, which predominantly describes an extremely thin figure for women (Myers & Crowther, 2007). These unattainable ideals can confirm the way young people perceive and value themselves (Aparicio-Martinez et al., 2019). In Western cultures, the emphasis on an unattainable thinness ideal has led to body image concerns primarily centered

around body weight and shape (Tiggeman & Lynch, 2001). Upward social comparison in these online contexts has been found to be associated with increased negative mood states, decreased self-esteem, body dissatisfaction and eating disorder symptoms such as weight-control behaviors among women (Laker & Waller, 2022; Hawkins et al., 2004; Arigo et al., 2014; Yong et al., 2021) While there is an abundance of research that has focused on the influence of body dissatisfaction on weight-loss dieting due to upward social comparison (Tiggemann & Polivy, 2010), little research has addressed the role of shame about one's body as an influential factor on weight-loss dieting. The current study expects that the underlying mediating factor for upward social comparison leading to restrictive weight-loss dieting is the emotion of body shame.

### **The influence of upward social comparison through body shame**

In order to understand the concept of body-shame (feelings of shame regarding one's own body shape, size, and appearance), it is imperative to have a comprehensive understanding of the nature of shame itself. Shame is a self-evaluative emotion that entails a highlighted concern and focus on the self (Budiarto & Helmi, 2021). When individuals experience shame, the devaluation of the self is perceived, which can lead to lowered self-esteem (Budiarto & Helmi, 2021), and feelings of inadequacy and worthlessness (Lim & Yang, 2015). To provide a basis for the role of body-shame as a mediator for upward social comparison and weight-loss dieting, we first call upon the identity-specific model by Michael Lewis (1992). This model proposes that there are a set of standards, rules, and goals that each individual has, which are determined by one's society and culture, that governs their behavior and feelings (Lewis, 1992). It further proposes that the evaluation of one's actions, thoughts, and feelings in terms of these standards then serves as a stimulus for self-conscious emotions like shame (Lewis, 1992). Young women might especially be vulnerable to this negative emotion, as they engage in social comparison on social media platforms and in real life more

than men do (Franzoi et al., 2012). Translated to this framework, it illustrates that when a young woman compares herself with the thinness ideals and beauty standards of today's society, which represent the standards rules and goals Lewis proposes (1992), and she feels like she does not adhere to this ideal, it consequently stimulates the self-conscious feelings of shame about the body. It's therefore predicted that the more frequent women engage in upward social comparison, the more they will experience body-shame episodes.

### **Body shame and weight-loss dieting**

In addition to Lewis' identity-specific model (1992), the idea that the feeling of body-shame leads to behaviors like weight-loss dieting to alter the discrepancy between the current self and the thinness ideal, corresponds with the paradigmatic behaviorism emotion theory (Staats & Eifert, 1990). This theoretical framework assumes that emotional responses, in particular negative emotions, have stimulus properties that can illicit overt motor behavior that help to achieve a relevant goal (Staats & Eifert, 1990; Lickel et al., 2014). Furthermore, paradigmatic behavioral theory has shown that the strength of behavior is profoundly influenced by the magnitude of the emotional response evoked in the individual (Staats & Eifert, 1990; Hekmat & Lee, 1970). Previous research has shown that the emotion shame is particularly powerful in predicting the motivation to change the self (Lickel et al., 2014), presumably as shame is linked to a dispositional appraisal instead of behavioral appraisal (Niedenthal et al., 1994). As shame about the body is a powerful emotion, it can therefore be reasoned that the individual will experience increased motivation to change the body, by engaging in weight-loss dieting.

Additionally, at an individual level, emotional responses within the individual have been proposed to serve the social function of informing the individual about specific social events or conditions that need to be acted upon and changed (Keltner & Haidt, 1999). Shame has been accepted to have the function to inform the individual of his or her lower status

(Keltner & Haidt, 1999; Tangney et al., 1996), and can motivate the individual to engage in behavior that will restore their social standing (Keltner & Buswell 1997).

Based on these theories, it would mean that the more episodes of body-shame an individual would experience, the greater the influence would be on behavioral change to reduce this emotional state and restore their social standing, such as engagement in weight-loss dieting. It's therefore expected that young women who experience more body-shame episodes also have increased engagement in weight-loss dieting.

Evidence for the mediating role of shame about one's body on upward social comparison and weight-loss dieting has also been found in a recent study by Yao et al. (2021). The findings of this study showed a positive association of body-image comparisons on social media with restricted eating, and a significant mediating role of body-shame among college women (Yao et al., 2021), indicating that among these women, increased shame about one's body due to upward social comparisons indeed increases the likelihood of engaging in weight-loss dieting.

### **The moderating role of neuroticism on upward social comparison and body shame.**

It's expected that this mediation pathway is especially strong for women who score higher in neuroticism. Neuroticism is the trait disposition to experience negative affect, including anxiety, self-consciousness, emotional instability, and chronic worrying (Widiger & Oltmanns, 2017). Judging by this definition a direct link can be found between shame and neuroticism, as shame is a self-conscious emotion (Tangney, 1999). Therefore, it can be assumed that people who score high in neuroticism are more likely to experience shame than people who score low in neuroticism. Previous research has shown supporting evidence for this, as studies have found a positive association between the self-conscious emotion shame and neuroticism (Erden & Akbag., 2015; Einstein & Lanning., 1998).

In addition to that, an indirect link between shame and neuroticism can be found as



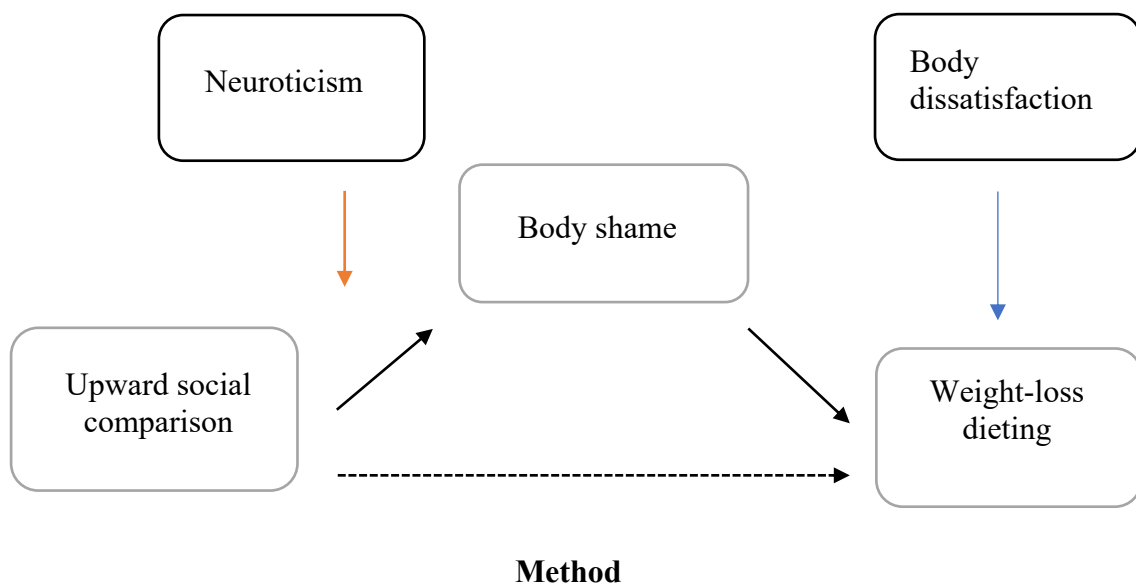
shame has been associated with social anxiety (Hedman et al., 2013; Levinson et al., 2016; Muris et al., 2017), and other anxiety disorder symptoms found in generalized anxiety disorder (GAD) and obsessive-compulsive disorder (OCD) (Valentiner & Smith., 2008; Fergus et al., 2010). As the personality trait neuroticism is defined by experiencing negative affect such as anxiety (Widiger & Oltmanns, 2017), and most anxiety problems are characterized by high levels of neuroticism (Kotov et al., 2010), it can be deduced that the personality trait neuroticism can also indirectly increase the risk to feel shame, by including a greater likelihood to experience anxiety.

Furthermore, individuals who possess high levels of neuroticism tend to experience negative emotions more strongly, are more vulnerable for self-criticism and are more prone to feelings of ‘not being good enough’ (Mader et al., 2023). Self-criticism has been associated with increased levels of shame following perceived failure (Milia et al., 2021). Based on this, it can be reasoned that when young women with elevated levels of neuroticism perceive a failure to conform to the societal thinness ideal, they will not only have an increased risk of experiencing body-shame, as they are more self-critical, but they’ll also experience this negative emotion more intensely. Therefore, young women with higher levels of neuroticism will have increased motivation to engage in weight-loss dieting, due to experiencing increased episodes body-shame.

The personality trait neuroticism has also been associated with weight-loss dieting directly, as positive correlations were found between higher levels of neuroticism and increased engagement in weight-loss dieting (Munro et al., 2011). With this in mind, the present study aims to examine the mediating role of body-shame while controlling for body dissatisfaction, and the moderating role of neuroticism, on upward social comparison frequency and weight-loss dieting among a sample of college women from the University of Groningen.

It's hypothesized that the emotion body-shame resulting from upward social comparison frequency will positively predict the motivation to engage in weight-loss dieting among college women, and that the mediating effect of body-shame will be stronger for women with higher levels of neuroticism. This leads us to the prediction that the strength of the relationship between upward social comparison and motivation weight-loss dieting is mediated by body-shame and moderated by neuroticism.

**Figure 1:** *Predicted moderated mediation model.*



### **Participants**

A total of 347 female university students volunteered to participate in this study. The participants were recruited through convenience sampling, by distribution of an online questionnaire. The questionnaire was distributed via social media platforms and at the university faculties. A total of 96 participants were excluded from this study due to missing values and/ or not passing the validating questions. The remaining 251 participants (N = 251) were used for statistical analysis. The ages of the participants ranged from 18 to 30 years, with a mean age of 22.00 (SD = 2.156).

## **Measures**

### ***Upward social comparison frequency***

To measure upward social comparison frequency the UPACS (O'Brien et al., 2009) was used. This 10-item scale is previously used to measure the frequency of engagement in physical appearance comparison with individuals who are viewed as better looking (i.e., "I tend to compare myself to people I think look better than me."). Responses were made on a 5-point Likert scale (ranging from 1 = Strongly disagree, to 5 = Strongly agree). The participants respond to a total of 10 questions, and higher total scores indicate greater engagement in upward social comparison. The internal reliability of the UPACS has previously been reported as .93 (O'Brien et al., 2009). The UPACS used in the current study has a reliability of Cronbach's alpha 0.91 ( $\alpha = .913$ ), which is satisfactory.

### ***Body image shame***

The emotion of shame about one's body was assessed using the BISS (Duarte et al., 2015). This scale was developed to measure the experience and phenomenology of body image shame, including externalized body image shame (i.e., negative perceptions that one's body image may be an object of criticism by others, following defensive responses such as avoidance of social contexts) and internalized body image shame (i.e., self-focused negative self-evaluations, following controlling exposure responses such as concealment). The participants responded to a total of 14 items (e.g., "I feel uncomfortable in social situations, because I feel that people may criticize me because of my body shape.") on a 5-point Likert scale (ranging from 1 = "Never" to 5 = "Almost always"). As this current study focuses on the entire phenomenology of body shame, the total scale including both internal shame and external shame are measured (Duarte et al., 2015). The BISS has been reported to have an internal reliability of Cronbach's alpha .92 (Duarte et al., 2015). The Cronbach's alpha of the BISS used in this study has a satisfactory value of .93 ( $\alpha = .931$ ).

### ***Weight-loss dieting***

The tendency to diet was measured using the Dietary Intent Scale (DIS) (Stice, 1998). The DIS consists of 9 items that aim to measure dietary behaviors, including three subscales measuring reduced intake of food, abstaining from eating, and consumption of low caloric foods (i.e., “I take small portions of food in an effort to control my weight.”). Participants responded to the items on a 5-point Likert scale (ranging from 1 = “Never” to 5 = “Always”). The internal reliability of the DIS has previously been reported as .94 (Stice, 1998). The current study reported an internal reliability of .93 ( $\alpha = .931$ ).

### ***Neuroticism***

Neuroticism was measured using the Neuroticism dimension of the Big Five inventory (BFI) (John et al., 1991). This neuroticism scale consists of 8 items assessing characteristics of the personality trait neuroticism (i.e., “I see myself as someone who is depressed, blue.”, and “I see myself as someone who can be tense.”). Participants responded to the questions using a 5-point Likert scale (ranging from 1 = “Strongly disagree” to 5 = “Strongly agree”). The internal reliability has previously been reported as .84 (John & Srivastava, 1999). In the current study the internal reliability is Cronbach’s alpha .83 ( $\alpha = .833$ ).

### ***Trait Body dissatisfaction***

Body dissatisfaction was measured using the Eating Disorder Inventory I (EDI-1) (Garner et al., 1983). The subscale ‘Body-dissatisfaction’ was used from this scale to measure body-dissatisfaction among the participants. This subscale contains 9 items that assess the belief that specific parts of the body associated with increased ‘fatness’ or shape change at puberty are too large (i.e., “I think that my stomach is too big”, and “I think that my thighs are too large.”) (Garner et al., 1983). The participants responded to the questions using a 5-point Likert scale (ranging from 1 = “Never” to 5 = “Always”). The internal reliability has

previously been reported as .90, the current study reported an internal reliability of .88 ( $\alpha = .880$ ) which is sufficient.

## **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. This questionnaire contained the measures of upward social comparison frequency, body image shame, weight-loss dieting, body dissatisfaction and neuroticism. Only participants who were female, did not have a previous history of eating disorder, had at least level B2 of English and/ or were enrolled in an English university program could partake in the questionnaire.

## **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 central limit theorem, a bootstrapping technique was used to empirically generate the sampling distributions. This was done by resampling with replacement 5000 times from our sample with the same initial sample size, to derive a bootstrap distribution which was used to calculate standard errors for the confidence intervals and hypothesis testing. The bootstrapping technique has been shown to be 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

normal theory approach (Hayes, 2013; Jose, 2013; Wright et al., 2011; MacKinnon et al., 2004). The model 7 moderated mediation model tested (Hayes, 2013) included upward social comparison tendency as a predictor for dieting, shame as a mediating variable, and neuroticism as a moderator. Trait body dissatisfaction was included as a control variable.

## **Results**

### **Assumption Checks**

To check for normality, normal probability plots (QQ-plots) were used and are portrayed in figures 1 to 4 in Appendix A (Ernst & Albers, 2017). The data points are distributed close to the line of normal distribution and therefore, no violations of normality were detected. Furthermore, bootstrap inference for model coefficients ( $N = 251$ ) was used to control for normality, as this method is robust against normality violations (Johnston & Faulkner, 2020). For robustness of homoscedasticity, we used the robust standard error HC4 (Cribari-Neto) (Cribari-Neto & Lima, 2014). To check linearity, simple scatterplots were made with the dependent variable (weight-loss dieting) and the independent variables (upward social comparison frequency, and body shame), and with the mediator variable body shame and the interaction variable (interaction of upward-social comparison and neuroticism) which are presented in figures 5 to 7 in Appendix A. For each of the scatterplots the relationships generally follow a linear direction, therefore linearity can be assumed (Ernst & Albers, 2017). Multicollinearity was assessed using the variance inflation factor (VIF), which portrays potentially correlated predictors by measuring the inflation in the variances of the parameter estimates due to multicollinearity (Vatcheva et al., 2016). Table one shows that all VIF values were less than 10 ( $VIF < 10$ ), therefore it can be assumed that no severe multicollinearity exists in the model (Kim, 2019).

**Table 1.**

*Coefficients<sup>a</sup>*

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.267	.246		1.087	.278		
	Upward_c	.166	.066	.153	2.514	.013	.624	1.601
	Shame	.304	.093	.264	3.248	.001	.349	2.867
	Neurotis	-.196	.063	-.165	-3.087	.002	.814	1.229
	Body_dis	.435	.082	.385	5.320	<.001	.442	2.264

a. Dependent Variable: Dieting

### Descriptive statistics and correlation analysis

Descriptive statistics and zero-order correlations are presented in table 2 below.

**Table 2.** Pearson correlations, means, and standard errors of the measured variables.

	1.	2.	3.	4.	5.
1. Upward comparison	-				
2. Shame	0.605**	-			
3. Neuroticism	0.256**	0.432**	-		
4. Dieting	0.468**	0.572**	0.112	-	
5. Body dissatisfaction	0.513**	0.743**	0.320**	0.607**	-
6. Mean	3.65	2.41	3.15	2.16	2.70
7. SE	0.84	0.79	0.76	0.91	0.80

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

### Moderated Mediation Analysis

A model 7 moderated mediation analysis was conducted using PROCESS (Hayes, 2013). The index of moderated mediation, which represents if the positive relationship between upward social comparison tendency and weight-loss dieting through increased episodes of body shame is stronger for higher values of neuroticism, was not significant ( $B =$

.014, SE = .012, 95% CI [-0.007; 0.041]). Thus, the results indicate that the mediating effect of body-shame on the relationship between upward social comparison tendency and weight-loss dieting is not influenced by different levels of neuroticism.

### **Exploratory analysis**

Our original model 7 was not supported by significant findings. However, significant correlations indicate that the predictor variables impact on body-shame and weight-loss dieting independently. Therefore, two mediation models will be explored. The first mediation that will be explored is if increasing upward social comparison frequency will lead to more episodes of body-shame, which will increase engagement in weight-loss dieting. The second mediation that will be explored is if women with neurotic personality traits will experience more body-shame episodes and thus will have more engagement in weight-loss dieting.

It's predicted that body-shame acts as a mediator on the relationship between upward social comparison and weight-loss dieting, and that body-shame mediates the relationship between neuroticism and weight-loss dieting.

### ***Does body shame mediate the relationship between upward social comparison tendency and weight-loss dieting?***

First, we conducted a model 4 mediation analysis using body-shame as a mediator for upward social comparison frequency and weight-loss dieting, while controlling for body dissatisfaction. An overall significant model was found [ $F(3, 244) = 72.098, p < 0.001$ ], with 41.42% of the variance of dieting explained by the predictor variables. The indirect effect, the effect of upward social comparison frequency on weight-loss dieting mediated by shame, is also significant, with a positive relationship ( $B = .064, SE = .033, 95\% CI [0.003; 0.132]$ ). Indicating that body-shame positively mediates the relationship between upward social comparison frequency and weight-loss dieting.

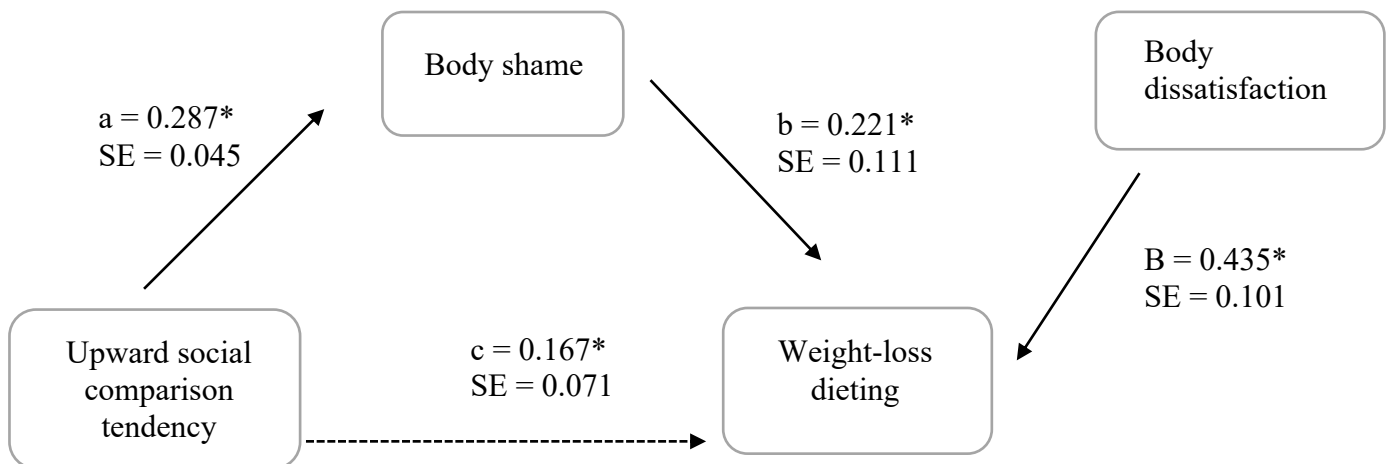
Furthermore, there were found both a positive significant direct effect of upward social



comparison tendency on weight-loss dieting ( $B = .167$ ,  $SE = .071$ , 95% CI [0.028; 0.307]) and a positive significant total effect of upward social comparison tendency on weight-loss dieting ( $B = .231$ ,  $SE = .064$ , 95% CI [0.105; 0.357]).

Results for bootstrapping reported a significant positive direct effect of body-shame on weight-loss dieting ( $B = .221$ ,  $SE = .111$ , 95% CI [0.008; 0.446]), a significant positive direct effect of body dissatisfaction on weight-loss dieting ( $B = .435$ ,  $SE = .101$ , 95% CI [0.227; 0.619]), and significant positive direct effects of upward social comparison tendency on body-shame ( $B = .287$ ,  $SE = .045$ , 95% CI [0.198; 0.374]) and body dissatisfaction on body-shame ( $B = .578$ ,  $SE = .053$ , 95% CI [0.473; 0.683]).

**Figure 2:** Mediation model of body shame on upward social comparison tendency and weight-loss dieting, while controlling for body dissatisfaction



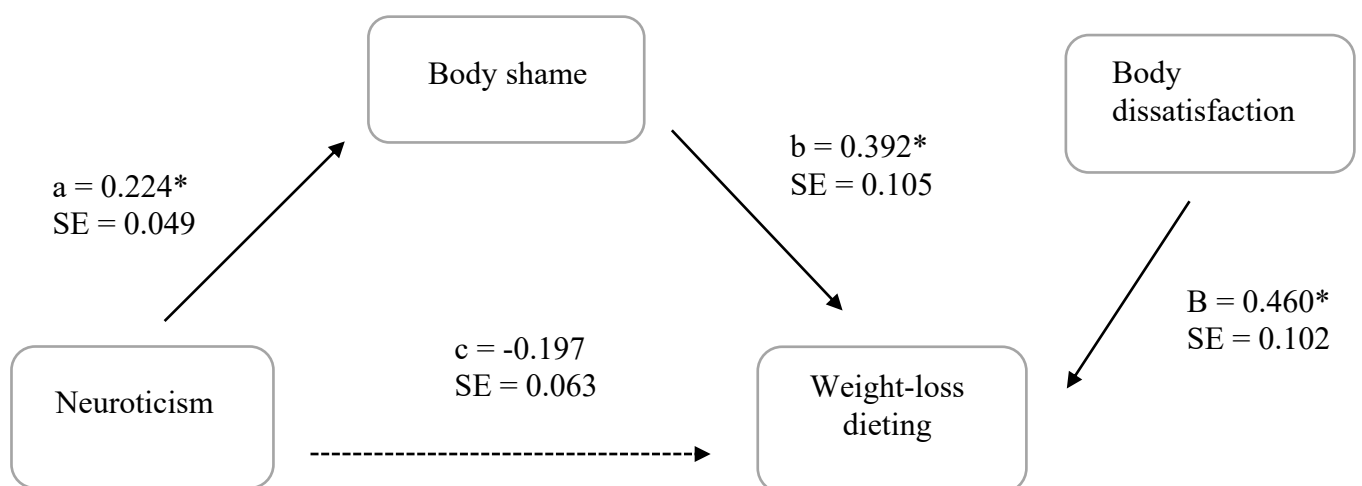
Note. \*  $p < .05$

***Does body-shame mediate the relationship between neuroticism and weight-loss dieting?***

For the second mediation analysis, we used body-shame as a mediator for neuroticism and weight-loss dieting, while controlling for body dissatisfaction. The overall model was found significant [ $F(2, 245) = 85.7767$ ,  $p < 0.001$ ], with an explained variance of 37.36% of the

predictor variables on weight-loss dieting. The total effect of neuroticism on weight-loss dieting was not found significant ( $B = -.1092$ ,  $SE = .0660$ , 95% CI [-0.2393; 0.0209]). Other than that, a significant negative direct effect of neuroticism on weight-loss dieting was found for this model ( $B = -.1970$ ,  $SE = .0636$ , 95% CI [-0.3222; -0.0717]). Furthermore, significant direct effects were found of a positive relationship of body-shame on weight-loss dieting ( $B = .3918$ ,  $SE = .1001$ , 95% CI [0.1968; .5932]), a positive relationship of body dissatisfaction on weight-loss dieting ( $B = .4595$ ,  $SE = .0968$ , 95% CI [0.2576; 0.6388]), and a negative relationship of neuroticism on weight-loss dieting ( $B = -.1970$ ,  $SE = .0634$ , 95% CI [-0.3193; -0.0678]). Other than that, the bootstrap results showed that both body dissatisfaction ( $B = .6634$ ,  $SE = .0506$ , 95% CI [0.5645; 0.7624]) and neuroticism positively predicted body-shame ( $B = .2240$ ,  $SE = .0494$ , 95% CI [0.1300; 0.3218]). Lastly, a positive indirect effect of body-shame on the relationship between neuroticism and weight-loss dieting was found ( $B = .0878$ ,  $SE = .0287$ , 95% CI [0.0385; 0.1522]), indicating that body-shame positively mediates the relationship between neuroticism and weight-loss dieting.

**Figure 3:** Mediation model of body shame on neuroticism and restrictive weight-loss dieting, while controlling for body dissatisfaction



Note. \*  $p < .05$

## Discussion

The main purpose of this study was to investigate the moderated mediation of the personality trait neuroticism and the emotion body-shame on the relationship between upward social comparison and weight-loss dieting among young women. In depth, it was predicted that in a sample of college women, more frequent upward social comparison would lead to increased episodes of body-shame, which consequently would increase engagement in weight-loss dieting. In addition to that, it was predicted that the personality trait neuroticism would moderate this mediation pathway, in a way that higher levels of neuroticism would increase body-shame and therefore increase engagement in weight-loss dieting. No evidence was found to support the predicted moderated mediation model.

Reasons as to why our findings are non-significant could be that previous studies have used different scales to assess neuroticism and shame to the ones that were used in this study. In previous research assessing the predictive power of neuroticism on shame (Einstein & Lanning, 2008), the Self-conscious Affect and Attribution Inventory (SCAAI) (Tangney, 1990) was used to assess shame, instead of the BISS (Duarte et al., 2015). Furthermore, to assess neuroticism, the Five Factor Personality Inventory (NEO-PI-R) by Costa and McCrae (1992) was used instead of the Big Five Inventory (John et al., 1991) (Einstein & Lanning, 2008). Future research could examine this moderated mediation model by using the scales that were utilized in previous research, as it might reflect different findings.

Another reason that could explain why our predicted model was not supported is that among our sample, the neuroticism scores were not high enough to promote significant episodes of body-shame. Furthermore, neuroticism scores were unrelated to weight-loss dieting, which contradicts previous research that showed that the personality trait neuroticism increases the motivation to engage in weight-loss dieting (Munro et al., 2011). Further

research on the moderating relationship of neuroticism on shame and weight-loss dieting could use a clinical sample, to ensure that the participants score higher on neuroticism (Xi et al., 2018). Using a clinical sample of participants that share the common condition of neuroticism can therefore give a more in-depth understanding into the moderating relationship of neuroticism on shame and weight-loss dieting, as it enhances opportunities that levels of neuroticism are high enough to be related to weight-loss dieting and to measure increased episodes of shame (Xi et al., 2018).

Based upon the found evidence and significant correlations, it seems that the predictor variables body-shame and neuroticism work independently on weight-loss dieting. The first significant mediation analysis reported in this study is consistent with the idea that body-shame acts as a mediator on the relationship between upward social comparison and weight-loss dieting. More explicitly, this significant mediation analysis reflects that within this sample of college women, the women who engaged more frequently in upward social comparison experienced increased episodes of body-shame and were therefore more likely to engage in weight-loss dieting. The increase in body-shame episodes in participants who had an increased upward comparison frequency align with the idea that comparing oneself to society's thinness-ideal contributes to feelings of shame and dissatisfaction with one's own body, particularly among young women (McComb & Mills, 2021). Furthermore, the observed increase in body-shame episodes is consistent with Lewis' (1992) identity-specific model, which suggests that comparing yourself to the cultural ideals of society fosters self-conscious feelings such as shame, or more precisely body-shame. This finding supports the idea that comparison with a cultural standard promotes negative affect (Laker & Waller, 2022; Hawkins et al., 2004; Arigo et al., 2014) as the individuals are unable to conform to an unrealistic standard (Aparicio-Martinez et al., 2019).

Additionally, increased episodes of body-shame were found to positively predict

engagement in weight-loss dieting. These findings support the concept that emotions can act as motivating factors to alter behavior (Lewis, 1992; Macht, 2008; Staats & Eifert, 1990), as emotions possess stimulus properties that can elicit overt motor behavior with respect to achieve a certain goal (Staats & Eifert, 1990; Lickel et al., 2014). In this case the behavior that's elicited through increased episodes of body-shame is the increased motivation to engage in weight-loss dieting, theoretically to achieve the goal to reduce the discrepancy between the self and the thinness ideal on social media (Lewis, 1992). Moreover, these findings are consistent with the concept that emotional responses within the individual serve the social function of informing the individual about specific social events or conditions that need to be acted upon and changed (Keltner & Haidt, 1999). Shame about their body informs the individual of his or her lower status (Keltner & Haidt, 1999; Tangney et al., 1996), and therefore motivates the individual to engage in behavior that will restore their social standing, in this case weight-loss dieting (Keltner & Buswell 1997).

The second significant mediation analysis reported in this study showed that body-shame acts as a mediator in the relationship between neuroticism and weight-loss dieting. Within our sample of college women, the more neurotic the women were, the more they experienced shame about their body, and the more likely they engaged in weight-loss dieting. Firstly, these reported findings are in line with the idea that women with higher levels of neuroticism experience more episodes of shame (Erden & Akbag, 2015), in this case body-shame, as neuroticism is the trait disposition to experience negative affect, including self-conscious emotions like shame (Oltmann & Widiger, 2017).

Secondly, the results align with the proposition that individuals who possess higher levels of neuroticism have an increased risk of experiencing body-shame following perceived personal failure, in this instance the failure to conform to society's unattainable thinness ideal, as they are more self-critical (Milia et al., 2021). It also conforms to the idea that individuals

with elevated levels of neuroticism experience negative emotions, such as body-shame more strongly (Mader et al., 2023).

Furthermore, like the first mediation analysis, the findings reflect that emotional motivating factors play a role within altered eating behaviors such as weight-loss dieting (Macht, 2008) (Yao et al., 2021). This further support's Lewis' identity-specific model (1992), as well as paradigmatic behaviorism emotion theory (Staats & Eifert, 1990) and the social function of experiencing shame (Keltner & Haidt, 1999) on that negative emotions such as body-shame serve as motivating factors for behavioral change, in this case weight-loss dieting.

### **Practical implications**

Derived from this, it seems that women who frequently engage in upward social comparison, and women who experience body-shame due to having higher levels of neuroticism are vulnerable to significant engagement in weight-loss dieting. This finding is highly valuable as weight-loss dieting is one of the biggest precursors for disordered eating pathologies such as anorexia nervosa and bulimia (National Eating Disorders Collaboration, 2021) (Haynos et al., 2016). Therefore, women who have elevated levels of neuroticism and engage more frequently in upward social comparison should be a target for intervention.

Central to these relationships is that these women increased their engagement in weight-loss dieting as the episodes of feeling shame about their body increased. Therefore, it's viable that focusing on the emotion body-shame can have great potential utility for health professionals for treating eating disorder precursors such as weight-loss dieting. Interventions could be targeted on the development of emotional regulation strategies, as they help individuals have emotional control and cope with difficult situations, by stimulating the development of automatic and controlled processes that help with increasing, maintaining, or decreasing the intensity, duration and/or quality of an emotion (Gyurak et al., 2011; Webb et

al., 2012). In the current study we focused on the emotion body-shame, therefore individual treatment could focus on decreasing the intensity, duration and/or quality of this emotion. Interventions that have previously shown to be effective in this regard are interventions such as cognitive reappraisal (Cândea & Szentágotai-Táatar, 2020) and dialectical behavior therapy (Neacsiu et al., 2014).

Furthermore, given the self-critical quality of experiencing body shame (Sick et al., 2020), an effective and therapeutic intervention could be practicing self-compassion. Self-compassion is defined as the ability to show kindness to the self while suffering (Wollast et al., 2020). This intervention can be effective, as self-compassion plays a significant role in the way individuals perceive their own body and aids in emotional processing in a way that allows the individual to acknowledge their role during negative experiences without being overwhelmed with negative emotions (Wollast et al., 2020; Leary et al, 2007). Research has shown that self-compassion is associated with experiencing less shame about one's body (Wollast et al., 2020), and can act as a buffer against this type of negative affect, as it may alleviate effects of self-objectification (Braun et al., 2016). Self-compassion could also buffer the effects of upward social comparisons as this component helps individuals to embrace themselves as they are, rather than criticizing or comparing themselves with others (Neff, 2003; Choi et al., 2014).

### **Limitations and future directions**

There are a few limitations that should be kept in mind with considering the significant findings of this study. Firstly, the present study made use of a cross-sectional design. As this cross-sectional design has shown correlations between the measured variables, follow-up research may need to be done in a longitudinal design, to produce truly foreboding results. Longitudinal designs allow to analyze how the measured variables change over time and can help to identify patterns within quantitative data (Caruana et al., 2015). Other than that,

longitudinal designs can make use of multiple research methods, which can improve the validity of the collected data (Caruana et al., 2015).

Another limitation is that the present study employed a convenience sample of college women. This sample may differ from a clinical sample in terms of symptomatology, shame, and neuroticism (Xi et al., 2018). Furthermore, as this type of sampling reflects those participants who were available in that moment in time it could limit generalizability to the whole population (Jager et al., 2017), which may have affected the results. Future research could utilize a clinical sample, to ensure that the sample is representative of women who have high levels of neuroticism and engage frequently in upward social comparison.

The significant findings of our study indicate other interesting directions for future research. The second mediation analysis additionally found no significant relationship between neuroticism and weight-loss dieting. This contradicts previous research that has indicated that elevated levels of neuroticism and weight-loss dieting are positively associated with each other (Munro et al., 2011). Future research should be done on the direct relationship between neuroticism and emotional eating to provide further insight into this relationship.

## **Conclusions**

In conclusion, body-shame was found to mediate the relationship between both upward social comparison frequency and weight-loss dieting, and neuroticism and weight-loss dieting. This indicates that women who experience body-shame as a result of engaging in upward social comparison tend to escape this negative emotion by engaging in disordered eating behaviors such as weight-loss dieting. Furthermore, women who possessed higher levels of neuroticism were also more likely to engage in weight-loss dieting when they experienced body-shame. Body-shame was central to these mediation pathways and governed the tendency to engage in weight-loss dieting. For women who experience body-shame due to possessing frequent upward social comparison tendency and higher levels of neuroticism,



treatments should focus on emotion regulation strategies such as cognitive reappraisal, dialectical behavior therapy, and self-compassion interventions.

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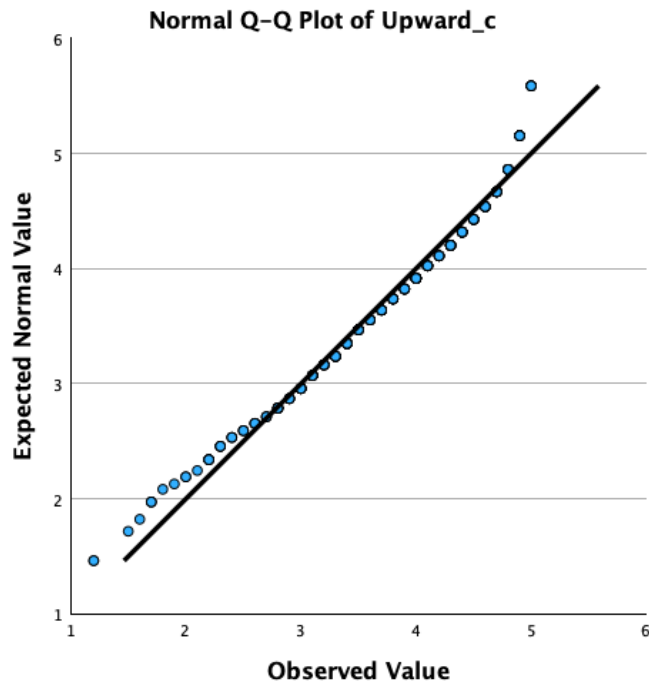
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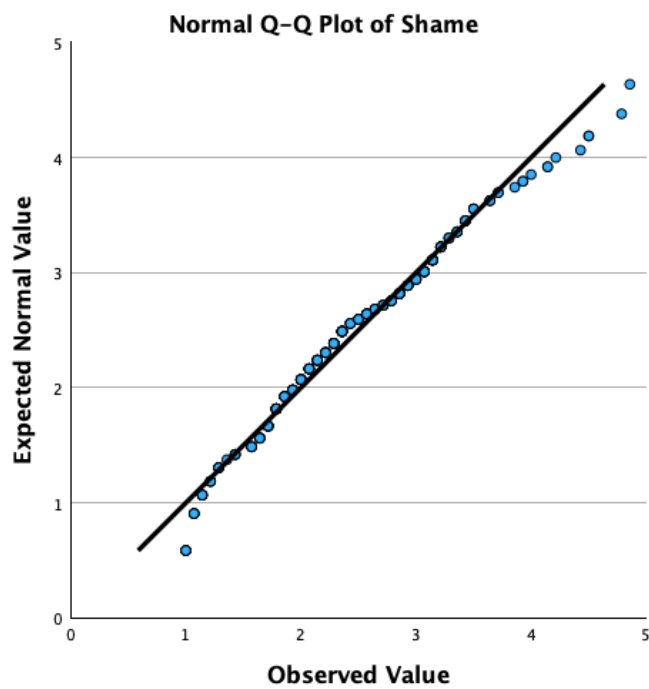
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## Appendix A

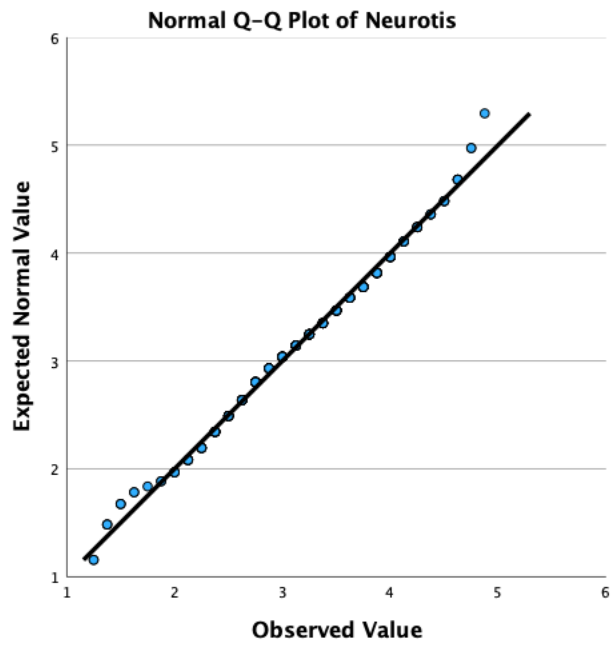
**Figure 1.**  
*Q-Q plot of Upward Social Comparison Frequency*



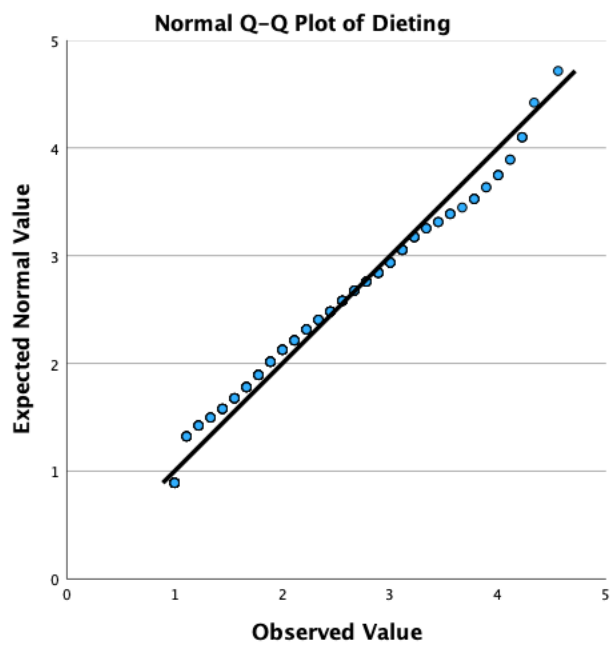
**Figure 2.**  
*QQ-plot of Body-shame*



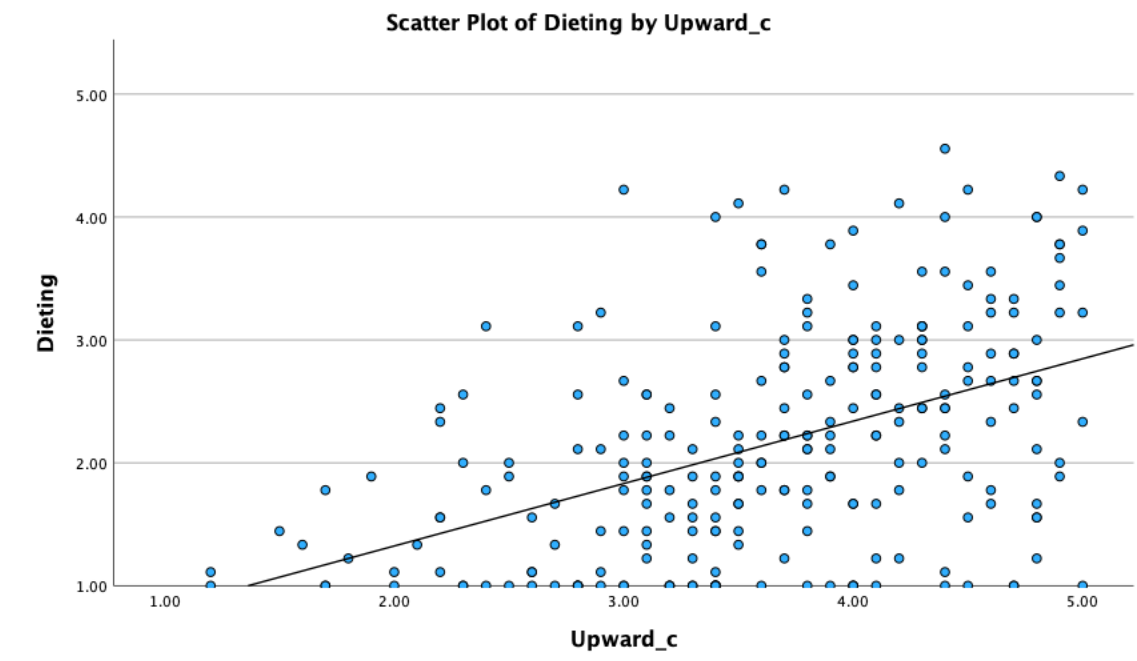
**Figure 3.**  
*QQ-plot of Neuroticism*



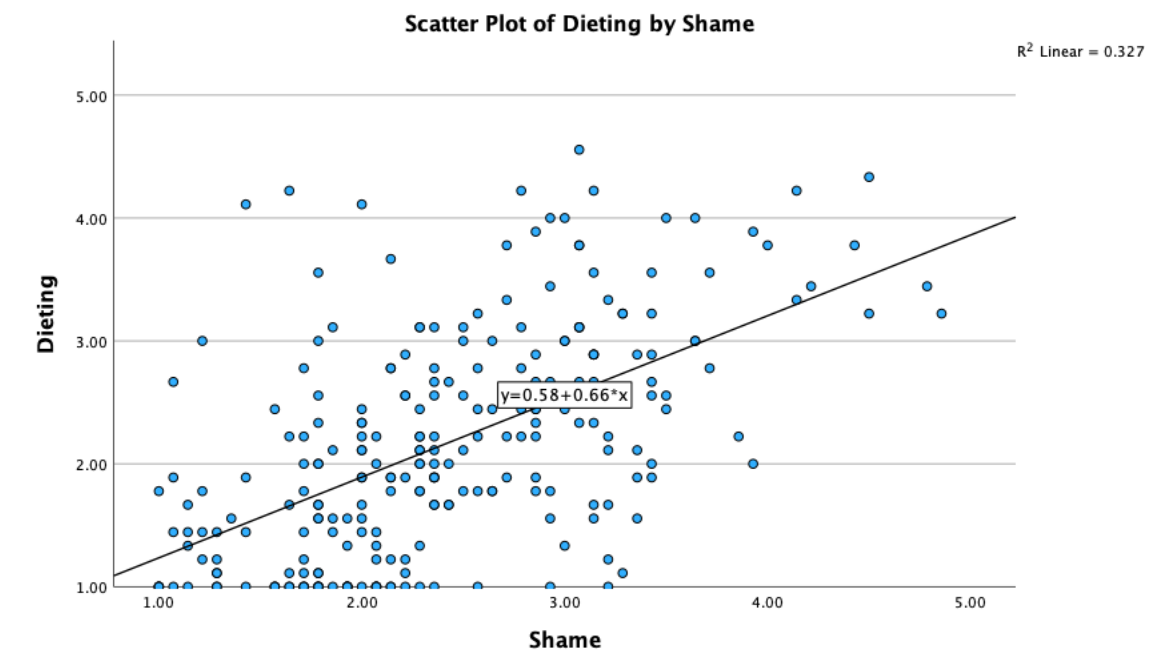
**Figure 4.**  
*QQ-plot of weight-loss dieting*



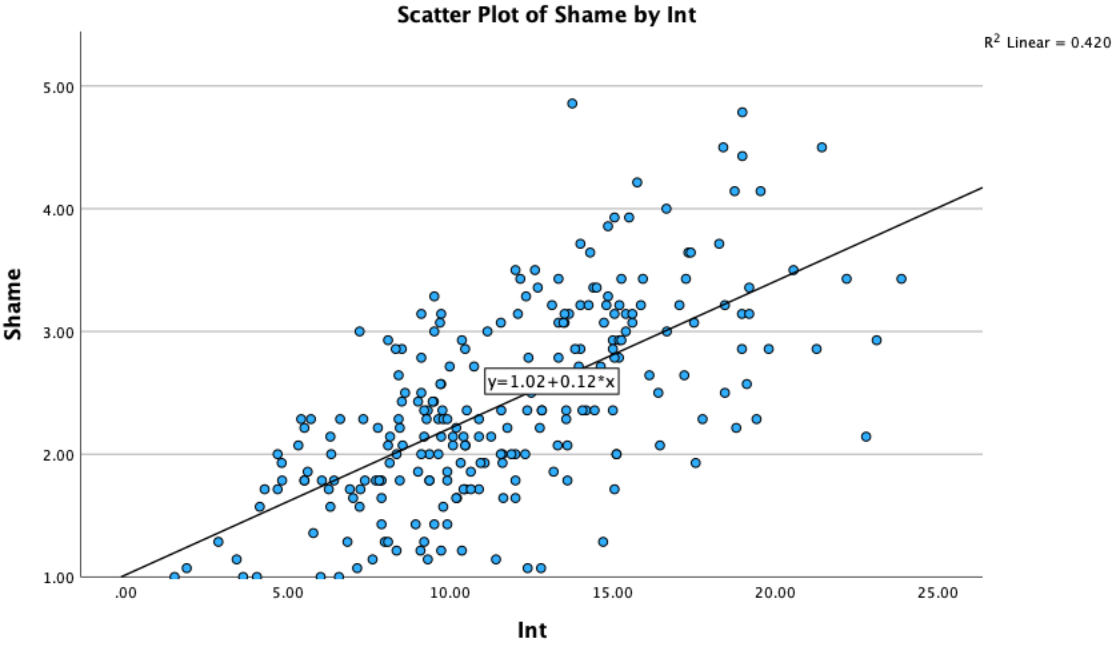
**Figure 5.**  
*Scatter plot of Upward social comparison frequency and Weight-loss dieting*



**Figure 6.**  
*Scatterplot of Body-shame and Weight-loss dieting*



**Figure 7.**  
*Scatterplot of interaction effect of Upward social comparison and Neuroticism and Body-shame*



## **Appendix B**

Following items 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.

### **Big Five Inventory Neuroticism Scale**

1. I see myself as someone who is depressed, blue.
2. I see myself as someone who is relaxed, handles stress well.
3. I see myself as someone who can be tense.
4. I see myself as someone who worries a lot.
5. I see myself as someone who is emotionally stable, not easily upset.
6. I see myself as someone who can be moody.
7. I see myself as someone who remains calm in tense situations.



8. I see myself as someone who gets nervous easily.

### **Body Image Shame Scale**

1. I feel uncomfortable in social situations because I feel that people may criticize me because of my body shape.

2. I avoid social situations (e.g., going out, parties) because of my physical appearance.

3. The relationship I have with my physical appearance makes it difficult for me to feel comfortable in social situations.

4. I do not like to exercise in front of others because I am afraid of how they might evaluate me.

5. My physical appearance makes me feel inferior in relation to others.

6. The relationship I have with my body prevents me from having an intimate relationship with someone.

7. 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.

8. I choose clothes to hide parts of my body that I feel are ugly or disproportional.

9. There are parts of my body that I prefer to hide.

10. I feel bad about myself when I use clothes that reveal my body shape.

11. I avoid wearing tight clothes that reveal my body shape.

12. I pay close attention to the movements and posture of my body to hide parts that I do not like.

13. It bothers me to see my body undressed.

14. When I see my body in the mirror I feel I am a defective person.

### **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.