

The effect of body dissatisfaction on disordered eating: The mediating role of self-esteem and negative affect in male and female adolescents

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Abstract

This study aimed to determine whether self-esteem and negative affect sequentially mediate the relationship between body dissatisfaction and disordered eating. A total of 806 adolescents (61.8% females) completed the Drive for Thinness, Bulimia, and Body Dissatisfaction subscales of the Eating Disorder Inventory-2, the Anxiety and Depression subscales of the General Health Questionnaire-28, and the Negative Self-beliefs subscale of the Eating Disorder Belief Questionnaire. Mediation analyses showed that body dissatisfaction had both direct and indirect effects through self-esteem and negative affect on disordered eating. It was also observed that negative self-esteem mediated—completely in boys and partially in girls—the relationship between body dissatisfaction and negative affect.

Keywords

adolescence, body dissatisfaction, disordered eating, negative affect, self-esteem

According to research data, body dissatisfaction is the most robust and consistent risk factor for the development of disordered eating in both community and clinical samples (Fairburn et al., 2003; Riva, 2011; Stice, 2002; Stice and Shaw, 2002).

In addition, the negative impact of body dissatisfaction in adolescents has consistently been associated with psychological problems, low self-esteem, and depressive mood. Studies have shown body dissatisfaction to be associated with anxiety (Cruz-Sáez et al., 2015; Dooley et al., 2015; Ferguson et al., 2011; Koronczai et al., 2013), depression (Cruz-Sáez et al., 2015; Dooley et al., 2015; Murray et al., 2015; Stice

and Bearman, 2001), and low self-esteem (Delfabbro et al., 2011; Van den Berg et al., 2010; Wichstrøm and Von Soest, 2016). Likewise, studies with adolescents of both sexes have found that body dissatisfaction predicted low self-esteem and depression (Johnson and Wardle, 2005; Paxton et al., 2006; Van den Berg et al., 2002). On the other hand, low

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self-esteem has been found to be associated with depression and anxiety among adolescents and university students (De Jong et al., 2012; Lee and Hankin, 2009; Orth et al., 2008).

These findings suggest that dissatisfaction may indirectly contribute to depression or anxiety through low self-esteem. In this regard, the little research that has been conducted on the mediating role of self-esteem in the association between body dissatisfaction and negative affect has not been entirely conclusive. Whereas, a study conducted by Siegel (2002) on a sample of teenagers and a study by Brechan and Kvaem (2015) on a sample of university students found a partial effect of mediation in the relationship between dissatisfaction and depression, in a study by Koronczai et al. (2013), carried out with a sample of young adults (14–31 years, mean age 21.5 years), self-esteem partially mediated the association between dissatisfaction and anxiety, and completely mediated the association between dissatisfaction and depression. On the other hand, in a study, Duchesne et al. (2017) carried out with a sample of adolescents found that the mediating effect was total for both variables. According to a study by Courtney et al. (2008), in a sample of adolescents with low self-esteem and depressive symptoms, the relationship between low-esteem and disordered eating behaviors was partially mediated by depressive symptoms in subjects of both genders.

Therefore, body dissatisfaction is an important but not a unique risk factor for the development of eating disorders (Brannan and Petrie, 2008; Fairburn and Cooper, 2011). In case of adolescents and young adults, low self-esteem and negative affect (e.g. depression and anxiety) may play a mediating role in this relationship, especially considering bulimia (Brechan and Kvaem, 2015; Cruz-Sáez et al., 2016; Heywood and McCabe, 2006; Ricciardelli and McCabe, 2001) However, most research examining the relationship between negative affect and binge eating has focused primarily on a single component of negative affect: depression. This is a limitation because anxiety and stress are more important than depression for understanding the

relationship between negative affect and binge eating (Rosenbaum and White, 2015; Schulz and Laessle, 2010). The majority of findings from studies on mediating variables have been inconsistent, especially in boys, where there has been less support for the mediation hypothesis. For example, Ricciardelli and McCabe (2001) studied the mediating role of restrained eating and the negative affect in the relationship between body dissatisfaction and bulimic eating behavior in a sample of adolescents. The authors found that both mediators affected the relationship between the two variables in girls and in boys who wanted a larger body size. But among boys who wanted to be thinner, only the negative affect proved to be a significant mediator. According to a study by Heywood and McCabe (2006), negative affect mediates the association of body dissatisfaction with weight loss strategies, dietary restraint, and bulimia, but only in women. However, in a study by Brechan and Kvaem (2015), self-esteem and depression completely mediated the association of body dissatisfaction with dietary restraint and binge eating in both genders. But in the boys, the mediation of depression functioned in the opposite direction for dietary restraint (the greater the depression, the less dietary restraint). In a recent study by Sehm and Warschburger (2017), low self-esteem, not negative affect, mediated the relationship between body dissatisfaction and binge eating in the long term.

Another approach in relation to the causal link between body dissatisfaction, negative affect, overconsumption of comfort foods, and weight increases and disordered eating is proposed by the Homeostasis Theory of Obesity (Marks, 2015, 2016). In this model, a similar surge of disordered eating is described as a consequence of homeostatic imbalance in the psychological sphere. The Homeostasis Theory proposes that weight gain is fostered by a Circle of Discontent (COD) consisting of body dissatisfaction, negative affect, and overconsumption (Marks, 2015).

In light of the inconclusive results from the reviewed literature, this study focuses on analyzing body dissatisfaction, negative self-esteem,

and negative affect (operationalized as symptoms of depression and anxiety) as risk factors for eating pathology. The primary objective is to determine whether self-esteem and negative affect mediate the relationship between body dissatisfaction and disordered eating. In addition, supported by findings from previous research (Brechan and Kvaem, 2015; Duchesne et al., 2017), this study also examines the sequential mediation of these variables. Therefore, we first hypothesize that self-esteem mediates the relationship between body dissatisfaction and negative affect; second, that self-esteem and negative affect mediate the associations between both body dissatisfaction and eating disorder symptoms; third, that self-esteem both directly and indirectly mediates through negative affect. A final hypothesis is that these associations are present in both boys and girls, although we expect them to be weaker in boys.

We believe that the results from this study may have important clinical implications. If it is shown that self-esteem and negative affect act as mediator variables between body dissatisfaction and eating disorders, then psychological treatment and prevention of eating disorders should be directed more at self-esteem and negative affect (anxiety and depressive symptoms) than directly at body dissatisfaction.

Method

Study design and participants

This research was designed as a cross-sectional study using a non-probabilistic sample. We selected public high schools which are far more representative of all social classes. After the schools agreed to participate in the project, the research team sent letters to the students' parents providing information on the study. The study was approved by the Ethics Committee of the University of the Basque Country.

A convenience sample of 1069 adolescents, aged between 16 and 19 was recruited from 18 public high schools from both big (23.5%) and small towns (76.5%) in the Basque Country, Spain. Participants with missing data on any of

the measures assessed were excluded (listwise deletion); therefore, the final sample was composed of 806 participants, 308 boys (38.2%) and 498 girls (61.8%). The mean age was 16.83 ($SD=0.83$). Of the total group, 57.1 percent were high school juniors, and 42.8 percent were high school seniors. Average body mass index (BMI) was 23.06 ($SD=3.42$) (range: 15.32–38.12).

Participants were given the questionnaires with the tasks to be performed, along with instructions for completion. They were then given approximately half an hour to complete the scales and questionnaires described above. Participants of legal age were asked to sign an informed consent form, and in the case of minors, the consent form was signed by parents or guardians. In all cases, participants were reminded that the information provided was anonymous and confidential.

The instruments were applied by two qualified psychologists in the classrooms at the students' schools. Once the questionnaires were completed, one of the psychologists measured the weight and height of each participant to calculate BMI. To encourage them to take part in the study, the psychologists offered to send them the results.

Instruments

BMI. Participant's height and weight were measured by a qualified psychologist using a digital scale (Fagor, BB-150) and a tape, all the required standardized procedures were applied (i.e. measures were taken in a standing position with minimum clothes and no shoes). Weight was recorded with the students fully dressed except for coats, shoes, key-chains, wallets, and other heavy objects. BMI was calculated as the weight in kilograms divided by the square of height in meters (kg/m^2).

Body dissatisfaction. This variable was measured using the *Body Dissatisfaction* subscale of the Eating Disorder Inventory-2 (EDI-2, Garner, 1991; Spanish version by Corral et al., 1998). The 9-item Body Dissatisfaction subscale assesses dissatisfaction with overall shape and

size. Participants rated their response to each item on a 6-point Likert-type scale from 1 (*never*) to 6 (*always*). This study used the 1–6 (instead of the 0–3) scoring because there is evidence that in non-clinical samples the 1–6 scoring provides higher sensitivity and variability than the 0–3 scoring (Schoemaker et al., 1994). Higher scores indicate higher body dissatisfaction. Cronbach's alpha for the Body Dissatisfaction subscale was 0.89.

Disordered eating was assessed using two scales of the EDI-2 (Garner, 1991; Spanish version by Corral et al., 1998): The *Drive for Thinness* subscale is a 7-item self-report measure of excessive concern with dieting, preoccupation with weight, and fear of weight gain; and *The Bulimia* subscale comprises 7 items that assess binge eating and inappropriate compensatory behavior. Participants were asked to rate each item from 1 (*never*) to 6 (*always*). In this study, the entire range of possible scores was used, as recommended for non-clinical samples by Schoemaker et al. (1994). The 14 items were summed to create a composite measure of disordered eating. This results in a range of total possible scores from 14 to 84, with higher scores indicating greater disordered eating. In this study, the internal consistency was satisfactory ($\alpha=0.89$).

Self-esteem. This variable was measured with the *Negative self-beliefs* subscale of the Eating Disorder Belief Questionnaire (EDBQ, Cooper et al., 1997). This subscale is composed of 10 items that are assessed on a scale from 0 (*I do not usually believe this at all*) to 100 (*I am usually completely convinced that this is true*). A total subscale score was obtained by summing all the subscale items and then dividing the total score by the number of items in the subscale, resulting in a final score between 0 and 100, with higher scores indicating greater negative self-beliefs. For the present sample, the internal consistency of the scale was 0.90.

Negative affect. In order to assess the level of negative affect, we used the *Anxiety/insomnia* (7 items) and *Depression* (7 items) subscales of

the General Health Questionnaire-28 (GHQ-28, Goldberg and Hillier, 1979; Spanish version by Lobo et al., 1986). The GHQ was developed as a screening instrument to identify psychological distress among adults in primary care settings. It consists of 28 items, which can be categorized in four subscales: somatic symptoms, anxiety/insomnia, social dysfunction, and depression. Each item consists of four possible answers, which were evaluated with a 4-point Likert-type scale (from 0 to 3). The responses to the 14 items were summed to create a composite measure of negative affect. Total scores ranged from 0 to 42, with higher scores indicating a greater degree of negative emotional symptoms. In this study, the internal consistency was satisfactory ($\alpha=0.90$).

Data analysis

In this study, descriptive statistics, mean differences, and Pearson's correlation analyses were selected. All tests were 2-tailed, and significance was set at 0.05. All statistical procedures were completed using SPSS 21.0. Mediation analyses were performed to test the mediating role of self-esteem in the relationship between body dissatisfaction and negative affect (symptoms of depression and anxiety). Specifically, sequential multiple meditational analyses were the principal data analysis technique used to contrast direct associations between body dissatisfaction and disordered eating, and the mediating role of negative self-esteem and negative affect. We used the SPSS macro PROCESS (model 4 and model 6) for bootstrapping indirect effects (Hayes and Preacher, 2013). This macro provides indirect effect estimates for multiple mediators, standard errors (SEs), and the confidence intervals (CIs) derived from the bootstrap distribution. Bootstrapping is a non-parametric re-sampling procedure which does not impose an assumption of normality on the sampling distribution; in consequence, it can be considered superior to more traditional ways of estimating SEs of indirect effects. All completely standardized indirect effects were subjected to follow-up bootstrap analyses with

Table 1. Descriptive statistics and tests of difference between boys and girls on body mass index, body dissatisfaction, disordered eating, negative self-esteem, and negative affect.

	Total (n = 806)	Boys (n = 308)	Girls (n = 498)	t	d
	M (SD)	M (SD)	M (SD)		
BMI	23.06 (3.42)	23.43 (3.23)	22.83 (3.52)	2.46*	0.18
Body dissatisfaction	29.39 (10.36)	23.91 (8.47)	32.78 (9.97)	-13.49***	0.94
Disordered eating	33.51 (12.67)	28.06 (10.07)	36.87 (12.94)	-10.8***	0.76
Negative self-esteem	18.02 (17.47)	13.27 (13.87)	20.96 (18.78)	-6.67***	0.45
Negative affect	9.59 (7.19)	7.23 (6.41)	11.05 (7.27)	-7.81***	0.56

* $p < 0.05$; *** $p < 0.001$.

Table 2. Pearson's correlations between body mass index, body dissatisfaction, disordered eating, negative self-esteem, and negative affect scores for adolescent girls and boys.

	Girls (n = 498)				Boys (n = 308)			
	BD	DE	NSE	NA	BD	DE	NSE	NA
BMI	0.46***	0.39***	0.17***	0.14**	0.35***	0.22***	0.04	0.01
BD		0.68***	0.49***	0.40***		0.62***	0.37***	0.28***
DE			0.43***	0.48***			0.38***	0.38***
NSE				0.55***				0.54***

BMI: body mass index; BD: body dissatisfaction; DE: disordered eating; NSE: negative self-esteem; NA: negative affect.
** $p < 0.01$; *** $p < 0.001$.

10,000 bootstrap samples and 95% bias corrected CI (95% CI). If the 95% CI did not contain zero, then the indirect effect was considered statistically significant (Hayes and Preacher, 2013). Sequential multiple mediational models included BMI as control variable.

Results

Differences in means and correlations

Table 1 presents a comparison of study variables in boys and girls. Girls scored significantly higher than boys on all variables, except BMI (slightly higher in boys). The magnitude of the differences was large in body dissatisfaction ($d=0.94$) and disordered eating ($d=0.76$) and moderate in negative affect and negative self-esteem.

Table 2 shows no significant relationships in boys between BMI, negative self-esteem, and negative affect. The rest of the variables showed positive significant relationships of moderate magnitude except in the body dissatisfaction

and disordered eating variables, in which the correlation was high ($r=0.62$).

As for girls, all the variables were significantly related and correlation coefficients were of greater magnitude than those obtained in boys. As in the case of boys, the highest relationship was between body dissatisfaction and disordered eating ($r=0.68$); the associations of lesser magnitude were between BMI, negative self-esteem, and negative affect.

Negative self-esteem as a mediator variable in the association between body dissatisfaction and negative affect

The model evaluated whether negative self-esteem mediated the relationship between body dissatisfaction and negative affect (model 4). The results for the mediation analyses for boys and girls are shown in Figure 1. As can be seen, the mediation analysis confirmed a significant positive effect of

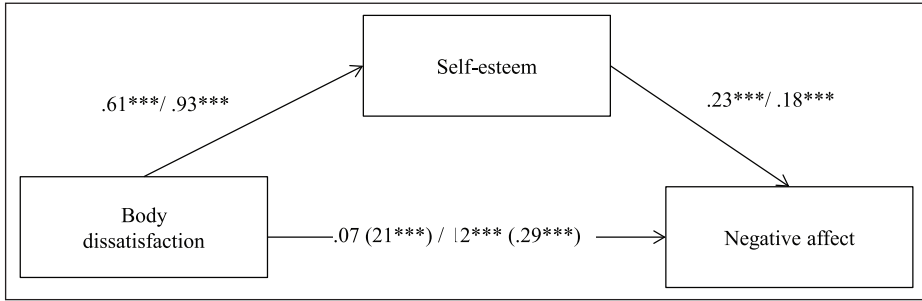


Figure 1. Mediation model with results for direct effects among boys/girls (total effect).

*** $p < 0.001$.

body dissatisfaction on negative self-esteem, which proved to be a significant positive predictor of negative affect. A significant total effect was also found of body dissatisfaction on negative affect; however, this effect lessened once the mediator variable was introduced, particularly in boys, where the relationship was no longer significant ($C' = 0.07$, $SE = 0.04$, $t = 1.83$, $p > 0.05$). In other words, negative self-esteem is a variable that mediates the relationship between body dissatisfaction and negative affect in both genders, but the mediating effect is partial in girls and complete in boys. The bootstrap test of indirect effects was significant in both boys ($B = 0.186$, $Boot SE = 0.032$, 95% $CI = 0.128 - 0.256$) and girls ($B = 0.229$, $Boot SE = 0.029$, 95% $CI = 0.174 - 0.290$). Therefore, the association between body dissatisfaction and negative affect can be explained, completely in boys and partially in girls, by negative self-esteem. In addition, the full model was significant and explained 29.39 percent of the total variance in negative affect for boys and 32.59 percent for girls.

Negative self-esteem and negative affect as sequential mediator variables in the association between body dissatisfaction and disordered eating

Given that negative self-esteem mediated the relationship between body dissatisfaction and negative affect, a sequential mediation model was developed, entering body dissatisfaction as the independent variable, disordered eating as

the dependent variable, and negative self-esteem and negative affect as sequential mediator variables (model 6). The BMI variable was also controlled because the correlational analyses showed its association with body dissatisfaction and disordered eating variables.

The mediation analyses showed similar results for boys and girls (Figure 2). Both analyses confirmed a significant total effect of body dissatisfaction on eating disorder symptoms; the effect diminished when the mediators (negative self-esteem and negative affect) were entered into the model, which suggests a partial mediating effect. The analyses showed indirect sequential effects of negative self-esteem through negative affect, and direct effects of negative affect but not of self-esteem. The bootstrap procedure was significant for the indirect effect of dissatisfaction through negative affect, both in boys ($B = 0.020$, $Boot SE = 0.013$, 95% $CI = 0.002 - 0.056$) and girls ($B = 0.042$, $Boot SE = 0.013$, 95% $CI = 0.021 - 0.071$), but not through negative self-esteem, in boys ($B = 0.030$, $Boot SE = 0.027$, 95% $CI = -0.019$ to 0.089) or girls ($B = 0.0079$, $Boot SE = 0.023$, 95% $CI = -0.037$ to 0.053). Nonetheless, the analyses revealed a sequential indirect effect of body dissatisfaction through negative self-esteem and negative affect in both boys ($B = 0.036$, $Boot SE = 0.015$, 95% $CI = 0.012 - 0.071$) and girls ($B = 0.057$, $Boot SE = 0.012$, 95% $CI = 0.036 - 0.085$).

These results illustrate the importance of the mediating role of negative self-esteem and negative affect, particularly the latter, as strong predictors of disordered eating. The full model was

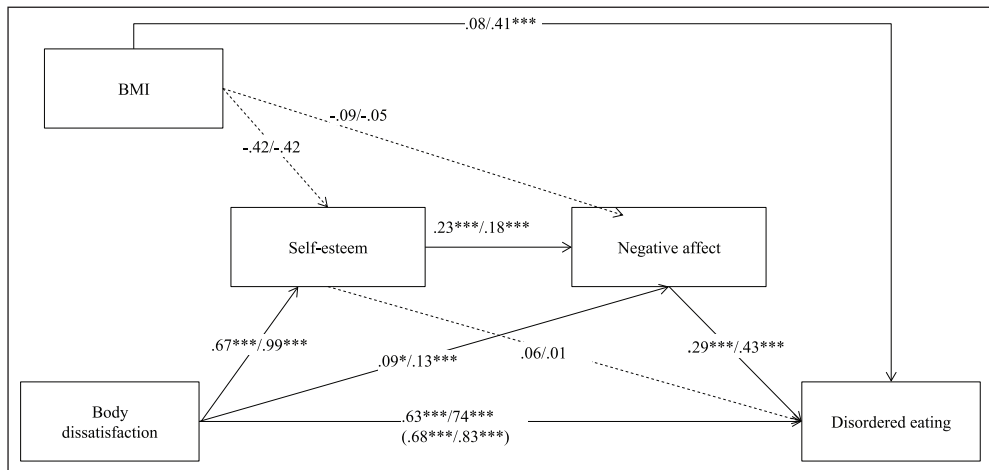


Figure 2. Mediation model with results for direct effects among boys/girls (Total effect).

* $p < 0.05$; *** $p < 0.001$.

significant and explained 43.56 percent of the total variance in disordered eating for boys and 52.26 percent for girls. Moreover, results showed that BMI was a significant predictor of disordered eating in girls but not in boys.

Discussion

This study analyzes the relationships between body dissatisfaction, self-esteem, and negative affect, considered three main risk factors for developing eating disorders. The primary objective of the study was to determine whether self-esteem and negative affect (symptoms of anxiety and depression) sequentially mediated the association between body dissatisfaction and disordered eating. To this end, it was first verified whether negative self-esteem mediated the relationship between body dissatisfaction and negative affect. The relationships were also evaluated to see if they were different as a function of gender.

In line with the findings from previous studies using community and clinical samples (Brechan and Kvaem, 2015; Duchesne et al., 2017; Koronczi et al., 2013; Núñez-Navarro et al., 2012), girls scored significantly higher than boys on all the variables evaluated (body dissatisfaction, disordered eating, negative

self-esteem, and negative affect), except BMI, which was slightly higher in boys. The correlational analyses showed that body dissatisfaction was strongly associated with disordered eating and moderately associated with self-esteem and negative affect, and that, in turn, the latter were moderately associated with disordered eating. While these relationships were observed in both genders, the values were lower, as predicted, for boys. No association was found between BMI, negative self-esteem and negative affect in boys but in girls these variables did show associations. Men's social pressure to eschew all femininity may lead them to avoid stereotypically feminine mental health diagnoses (Bosson and Michniewicz, 2013; Thompson et al., 1985).

The hypothesis that negative self-esteem was a mediator between body dissatisfaction and negative affect was confirmed. The results showed that the mediating effect was total for the boys and partial for the girls. Moreover, results of the mediation analyses are consistent with previous studies that have found body dissatisfaction to be a predictor of low self-esteem and low self-esteem to be a predictor of anxiety and depressive symptoms (Dooley et al., 2015; Orth et al., 2008; Paxton et al., 2006; Van den Berg et al., 2010; Wichstrøm and Von Soest, 2016). But in contrast with the findings of Duchesne

et al. (2017), our study did find gender differences in the effect of body dissatisfaction. In boys, body dissatisfaction predicted anxiety and depressive symptoms only through their association with negative self-esteem. But in girls, body dissatisfaction had effects on negative affect beyond what can be explained by negative self-esteem. This finding points to the importance of specific preventive measures tailored to boys with high levels of body dissatisfaction to bolster self-esteem and decrease negative affect.

As for the second hypothesis tested in this study, body dissatisfaction emerged as a predictor of self-esteem and negative affect, consistent with findings from previous studies (Paxton et al., 2006). But contrary to our prediction and to the results from other studies (Brechan and Kvalem, 2015; Courtney et al., 2008; Fairburn et al., 2003), negative self-esteem did not have a direct effect on disordered eating and only indirectly influenced disordered eating through negative affect. In other words, when body dissatisfaction and negative affect (in this case, anxiety and depressive symptoms) are added to the mediation model, negative self-esteem alone is no longer a significant predictor of disordered eating. However, negative affect did have a direct effect on disordered eating, which suggests that disordered eating is not associated solely with concerns about body image and a drive for thinness. An indirect effect of body dissatisfaction on disordered eating was also found through self-esteem and negative affect. Therefore, in accordance with other studies, the relationships between body dissatisfaction and eating disorders are partially explained by the emotional distress experienced by adolescents with high levels of body dissatisfaction. All these elements thus concur with the theory of the COD according to which disordered eating, body dissatisfaction, and negative affect are parts of feedback loops (Marks, 2015). Moreover, to a certain extent, our results appear to corroborate also the transdiagnostic model (Fairburn et al., 2003) in which mood intolerance and low self-esteem are factors that maintain eating psychopathology. For this model, disordered eating behaviors can be understood as a maladaptive response

for coping with or mitigating strong emotions, particularly emotions that cause distress. Likewise, our results, at least in part, support Mark's homeostasis theory of obesity, which considers overconsumption as a hedonic strategy to increase reward and reinforces habitual behavior by reducing negative affect and dissatisfaction (Marks, 2016). Therefore, future research should include the assumptions of the homeostasis theory of obesity in order to design prevention plans and treatment strategies that target sources of dyshomeostasis and in consequence considerably reduce disordered eating and improve the capacity to cope with low self-esteem and negative affect.

In addition, considering that a partial mediation effect was found in both genders, it can be said that body dissatisfaction has both direct and indirect effects on disordered eating through self-esteem and negative affect in adolescents aged 16–19. These results would support the idea that preventive measures should tackle emotional aspects by including strategies for managing and regulating negative emotions. Thus, we would agree with authors who recommend that any program aimed at treatment and prevention of eating disorders consider the negative emotions involved and provide adequate coping strategies to regulate emotions and emotional reactions (Ardito and Rabellino, 2011; Baer, 2006; Chambers et al., 2009). But unlike Brechan and Kvalem (2015), our results indicate that, in addition to an indirect effect, body dissatisfaction also has a direct effect on disordered eating. Therefore, we feel that intervention and treatment programs for adolescents should also continue to focus on body dissatisfaction.

The main contributions of this study are: (1) it provides empirical support for earlier research (Duchesne et al., 2017) by identifying negative self-esteem as a central variable in the relationship between body dissatisfaction and negative affect in adolescents, especially in boys; and (2) it tests an integrated model of different risk factors, in which body dissatisfaction, negative self-esteem, and negative affect have been considered simultaneously to study their effects on disordered

eating. Most previous studies examining the role of negative emotions have focused mainly on depression; however, anxiety has proven to be a variable that plays an important role in bulimic symptoms (Rosenbaum and White, 2015; Schulz and Laessle, 2010). To partially overcome this limitation, negative affect has been operationalized in this study as anxiety and depressive symptoms. Nonetheless, it is necessary to continue examining the role of body dissatisfaction, self-esteem, and negative affect in eating disorder intervention in longitudinal studies to determine their long-term effects.

This study is not without limitations. First, it is a cross-sectional and correlational study. While most mediation studies have used a cross-sectional design, a longitudinal study would shed light on the associations between the variables studied (body dissatisfaction, negative self-esteem, negative affect, and disordered eating). Second, all the data (except BMI) were collected through self-report measures, which means that they can be influenced by the participants' subjective responses. The Body Dissatisfaction subscale of the EDI-2 rates dissatisfaction with the shape or size of different parts of the body, but does not include parts particularly relevant to boy anatomy (e.g. upper body). Finally, despite a large sample size, the sample may not be representative of the Spanish adolescent population, and therefore the results are not necessarily generalizable to other young people of the same age.

Author's note

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