

Normative body dissatisfaction and eating psychopathology in teenage girls:

The impact of inflexible eating rules

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Abstract

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2 **Purpose:** Adolescence has been considered a critical time for the development of body image-related
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4 difficulties and disordered eating behaviours, especially in females. Although adherence to eating rules has
5
6 been linked to disordered eating, literature has not yet explored how the inflexible subscription to those rules
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8 impacts on eating psychopathology. Therefore, the aim of the current study was to explore whether inflexible
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10 eating impacts on the relationships between weight and body image-related variables, and disordered eating.

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12 **Methods:** Participated in this study 497 female adolescents from the community, aged between 14 and
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14 18 years old, who completed self-report measures.

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16 **Results:** Results revealed that the majority of the participants were dissatisfied with their weight and
17
18 body shape. Moreover, 6.64% of the participants demonstrated severe eating psychopathology. A path analysis
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20 revealed that BMI, body dissatisfaction and social comparisons based on physical appearance impact on
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22 disordered eating behaviours, through the mechanism of inflexible adherence to eating rules. This model
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24 explained 52% of eating psychopathology's variance.

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26 **Conclusions:** Findings highlight the relevance of body image-related difficulties in adolescence and
27
28 additionally they emphasise the importance of promoting more flexible attitudes towards eating in prevention
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30 and intervention programs with female adolescents.

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34 **Keywords:** body dissatisfaction, social comparison, eating psychopathology, inflexible eating rules,
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36 adolescence; community sample; disordered eating.

Introduction

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4 The prevalence of disordered eating behaviours among female adolescents has been described as
5 reaching epidemic proportions [1,2]. Indeed, research has long been reporting a significant number of disordered
6 eating behaviours on this population (e.g., [2]) and adolescence has been recognized as a period when several
7 risk factors for eating psychopathology are established (e.g., [3,4]).
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11 Approximately 41% to 66% of female adolescents from the community engage in excessive or unhealthy
12 dieting behaviours [5]. In addition, dietary behaviours are commonly associated with other maladaptive weight
13 control strategies, such as excessive exercise, self-induced vomiting, and the use of diet pills, diuretics or
14 laxatives. Although most of these cases are subclinical [6], these behaviours in adolescence are not benign
15 and are associated with emotional and physical health consequences (e.g., [7]). In fact, dietary restraint may
16 reflect the initial phase of a diagnosable eating disorder, and weight control behaviours have been linked to later
17 eating disorders (e.g., binge eating; [8] and overweight-related problems (e.g., [9,10]). This consistent body of
18 evidence reinforces the relevance of identifying risk factors and how they interact to predict disordered eating
19 behaviours in community samples and especially in the critical vulnerable period of adolescence.
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23 Body dissatisfaction is considered the main risk factor for maladaptive dietary behaviours (e.g., [8,11]).
24 Dissatisfaction with one's body is so prevalent among teenage girls that it has been considered a "normative
25 discontent" [12]. It is consensual that this dissatisfaction arises from the perception of having a bodily figure
26 significantly different from the socially ideal thin body often portrayed by media unrealistic images of models
27 and other celebrities [13]. Furthermore, several studies have shown that body dissatisfaction is not confined to
28 overweight females, and is prevalent among girls who are normal-weight or underweight (e.g., [14]).
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32 Recently, research showed that body dissatisfaction and the over-evaluation of thinness are linked to
33 unfavourable social comparisons, that is, to feelings of inferiority in comparison to others (e.g., [15,16]).
34 Physical appearance is indeed considered a main domain of social comparison and self-evaluation, especially for
35 females [15]. This may be explained by the emphasis given to thinness as a valued attribute by the social group,
36 and by its association to success, status and happiness (e.g., [17]). Hence, in women who experience feelings of
37 inferiority derived from social comparisons based on physical appearance, drive for thinness might be
38 conceptualized as a strategy adopted to be more accepted by others [15,18].
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42 Although in certain cases (e.g., obesity, diabetes) the existence of restrictive eating patterns may be
43 advisable, the adherence to restrictive personal food rules has been found to be associated with eating
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1 psychopathology [19,20]. Indeed, eating rules tend to increase levels of excessive preoccupation with eating and
2 the adoption of maladaptive eating behaviours [21,9], and may become a problem instead of a solution. This
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4 may occur when the individual blindly follows rigid eating rules, without meeting internal and external cues,
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6 and consequently engages in disordered eating behaviours with possible damaging consequences [11]. A large
7
8 number of studies using neuropsychological tasks have been gathering support that eating disorders patients,
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10 especially with restrictive eating patterns, present an inflexible cognitive style [22-24]. This pattern of poor
11
12 flexibility of thinking has been identified as a vulnerability trait, as being associated with the maintenance of the
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14 disorder, and with poorer treatment outcomes [25].

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16 In fact, body image and eating-related difficulties have been conceptualized as problems marked by
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18 inflexibility [26-28,25]. In particular, according to Acceptance and Commitment Therapy (ACT; [29])
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20 psychological inflexibility is defined as the inability of behaving flexibly while dealing with negative sensations,
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22 thoughts and feelings. In this sense, psychological inflexibility involves the dominance of cognitions and
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24 emotions over one's values and situational cues in guiding behaviours [27]. Psychological inflexibility has been
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26 identified as a key process underlying a range of psychopathological conditions and behavioural ineffectiveness
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28 [29-31]. Specifically, psychological inflexibility focused on body image has been recognized as a core
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30 dimension implicated in body image difficulties and disordered eating behaviours [26,32-36].

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32 Nevertheless, the impact of psychological inflexibility associated with eating rules on eating
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34 psychopathology remains unexplored. As adolescence is a phase of life of increased vulnerability for emotional
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36 difficulties, especially body image problems and disordered eating behaviours [10,1,11], it seems particularly
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38 relevant to examine the processes underlying the association between body shape and weight difficulties and
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40 eating psychopathology in this specific population. In fact, the globally rising levels of subclinical disordered
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42 eating behaviours in adolescent girls [1] and how this serious phenomenon is related with emotional difficulties
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44 and physical health impairments [7], stress the importance of investigating and addressing maladaptive body
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46 image and eating-related attitudes and behaviours in community samples. Thus, the current study aimed at
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48 investigating the associations between eating rules inflexibility and body image and eating-related dimensions,
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50 among adolescent girls from the community. These associations were examined in a path analysis in which it
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52 was hypothesised that eating-related inflexibility would mediate the association between well-known risk
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54 factors – body mass index, body dissatisfaction and social comparisons based on physical appearance – and
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56 eating psychopathology.
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Methods

Participants

The study's sample comprises 497 female adolescents aged between 14 and 18 ($M = 16.03$; $SD = 1.43$) years old, attending classes from 8th to 12th grade ($M = 9.96$; $SD = 1.37$). Three hundred and thirty five (67.40%) participants lived in the north and 162 (32.60%) in the centre of Portugal. Three hundred and nineteen (64.19%) lived in an urban and 178 (35.81%) in a rural zone. The participants' mean body mass index (BMI) was 21.12 ($SD = 2.76$). Five participants (1%) presented a BMI indicating thinness, 411 (82.7%) presented normal weight, 72 (14.5%) were overweight, and 9 (1.8%) were obese, according to the WHO reference for adolescent girls [37].

Procedures

The sample of this study is part of a wider research investigating the role of emotional regulation processes in eating psychopathology. The sample was collected in Portuguese high schools during scheduled class periods, after the respective Direction's Boards approval. Participants and their parents were fully informed about the study, as well as the voluntary and anonymous character of their participation, and provided their written informed consent. One of the researchers gave standardized instructions to the participants. To encourage honest responding, prior to the questionnaires completion, it was reinforced that the data collection was confidential and used only for the research. The participants completed the self-report measures at a class designated by the teacher in charge, during approximately 20 minutes. The researcher was present during the questionnaires completion and assisted the participants whenever necessary.

Measures

Demographic Data. Participants reported their age, educational level, height, and current and desired weight.

BMI was calculated using the Quetelet Index (Wt/Ht^2), and Weight Dissatisfaction was calculated as the subtraction between participants' current weight and desired weight.

Figure Rating Scale (FRS [38,39]; Portuguese version by [39]). The FRS consists of nine figures of different body sizes (1:the thinnest to 9:the largest). The respondent chooses the silhouettes that best illustrate

1 her real and ideal body shape. The discrepancy between these two figures represents the participant's body
2 dissatisfaction. The FRS presents good temporal, convergent and divergent validities.

3
4 *Social Comparison through Physical Appearance Scale (SCPAS; [15]).* The SCPAS measures one's
5 subjective perception of social ranking based on physical appearance. Participants are presented with bipolar
6 constructs (e.g., Inferior/Superior; Left out/Accepted) and asked to choose the number, on a 10-point Likert
7 Scale, that best translates how they feel when physically comparing themselves with others (with peers friends
8 and colleagues; and with models and celebrities). Higher scores represent more favourable comparisons. The
9 SCPAS presented a high internal reliability (Peers: .94; Models: .96) in its original study.

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16 *Inflexible Eating Questionnaire (IEQ; Ferreira, Pinto-Gouveia, & Duarte 2013).* This 11-item scale
17 assesses eating-related inflexibility (e.g., "I rather follow my eating rules than eating in function of the context
18 or my hunger or will"; "I get concerned when I don't comply with my eating rules, even if it only happens
19 occasionally"). One is asked to evaluate the scale's items on a 5-point Likert scale (1: Totally Disagree; 5:
20 Totally Agree), with higher scores revealing a heightened inflexible adherence to verbal eating rules. The IEQ
21 showed good psychometric characteristics ($\alpha = .95$) in its original study.

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28 *Eating Disorder Examination Questionnaire (EDE-Q [40,41]).* The EDE-Q is a 36-item self-report
29 inventory of disordered eating based on the Eating Disorder Examination Interview. This questionnaire
30 comprises four subscales: Restraint, Shape Concern, Weight Concern, and Eating Concern, which combined
31 offer a global measure of disordered eating. The EDE-Q presents good reliability and may be useful to screen
32 for eating disorders [42].

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38 The participants completed the Portuguese versions of the described measures, which are validated for
39 the current sample's age interval, and showed adequate to very good internal reliability in the current study (see
40 Table 1).

41 42 43 44 45 46 *Data Analysis*

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48 Data analyses were performed using IBM SPSS Statistics 20 (IBM Corp, 2011). Path analyses were
49 performed using the software AMOS.

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Descriptive analyses were conducted to explore the sample's levels of weight and shape dissatisfaction.
In addition, the incidence of eating psychopathology cases in this sample was explored. This analysis was based
on the EDE-Q's cut-off value of 4, which has been considered a good guide for screening eating disorders [43].

1 The associations between rigid eating (IEQ), body dissatisfaction (BD) and social comparisons based
2 on physical appearance (SCPAS) and the severity of eating disorders' symptomatology [44] were examined
3 through *Pearson* correlations.
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6 *Path analyses* were conducted to estimate the presumed relations among variables in a proposed
7 theoretical model (Figure 1). Path analyses are a type of structural equation modelling (SEM) that allows the
8 simultaneous examination of structural relationships and direct and indirect paths (e.g., [45]). The Maximum
9 Likelihood method was used to estimate the model path coefficients and to compute fit statistics. The
10 plausibility of the overall model was examined through the following recommended goodness-of-fit indices:
11 Chi-Square (χ^2), Normed Chi-Square (χ^2/df), Tucker Lewis Index (TLI), Comparative Fit Index (CFI), Normed
12 Fit Index (NFI), and Root-Mean Square Error of Approximation (RMSEA) with 95% confidence interval. The
13 bootstrap procedure (with 2000 samples) was used to create 95% bias-corrected confidence intervals around the
14 standardized estimates of total, direct and indirect effects. The effect is statistically significant ($p < .050$) if the
15 interval between the lower and the upper bound of the 95% bias-corrected confidence interval does not contain
16 zero [46].
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32 **Results**

33 *Descriptive Analyses*

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36 Results revealed that 71.23% of the sample desired to lose weight, and 61.37% desired a thinner figure.
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38 Besides, 6.64% of the adolescents scored 4 or higher on the EDE-Q, which translates the presence of severe
39 eating psychopathology. Means and Standard Deviations of the measures in the current study are reported in
40 Table 1.
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48 *Correlations*

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50 Results (Table 1) showed that BMI and body dissatisfaction (BD) presented moderate to high positive
51 correlations with each other, with inflexible adherence to eating rules (IEQ) and with EDE-Q's subscales and
52 global score.
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56 Furthermore, results showed that both domains of social comparisons based on physical appearance
57 (SCPAS peers and SCPAS models) were associated with increased BD, IEQ, and with higher scores on EDE-
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1 Q's subscales and global scale. In turn, inflexible eating presented positive and strong correlations with all
2 EDE-Q's dimensions and global score.

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4 Finally, a partial correlation analysis was conducted controlling for age. Results indicated that the
5 strength and direction of the associations between the study variables remained the same. Thus, age was not
6 considered in the following analyses.
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8 *Path analyses*

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10 Mahalanobis distance statistic was used to analyse multivariate outliers and results indicated the
11 absence of extreme values. Moreover, Skewness and Kurtosis values did not show a bias to normal distribution
12 (SK < |3| and Ku < |8-10|; Kline, 2005), and there were no evidence for multicollinearity (VIF < 5).
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15 The hypothesized model (Figure 1) tested the associations between increased BMI, body dissatisfaction
16 (BD), and negative social comparisons based on physical appearance with others, such as models or celebrities
17 (SCPAS) and eating psychopathology (Figure 1), considering the mediator effect of increased inflexible eating
18 (IEQ). This model was first examined through a fully saturated model (i.e., zero degrees of freedom), consisting
19 of 22 parameters.
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22 In the first saturated model, one path coefficient was not statistically significant, the direct effect
23 between BMI and EDE-Q ($b_{BMI} = .01$; $S.E. = .02$; $Z = .72$; $p = .472$). This nonsignificant relation was removed,
24 and the respecified model was then tested.
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27 The final adjusted model (Figure 1) explained 52% of EDE-Q and 17% of IEQ, and its evaluation
28 revealed an excellent model fit, with a nonsignificant chi-square of $\chi^2_{(1)} = .517$, $p = .472$. Furthermore, the
29 goodness-of-fit indices indicated a very good model fit ($\chi^2/df = .517$; TLI = 1.00; CFI = 1.00; NFI = 1.00;
30 RMSEA = .000, $p = .687$ [46].
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33 ----- Insert Figure 1 around here -----
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36 Furthermore, all individual path coefficients were statistically significant and represented the expected
37 directions. Namely, BMI and BD presented a direct effect on IEQ, with an effect of .15 ($b_{BMI} = .54$; $S.E. = .18$; Z
38 = 3.00; $p = .003$) and .26 ($b_{BD} = 2.69$; $S.E. = .53$; $Z = 5.08$; $p < .001$), respectively. Furthermore, more
39 favourable social comparisons based on physical appearance were associated with lower IEQ ($\beta = -.13$; $b_{SCPAS} =$
40 $-.07$; $S.E. = .02$; $Z = -3.06$; $p = .002$). In turn, IEQ presented a positive association with eating psychopathology,
41 with an effect of .44 ($b_{IEQ} = .06$; $S.E. = .00$; $Z = 13.01$; $p < .001$).
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Moreover, favourable social comparisons based on physical appearance (SCPAS) presented a total effect of -.25 on eating psychopathology (EDE-Q), with a negative direct effect of -.20 ($b_{SCPAS} = -.01$; $S.E. = .00$; $Z = -5.94$; $p < .001$), and an indirect effect partially mediated by IEQ of -.06 (95% C.I. = -.10 to -.09; $p = .004$).

Moreover, regarding the effects of body dissatisfaction on EDE-Q, BD presented a total effect of .44, with a direct effect of .33 ($b_{BD} = .44$; $S.E. = .05$; $Z = 9.38$; $p < .001$) and an indirect effect of .12 (95% C.I. = .07 to .16; $p = .001$), partially explained through increased IEQ.

Results also revealed that BMI did not present a significant direct effect on EDE-Q. BMI showed, however, an indirect effect on EDE-Q of .07 (95% C.I. = .02 to .11; $p = .004$), which was fully mediated by increased levels of IEQ.

Discussion

It is increasingly recognized that adolescence is a critical developmental stage in which pathological attitudes and behaviours about body image and eating tend to develop and may have a negative impact in psychosocial functioning and mental health [47,1,7]. Thus, it is particularly pertinent to investigate disordered eating behaviours and implicated risk factors in nonclinical community samples of adolescents. Recent research shows that body dissatisfaction and drive for thinness, recognized risk factors for eating disorders, have become the norm among adolescent girls (e.g., [5,48,12]). Our results corroborate this phenomenon, showing that the majority of the participants desired to lose weight and to present a thinner body shape.

Findings also revealed that body dissatisfaction was associated with perceptions of inferiority based on social comparisons through physical appearance, and both of these factors were linked to disordered eating attitudes and behaviours, which is in accordance with previous research (e.g., [18]). In fact, these results support prior theoretical and empirical accounts that suggest that for women physical appearance is a key domain for self and social evaluation [15]. Adolescence is characterized by physical maturation and by psychosocial transformations, according to which concerns about how one stands in relation to peers in valued domains (e.g., physical appearance) becomes particularly important [4]. In this way, many adolescents may believe that by reaching a thinner body (e.g., by controlling their eating behaviours) they will become closer to ideal body image patterns and thus more accepted and valued by others [11,15]. In fact, our results indicated that adolescent girls present more unfavourable social comparisons with peers based on physical appearance in

1 comparison to other samples of adult women [15], and similar levels of eating psychopathology scores to those
2 found in young women [41]. It is important to note that 6.64% of the current female adolescent sample's scores
3 revealed severe eating psychopathology (EDE-Q > 4; [42,43]).
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6 Additionally, the present study aimed at exploring whether the impact of body-related variables (BMI,
7 body dissatisfaction, and social comparisons based on physical appearance) on the severity of eating
8 psychopathology is influenced by the inflexible adherence to eating rules. The tested model explained 52% of
9 eating psychopathology's variance and clarified the pervasive effect of this adherence to rigid eating rules.
10 Findings suggested that, in teenage girls, the inflexible and rigid subscription to eating rules was a significant
11 mediator on the relationships between BMI, body dissatisfaction, and social comparisons based on physical
12 appearance, and eating psychopathology. More specifically, the inflexible adherence to eating rules fully
13 mediated the association between higher BMI values and eating psychopathology. Furthermore, increased body
14 dissatisfaction and unfavourable social comparisons based on physical appearance were associated with higher
15 scores of eating psychopathology as in prior studies [15], but these relationships were partially explained by
16 eating-related inflexibility. Taken together, these findings suggest that, in teenage girls, disordered eating
17 attitudes and behaviours may be amplified by the inflexible adherence and implementation of eating rules.
18 These inflexible eating patterns may be adopted with the purpose of controlling body weight and shape in the
19 context of overall dissatisfaction and perceptions of inferiority based on physical appearance. These findings can
20 be understood in light of ACT psychological inflexibility model [29,33], in the sense that inflexible eating may
21 be understood as strategy which aims at diminishing, neutralizing or avoiding unwanted internal body image-
22 related experiences. However, due to its rigid features and decontextualization from internal and external cues
23 (e.g., hunger, social situations), this strategy tends to become a source of greater difficulties.
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42 These findings should not be considered without acknowledging some limitations. The cross-sectional
43 nature of the study design does not allow analysing the associations' directionality. Further studies are needed to
44 longitudinally explore the development of eating psychopathology, its risk factors, and inflexible adherence to
45 eating rules. Given the large body of evidence derived from neuropsychological studies on inflexible thinking
46 style in disordered eating patients [23,24,22], the findings from the current study should also be corroborated
47 through experimental designs using neuropsychological tasks, which overcome the limitation of using self-
48 report measures. Besides, more work is needed to confirm this study's findings on patients with eating
49 disorders. Finally, this model was purposely restrained to specifically examine the impact of inflexible
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1 subscription to eating rules on disordered eating; however, given the multidetermined nature of eating
2 psychopathology, other processes may be involved in the examined associations.
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4 Nonetheless, this study offers important insights for research on body image and eating-related
5 difficulties in adolescent females. In fact, this study corroborates the link between “normative” body
6 dissatisfaction and eating psychopathology in teenage girls, and also explores the role of inflexible subscription
7 to eating rules on the engagement in disordered eating attitudes and behaviours. The findings highlight that the
8 extent to which BMI, body dissatisfaction and social comparisons based on physical appearance are associated
9 with eating psychopathology severity is partially influenced by how one follows inflexible personal eating rules.
10 These findings may have important implications for the clinical work with adolescent girls with eating disorders
11 since they emphasise the relevance of addressing the negative impact of an excessive focus on social
12 comparison and the adherence to inflexible eating rules. Furthermore, as normative body image and eating
13 difficulties have per se important negative biopsychosocial consequences (e.g.,[7]), the current study offers
14 important directions for the development of preventive programmes focused on body image and eating
15 behaviours directed at adolescent girls. In fact, this study seems to support the relevance of therapeutic
16 approaches that target cognitive rigidity and promote flexibility [49,50]. In particular, the development of
17 higher psychological flexibility may be beneficial to attenuate the impact of body and weight dimensions on
18 eating difficulties, and to help adolescent girls to focus on and engage with valued life domains [51,33]. The
19 early targeting of these difficulties at a community level could also have an important effect on preventing the
20 progress of disordered eating behaviours to cases of clinical significance.
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On behalf of all authors, the corresponding author states that there is no conflict of interest.

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Table 1
Means (M), Standard Deviations (SD), Cronbach's alphas and correlations between the study measures (N = 497)

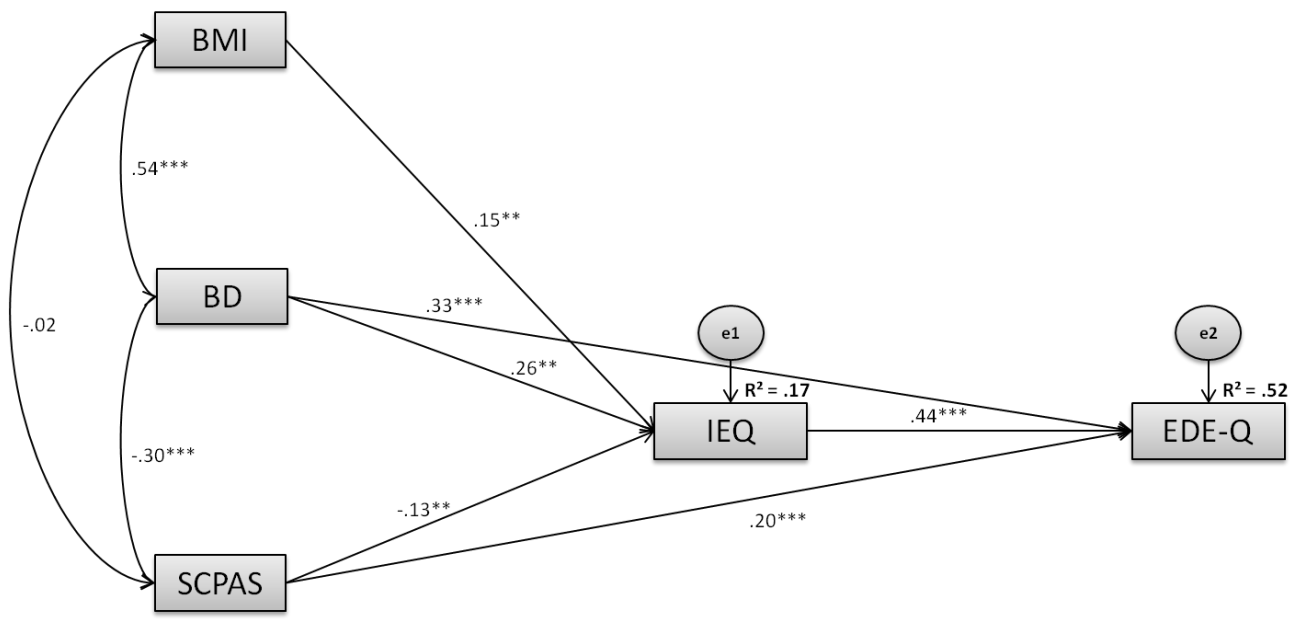
Measure	M	SD	α	1	2	3	4	5	6	7	8	9
1. BMI	21.12	2.76	-	-								
2. FRS	.69	.98	-	.54***	-							
3. SCPAS_Peers	58.52	15.39	.94	-.06	-.20***	-						
4. SCPAS_Models	48.84	18.59	.97	-.02	-.30***	.63***	-					
5. IEQ	30.13	10.06	.95	.29***	.38***	-.12**	-.21***	-				
6. Dietary Restraint	1.05	1.30	.84	.25***	.38***	-.10**	-.15**	.50***	-			
7. Eating Concern	.96	1.13	.77	.26***	.47***	-.30***	-.34***	.55***	.63***	-		
8. Weight Concern	2.14	1.63	.85	.34***	.52***	-.31***	-.38***	.54***	.57***	.75***	-	
9. Shape Concern	2.29	1.70	.90	.30***	.54***	-.34***	-.42***	.56***	.59***	.77***	.90***	-
10. Global EDE-Q	1.70	1.32	.94	.33***	.55***	-.31***	-.38***	.60***	.75***	.87***	.93***	.96***

Note. * $p < .050$. ** $p < .010$. *** $p < .001$. BMI = Body Mass Index; FRS = Figure Rating Scale (measuring Body Dissatisfaction); SCPAS = Social Comparison through Physical Appearance Scale, Peers and Models subscales; IEQ = Inflexible eating Questionnaire; Dietary Restraint = subscale of the EDE-Q; Eating Concern = subscale of the EDE-Q; Weight Concern = subscale of the EDE-Q; Shape Concern = subscale of the EDE-Q; Global EDE-Q = global score of the Eating Disorder Examination-Questionnaire.

Figure_1. Final Path Model

Note. Standardized path coefficients among variables are presented. All path coefficients are significant at the .05 level.

* $p < .05$; ** $p < .01$; *** $p < .001$; BMI = Body Mass Index; SCPAS = Social Comparison Based on Physical Appearance; SCPAS_models = Social Comparison through Physical Appearance Scale (Models); BD = Body Dissatisfaction; IEQ = Inflexible Eating Questionnaire; EDE-Q = Eating Disorder Examination Questionnaire.



Figure_1. Final Path Model

Note. Standardized path coefficients among variables are presented. All path coefficients are significant at the .05 level.

* $p < .05$; ** $p < .01$; *** $p < .001$; BMI = Body Mass Index; SCPAS = Social Comparison Based on Physical Appearance; SCPAS_models = Social Comparison through Physical Appearance Scale (Models); BD = Body Dissatisfaction; IEQ = Inflexible Eating Questionnaire; EDE-Q = Eating Disorder Examination Questionnaire.