



UC/FPCE\_2016

Universidade de Coimbra

Faculdade de Psicologia e de Ciências da Educação

**Interpersonal variables and eating psychopathology: Exploring  
underlying mechanisms of body appreciation and inflexible eating**

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Dissertação de Mestrado em Psicologia Clínica e de Saúde (Especialização em  
Intervenções Cognitivo-Comportamentais nas Perturbações Psicológicas e de  
Saúde) sob orientação da Professora Doutora Cláudia Ferreira

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Julho 2016

## **Agradecimentos**

À melhor orientadora de tese que poderia ter tido, a Professora Doutora Cláudia Ferreira, pela infinita paciência e por toda a ajuda que me proporcionou. Mais que isso, agradeço pela motivação que sempre me incutiu, sobretudo nos momentos em que o cansaço e as lágrimas se apoderaram de mim. Todos os ensinamentos foram valiosos e serão certamente guardados com muito carinho. No final, todos os “raspanetes” valeram a pena!

À Laura, por toda a dedicação e tempo disponibilizados, pela presença constante e pela boa vontade que teve em ajudar-me em todo este processo. Sem ela teria sido tudo muito mais complicado, pelo que a considero uma das minhas estrelinhas na concretização deste projeto.

À minha mãe, o meu motivo de alegria, de boa disposição, o meu porto de abrigo em todos os momentos de stress. Agradeço por toda a paciência, pelo carinho, pela força, por nunca me deixar desanimar nem desistir dos meus sonhos e sobretudo por ter sacrificado muito em prol da minha felicidade. Clichés à parte, a melhor do mundo, sem sombra de dúvida.

Ao meu pai, que mesmo a 200 km de distância faz questão de estar incondicionalmente presente tanto na minha vida académica como na minha vida pessoal. A ele agradeço de forma muito especial, por todas as correções no inglês e ajuda na formatação, mas sobretudo pela preocupação, pelo reforço positivo e pelo orgulho que diariamente mostra ter em mim.

Ao meu mano, o meu eterno bebé, embora tenha já 17 anos. Embora distante fisicamente, e embora nem ele saiba, foi sem dúvida um dos meus motores de força ao longo de todo este processo.

À minha avó, que dedicou grande parte da sua vida a educar-me e a fazer de mim a lutadora que sou hoje em dia, a ela devo o meu espírito de guerreira e a minha vontade de dar sempre o melhor de mim.

Ao Stefan, “por tudo e mais alguma coisa”; porque muito mais que mudar o rumo da minha tese, mudou o rumo da minha vida. Agradeço-lhe por ter sido a minha maior e melhor companhia, pelos olhares doces e revigorantes, pelos abraços “terapêuticos”, pelo sorriso reconfortante, pela capacidade de saber ouvir, pelos desabaços e por nunca me ter deixado desistir. Sobretudo agradeço-lhe por ter sido e continuar a ser um dos maiores motores do meu sorriso.

À Daniela e à Teresa, por terem feito parte da totalidade do meu percurso académico e por terem sido as minhas grandes companheiras ao longo destes anos.

À minha afilhada, um dos meus maiores motivos de orgulho e de referência, pela determinação com que faz tudo na vida e por nunca deixar que a derrubem; por manter o sorriso em todas as adversidades e servir de exemplo em várias situações. Agradeço-lhe muito pela genuinidade e pela preocupação que sempre demonstrou ao longo desta fase da minha vida.

À Rafaela, pela preocupação genuína, pelas mensagens de força, pela bondade e pureza e por ser uma das pessoas com maior coração que conheço.

A todos os meus amigos, pelos inúmeros incentivos, pelas mensagens de apoio e por me manterem sorridente e motivada ao longo de todo este percurso. Sem eles nada disto teria sido possível!

Às minhas colegas de tese, Vanessa, Carolina, Sara e Sofia, por compartilharem comigo o “sofrimento”, as lágrimas, os “apertos” e todos os momentos em que a luz ao fundo do túnel estava tão distante, bem como os momentos em que essa luz se tornou à distância de uma mão. Foram as minhas companheiras nesta luta e tenho orgulho em vê-las crescer com sucesso.

Finalmente, a todas as pessoas que dedicaram alguns minutos do seu tempo a responder aos questionários que contribuíram para que a concretização deste estudo fosse possível.

**Title:** Interpersonal variables and eating psychopathology: Exploring underlying mechanisms  
of body appreciation and inflexible eating

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**INTERPERSONAL VARIABLES AND EATING PSYCHOPATHOLOGY:  
EXPLORING UNDERLYING MECHANISMS OF BODY APPRECIATION AND  
INFLEXIBLE EATING**

**Abstract**

Social comparisons based on physical appearance and BMI have been considered, overtime, as risk factors for eating psychopathology. Moreover, although literature has highlighted the importance of belonging to a group for a healthy personal development, the relationship between social safeness and eating psychopathology remains understudied. The aim of the present study was to explore the impact of social-related variables on eating psychopathology, and explore the mediator role of body appreciation and inflexible eating rules in these relationships.

The participants in this study were 253 women, aged between 18 and 50 years old, who completed a series of self-report measures displayed on an online tool.

A path analysis showed that social safeness, social comparison based on physical appearance and BMI hold a significant effect on eating psychopathology, partially through the mechanisms of body appreciation and inflexible eating rules. Results suggested that women who present higher levels of social safeness and report more favourable appearance-based social comparisons are more willing to reveal a positive and respectful attitude towards the body and decreased adoption of inflexible eating rules and disordered eating behaviours.

These findings seem to present empirical support for the importance of promoting body appreciation in female population, in order to prevent the adherence to inflexible eating rules and disordered eating behaviours.

**Key-words:**

Social safeness; social comparison through physical appearance; body appreciation; inflexible eating rules; eating psychopathology.

**Introduction**

Literature suggested that current competitive dynamics in Western societies and the need to achieve and to be successful may explain the increasing adoption of maladaptive eating behaviours [1, 2]. In fact, some recent studies have described eating psychopathology, in women, as an attempt of striving for social approval [1].

The need for social approval has been overtime associated to the need of belonging to a group and feeling safe and protected within others [1, 3-5]. Actually, it is crucial to understand that life in small groups is inherent to human evolutionary story, because individuals are not programmed to live alone [6]. Studies argued that socialization is fundamental for individual and social survival [7], which implies the existence of a need for a person to feel significant and mattering, which, at a group level, signifies communion or belonging [3]. Therefore, one needs to be accepted, valued and chosen by others for different roles (like friend, sexual partner or colleague). In this way, the individual needs to be aware of the qualities valued by the group and display attractive features in order to be accepted [1].



Related to the prior idea, and in order to feel accepted in a group, especially for women, there is an overvaluation of physical appearance, namely with body shape and weight [1]. Indeed, overtime these dimensions have been seen as indicators of social rank and attractiveness, and they are taken into consideration for social and self-evaluation [1, 8, 9].

Since the decade of 1970, changes have occurred in women's perception of what their ideal body shape should be. Indeed, the beauty ideal changed from voluptuous and curvy to angular and thin in modern Western societies [10]. Furthermore, nowadays thinness is seen as a characteristic valued by the social group and has been associated to health, success, status and happiness [11, 12]. Particularly, research highlighted that women tend to perceive their overweight as a sign of failure and unattractiveness, and several studies documented that a higher BMI is associated with social stigma and the adoption of maladaptive eating behaviours [13 14].

In order to feel more valued and accepted, women tend to compare themselves to others based on their physical appearance. This process helps them to set a benchmark for their desired thinness [15-17]. Alongside with physical comparison, comes the concept of "social comparison", which can be defined as the process used by individuals to establish a relationship between his/her attributes and capacities and the ones displayed by others. [1, 18, 19]. Although Festinger [20] has stated that individuals tend to compare themselves with similar others, when it concerns to their body image, studies have been showing that women's preferential comparison target are figures that represent ideal, and almost unreachable, beauty patterns (e.g., models, actresses or other celebrities) [1].

When women compare themselves with others and feel that they are inferior in what concerns physical appearance, the adoption of restrictive eating patterns may emerge as strategy to avoid feeling inferior or inadequate [21]. However, several studies have been

showing that dieting has a paradoxical effect, increasing shame feelings and eating psychopathology [e.g., 21].

It is consensual that in certain situations, such as obesity and diabetes, the existence of restrictive personal food rules may be appropriate; however, in most cases these rules can become a major problem [21]. In fact, dieting can result in huge physical and mental damages and it may be derived from the fact that individuals ignore internal and external cues and persist in following rigid eating-related rules [22]. In a recent study, Duarte and colleagues [23] showed that the adoption of inflexible eating rules is a central process for understanding eating psychopathology in teenage girls.

Another item pointed out by literature as being a contributing factor for the development of eating psychopathology is the presence of an unfavourable body appreciation [24, 25]. This construct when defined in the positive pole, represents individual's favourable attitude and respect for his/her own body [26]. Body appreciation can be conceptualized as a protective and respectful attitude towards the body through the rejection of unrealistic ideals, involving the acceptance of the specificities and imperfections that the body may have [27]. Empirical data emphasized that a positive attitude towards the body is inversely correlated with disordered eating attitudes and behaviours [27]. Furthermore, Wood-Barcalow and colleagues [28] suggested that there is a positive relationship between body appreciation and the existence of meaningful connections and close emotional ties with family, friends, and romantic partners. Along this line of thought, positive and secure social relationships may be associated with favourable and accepting relationship with one's body, which seems to promote the engagement in healthy behaviours.

Taking in consideration previous research, the aim of this study is to expand the knowledge in the field of disordered eating attitudes and behaviours, through the examination

of an integrative model. More specifically, the tested model intends to explore the mediator role of both body appreciation and the adoption of inflexible eating rules on the relationship between interpersonal variables (e.g., social safeness and social comparison based on physical appearance) and the severity of eating psychopathology.

In accordance with previous literature [1, 28], it is hypothesized that women who feel less secure in their relationships with others, as well as inferior (when comparing themselves based on their physical appearance) tend to present a lower body appreciation. Additionally, it is expected that decreased levels of body appreciation may explain the adoption of rigid eating rules, which can predict eating psychopathology.

## **1. Method and Materials**

### **1.1.Participants**

The sample of this study gathered 253 women from the general population, aged between 18 and 50 years old ( $M = 25.00$ ;  $SD = 7.15$ ). The participants' Body Mass Index mean ranged from 15.06 to 35.49 and presented a mean of 21.76 kg/m<sup>2</sup> ( $SD = 3.26$ ), which corresponds to normal weight values [29].

### **1.2.Procedures**

This study is part of a wider research about the role of different emotional regulation processes on mental health and particularly eating psychopathology. The study's procedures respected all ethical and deontological requirements inherent to scientific research. It was announced via facebook or e-mail and included a link to access an online survey. The participants who accepted to collaborate in the study, gave their informed consent and filled a series of measures, listed below, which took them approximately 5 to 10 minutes.

Information about the voluntary nature of their cooperation in this study and confidentiality of the data collected was given.

Additionally, participants completed a brief demographic questionnaire that assessed gender, age, nationality, area of residence, marital status, education, occupation, height, weight and ideal weight.

### **1.3. Measures**

***Body Mass Index.*** Participants's BMI was calculated through the Quetelet Index (kg/m<sup>2</sup>), based on self-reported weight and height.

***Social Safeness and Pleasure Scale*** (SSPS; [30]; Dinis, Matos, & Pinto-Gouveia, 2008). It is composed by 11 items which assess positive feelings and emotions in social situations (e.g., "I feel part of something greater than myself"). Participants were asked to rate, in a 5-point scale (1 = "almost never" to 5 = "almost ever"), the extent to which they felt secure and safe when interacting with others. In the original version, the scale revealed a very good internal consistency, with a Cronbach's alpha of 0.91.

***Social Comparison through Physical Appearance Scale*** (SCPAS; [1]). This scale is based on Social Comparison Rating Scale (SCRS; [31]) and was designed to measure one's perception of social rank and group fit through the person's physical appearance. It includes two different parts, with 12 items each: one measures social comparison with friends and colleagues (subscale "peers") and the other the comparison with models, actresses or television artists (subscale "models"). Participants are asked to choose a number, in a 10-point scale with bipolar constructs (e.g., Inferior/Superior), selecting the one that best reveals their experiences about themselves, when physically compared to others. Lower scores reflect unfavourable social comparisons. In the original study, the scale revealed a very good

internal consistency for both parts (0.94 for SCPAS\_peers and 0.95 for SCPAS\_models). In the current study it was only used the subscale “models”.

***Body Appreciation Scale-2*** (BAS-2; [26, 32]. BAS-2 is a 10-item scale, which addresses the appreciation, respect, acceptance and attention that one gives to her body (e.g., “I am comfortable in my body”), despite the specific characteristics or flaws it may have. Responses are given in a 5-point scale (1 = “Never” and 5 = “Always”), with higher scores reflecting greater body appreciation. The scale revealed, in both the original and the portuguese studies, very good internal consistencies, with Cronbach’s alphas of 0.97.

***Inflexible Eating Questionnaire*** [IEQ; Ferreira, Pinto Gouveia, Duarte, & Martinho, 2014]. IEQ comprises 11 items to evaluate the presence of inflexible and rigid eating rules (e.g., “I rather follow my eating rules than eating in function of the context or my hunger or will”). Participants are requested to select, on a 5-point Liker scale (1 = “I totally disagree” and 5 = “I totally agree”), the number that best translates the truthfulness of each sentence. Higher scores on this scale indicate higher inflexible eating behaviours. The scale showed a very good internal consistency (0.95) in the original study.

***Eating Disorder Examination Questionnaire*** (EDE-Q; [33, 34]). This is the self-report form version of the Eating Disorder Examination (EDE [35]), a semi structured interview which evaluates the frequency and severity of pathological eating behaviours and attitudes. It is composed by 36 items, divided in four subscales: restraint, eating concern, weight concern and shape concern. The items are rated for frequency of occurrence (items 1-15, on a scale ranging from 0 = “None” to 6 = “Every day”) or for severity (items 29-36, on a scale ranging from 0 = “None” to 6 = “Extremely”), taking into account the past 28 days. This scale has shown to be a valid and reliable instrument, with high values of internal consistency (0.94), for both the original and the Portuguese versions.

Cronbach's alphas of these measures in the current study are reported in Table 1.

#### **1.4.Data analysis**

Data analysis was performed using the software IBM SPSS Statistics 23.0 (SPSS IBM; Chicago, IL) and software AMOS [36]. In order to have a better comprehension of the sample in study, descriptive statistics of the variables were performed (means and standard deviations). Additionally, to explore the relationship between the variables in study, product-moment Pearson correlation analyses were performed. Coefficients were analysed taking into account Cohen's guidelines, in which values ranging from 0.1 to 0.3 are considered of weak magnitude, from 0.3 to 0.5 moderate and equal or superior to 0.5 high, at a significance level of 0.05 [37].

To test the mediator effect of inflexible eating and body appreciation in the relationship between social safeness, social comparison based on physical appearance and BMI and the severity of disordered eating, a path analysis was conducted. Thus, social safeness, social comparison based on physical appearance and BMI were considered as exogenous variables, body appreciation and inflexible eating were hypothesized as mediator variables and the global score of EDE-Q was considered as an endogenous variable.

In order to estimate the regression coefficients and fit statistics, the Maximum Likelihood method was used. Additionally, a set of goodness-of-fit indexes (e.g., CMIN/DF, CFI, TLI, RMSEA) were used to examine the adequacy of the model to the empirical data. The significance of the paths was examined via the Bootstrap resampling procedure with 5000 samples, and 95% bias-corrected confidence intervals (CI) around the standardized estimates of total, direct and indirect effects.

## 2. Results

### 2.1. Preliminary analyses

Skewness and Kurtosis values were analysed and seem to confirm uni and multivariate normality of the variables in study [38]. Furthermore, the data showed to be suitable, as indicated by preliminary analyses, which pointed to normality, linearity, homoscedasticity, independence of errors, and also singularity and absence of multicollinearity amidst the variables [39].

### 2.2. Descriptive analyses

Descriptive statistics for the variables in study are presented for the total sample ( $N = 253$ ) on Table 1. The means and standard deviations of the study variables were similar to those obtained in previous studies with female nonclinical samples [15].

Table 1

*Cronbach's Alphas ( $\alpha$ ), Means ( $M$ ), Standard Deviations ( $SD$ ), and Intercorrelation scores on self-report measures ( $N=253$ )*

Measures	$\alpha$	$M$	$SD$	1	2	3	4	5
1.BMI	-	21.76	3.26	1				
2.SCPAS _models	0.96	54.38	19.42	-0.15*	1			
4.SSPS	0.92	32.42	6.91	-0.17**	0.21**	1		
5.BAS_2	0.95	27.87	7.45	-0.36***	0.47***	0.41***	1	
6.IEQ	0.94	16.00	10.67	0.26***	-0.21**	-0.19**	-0.40***	1
7.EDE_Q	0.94	1.26	1.13	0.42***	-0.33***	-0.25***	-0.58***	0.66***

**Note:** BMI = Body Mass Index; SCPAS\_models = Social Comparison through Physical Appearance Scale – models version; SSPS = Social Safeness and Pleasure Scale; BAS\_2 = Body Appreciation Scale\_2; IEQ = Inflexible Eating Questionnaire; EDE\_Q = Eating Disorder Examination Questionnaire.

\*\*\*  $p < 0.001$ ; \*\*  $p < 0.010$ ; \*  $p < 0.05$

### **2.3. Correlations**

Correlations results (Table 1) allowed to observe that BMI presented weak and negative correlations with favourable social comparisons based on physical appearance with models (SCPAS\_models) and social safeness (SSPS). Additionally, a moderate and negative relationship was found between BMI and body appreciation (BAS-2). On the other hand, BMI was positively associated with inflexible eating (IEQ) and with a global score of EDE-Q.

In what concerns social comparison based on physical appearance with models and social safeness, a positive and weak correlation was found between each other. In the other hand, SCPAS\_models and social safeness linked negatively with both inflexible eating and EDE-Q. Additionally, a positive and moderate relationship was established between both social comparison based on physical appearance with models and social safeness and body appreciation. In turn, body appreciation was negatively correlated with both inflexible eating and EDE-Q, with moderate and strong magnitudes, respectively.

Finally, a strong and positive correlation was observed between IEQ and EDE-Q.

### **2.4. Path analysis**



The purpose of this path analysis was to test the mediator role of body appreciation and inflexible eating in the association between social safeness, social comparison with models and body mass index and disordered eating behaviours (EDE-Q).

This path model was tested through a fully saturated model (i.e., with zero degrees of freedom), consisting of 27 parameters. The model explained 38% of body appreciation, 18% of inflexible eating and 58% of EDE-Q's variance. In this model, four paths were not significant: the direct effect of social safeness on EDE-Q ( $b_{SSPS} = 0.02$ ;  $SE_b = 0.21$ ;  $Z = 0.10$ ;  $p = 0.93$ ), the direct effect of social comparison with models on inflexible eating ( $b_{SCPAS\_models} = -0.02$ ;  $SE_b = 0.04$ ;  $Z = -0.43$ ;  $p = 0.67$ ), the direct effect of social safeness on inflexible eating ( $b_{SSPS} = -0.05$ ;  $SE_b = 0.01$ ;  $Z = -0.53$ ;  $p = 0.60$ ) and the direct effect of social comparison with models on EDE-Q ( $b_{SCPAS\_models} = -0.12$ ;  $SE_b = 0.08$ ;  $Z = -1.58$ ;  $p = 0.12$ ). According to these results, these paths were eliminated and the model was recalculated.

The readjusted model indicated that all path coefficients were statistically significant ( $p < 0.001$ ), accounting for 58% of EDE-Q's variance. Also, this parsimonious model revealed an excellent model fit, with a nonsignificant chi-square [ $\chi^2_{(4)} = 2.95$ ,  $p = 0.57$  and as supported by other recommended goodness-of-fit indexes [TLI = 1.01; CFI = 1.00; RMSEA = 0.00; (IC = 0.00 - 0.08;  $p = 0.80$ )].

The final path model (Figure 1) explained 58% of EDE-Q's variance. Social safeness, social comparison with models and BMI accounted for 38% of body appreciation. Additionally, 18% of inflexible eating was explained by the direct effect of BMI and the indirect effect through body appreciation. Finally, 58% of EDE-Q was explained by the direct effect of BMI and by the indirect effect through body appreciation and inflexible eating.

Specifically, social safeness, social comparison with models and BMI presented a direct effect of 0.28 ( $b_{SSPS} = 0.30$ ;  $SE_b = 0.06$ ;  $Z = 5.50$ ;  $p < 0.001$ ), 0.37 ( $b_{SCPAS\_models} = 0.14$ ;  $SE_b =$

0.02;  $Z = 7.17$ ;  $p < 0.001$ ) and  $-0.26$  ( $b_{\text{BMI}} = -0.59$ ;  $SE_b = 0.12$ ;  $Z = -5.11$ ;  $p < 0.001$ ) on body appreciation, respectively. In turn, BMI had a direct effect of  $0.13$  ( $b_{\text{BMI}} = 0.44$ ;  $SE_b = 0.20$ ;  $Z = 2.20$ ;  $p = 0.03$ ) on inflexible eating and  $0.17$  ( $b_{\text{BMI}} = 1.70$ ;  $SE_b = 0.44$ ;  $Z = 3.87$ ;  $p < 0.001$ ) on EDE-Q's variance. Furthermore, body appreciation presented direct effects of  $-0.35$  ( $b_{\text{BAS}_2} = -0.50$ ;  $SE_b = 0.09$ ;  $Z = -5.73$ ;  $p < 0.001$ ) and  $-0.32$  ( $b_{\text{BAS}_2} = -1.39$ ;  $SE_b = 0.20$ ;  $Z = -6.86$ ;  $p < 0.001$ ) on inflexible eating and EDE-Q, respectively. Finally, inflexible eating showed a direct effect on EDE-Q of  $0.48$  ( $b_{\text{IEQ}} = 1.46$ ;  $SE_b = 0.14$ ;  $Z = 10.71$ ;  $p < 0.001$ ).

In what concerns the analysis of indirect effects, it is possible to observe that both social safeness and social comparison with models presented an indirect effect on EDE-Q, of  $-0.14$  (95 % CI  $-0.20$  to  $-0.09$ ) and of  $-0.18$  (95 % CI  $-0.25$  to  $-0.12$ ), respectively, which were totally explained by body appreciation and inflexible eating. Furthermore, it was verified that social safeness and social comparison with models revealed an indirect effect of  $-0.10$  (95 % CI  $-0.15$  to  $-0.05$ ) and of  $-0.13$  (95 % CI  $-0.19$  to  $-0.08$ ) on inflexible eating, through the effect of body appreciation, respectively. Also, BMI had an indirect effect of  $0.09$  (95 % CI  $0.04$  to  $0.15$ ) on inflexible eating, which was partially explained by body appreciation and an indirect effect of  $0.19$  (95 % CI  $0.11$  to  $0.27$ ), on EDE-Q, which was partially carried by the effects of body appreciation and inflexible eating. Finally, body appreciation showed an indirect effect of  $-0.17$  (95 % CI  $-0.23$  to  $-0.11$ ) on EDE-Q, through inflexible eating.

To sum up, the model explained 38% of body appreciation, 18% of inflexible eating and 58% of EDE-Q's. Additionally, it revealed that the impact of social safeness, social comparison with models and BMI on eating psychopathology severity was carried by the mechanisms of body appreciation and inflexible eating.

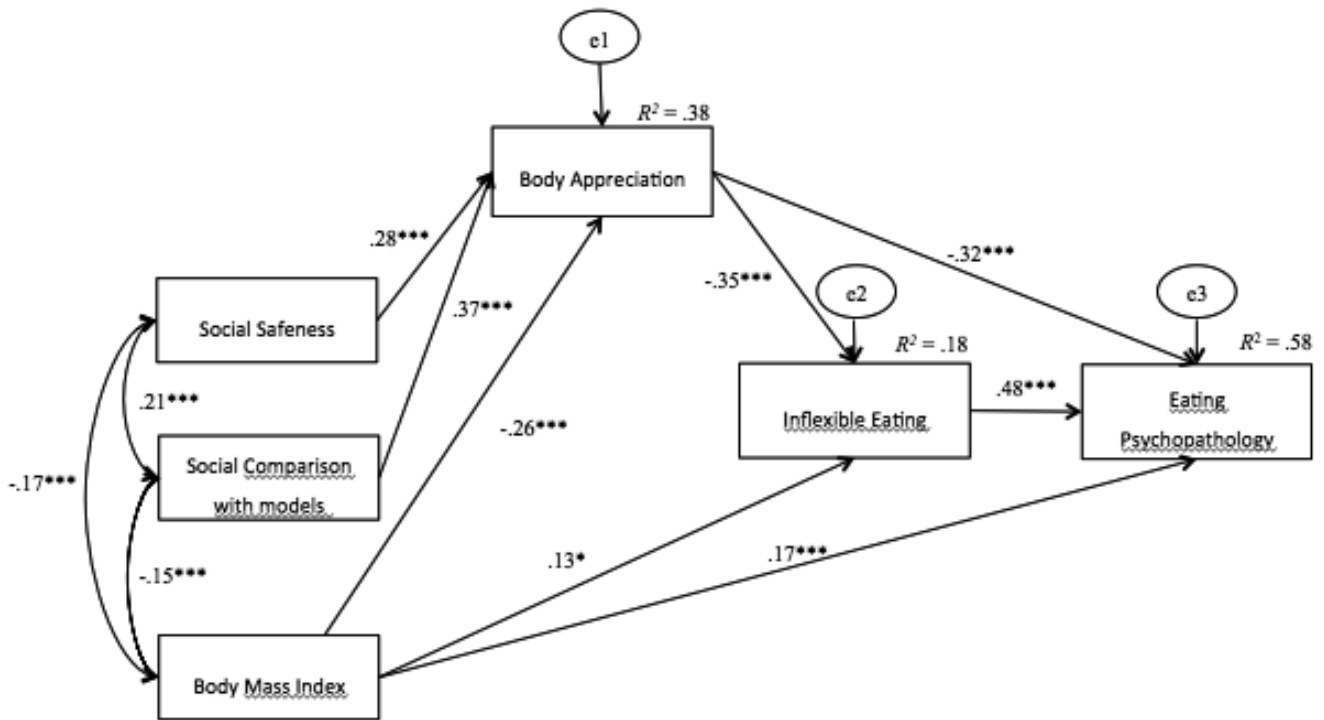


Fig. 1. Final path model.

Note: Standardized path coefficients among variables are presented. All path coefficients are significant at the 0.05. level; \* $p < 0.05$ ; \*\*\*  $p < .0001$ .

## Discussion

The present study tested an integrative model which explores the mediator role of body appreciation and inflexible eating rules in the relationship between social safeness, social comparison based on physical appearance and BMI and disordered eating attitudes and behaviours, in a sample of women from the general population.

Findings showed that social safeness and favourable social comparison based on physical appearance (with models) are positively linked with each other and negatively associated with BMI, albeit with a weak magnitude. Additionally, both social safeness and positive physical appearance-based social comparison showed a negative relationship with inflexible eating rules and eating psychopathology. Although these results are expected, and in line with

previous research [1, 24], this is the first study that explores the relationships previously pointed out. Furthermore, the observed findings seem to suggest an inverse correlation between secure and positive relationships and favourable comparisons with others and the engagement in rigid eating rules and maladaptive eating behaviours.

Additionally, results revealed the existence of a positive and moderate relationship between social safeness and social comparison based on physical appearance and body appreciation, which seems to corroborate the data presented by Wood-Barcalow and associates [28]. These authors suggested that the experience of feelings of belonging to a group are linked to a positive and respectful attitude towards the body. Additionally, the current study expands the knowledge by revealing that this positive and respectful attitude towards the body (body appreciation) is negatively linked to the adoption of inflexible or rigid eating rules.

Taking in account the data obtained through the correlation analysis, a path model was explored revealing the plausibility of the tested model. More specifically, results revealed that social safeness, social comparison based on physical appearance and BMI explained 38% of body appreciation's variance, and this mediator model explained 18% of inflexible eating rules' variance and 58% of eating psychopathology's.

Findings seem to prove that the relationship between social safeness, social comparison based on physical appearance and BMI and eating psychopathology is mediated by body appreciation and inflexible eating rules.

The obtained data suggested that women with inferior levels of social safeness in their relationships and which report more unfavourable social comparisons (based on physical appearance) tend to present inferior levels of body appreciation. Furthermore, the study suggests that the scarcity of this positive attitude towards the body (characterized by a

protective, favourable and respectful attitude [27, 28]) may work as a fuel to the adoption of inflexible eating rules, promoting disordered eating behaviours.

To sum up, this study is in line with previous investigations, highlighting the importance of inflexible eating rules [22, 23] and body appreciation in understanding eating psychopathology [24, 25]. However, this is the first study which tests the combined effect of body appreciation and inflexible eating rules in the explanation of disordered eating behaviours.

Nevertheless, this innovator study carried some limitations. Firstly, the cross-sectional nature of the study precludes the existence of conclusions regarding causality. In this way, it would be interesting to enlarge the study to a longitudinal design. The second limitation which can be pointed out is related to the multidetermination of eating disorders, which makes the used model a limited one, due to the fact that other variables can be involved and not taken in account in this study. However, there was a previous intention of restraining this model in order to give special attention and emphasis to the role of body appreciation and inflexible eating rules. Additionally, the fact this study comprised a sample constituted only by women can compromise the generalization of the data. A relevant suggestion would be to include men in the sample, as well as people from different ages and from a clinical population. However, the choice of including only women was due to the fact that body and eating-related difficulties are much more common in women rather than in men [40]. Finally, the exclusive use of self-report measures can also be seen as a limitation of this study. Future studies should use other types of measures (e.g., interview), in order to enrich the present one and confirm the obtained results.

This study highlights that the extent to which social safeness, physical appearance-based social comparisons and BMI impact on eating psychopathology severity partially depends

upon the attitude that one adopts towards his/her body, as well as the extension at which one follows inflexible eating rules. These findings may have important implications for prevention and therapeutic interventions, by suggesting the need of specific work for the promotion of a positive and respectful attitude towards the body, which seems an important mechanism to decreased inflexibility eating rules and disordered eating behaviours.

### **Conflict of Interest**

The authors declare no conflict of interest.

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