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**How different emotion processes influence disordered  
eating? The distinct effect of body image-related cognitive  
fusion and body appreciation**

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Dissertation supervised by Professor Cláudia Ferreira  
Master's degree in Clinical Psychology, in the field of  
Cognitive-Behavioral Interventions.

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**HOW DIFFERENT EMOTION PROCESSES INFLUENCE DISORDERED  
EATING? THE DISTINCT EFFECT OF BODY IMAGE-RELATED  
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**How different emotion processes influence disordered eating? The distinct effect of  
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## **Abstract**

The impact of body image-related variables in eating psychopathology may be influenced by different emotion regulation processes. This study aims to clarify the distinct effect of cognitive fusion and body appreciation, in the relationship between body image discrepancy and disordered eating, while controlling the effect of BMI in a sample of 369 women. The model explained 67% of eating psychopathology's variance and results, tested via path analysis, indicated that women who perceived their body as significantly discrepant from the social and culturally ideal thin figure, have a greater tendency to engage in disordered eating behaviours. This association is partially carried by distinct emotion regulation processes, namely body image-related cognitive fusion and body appreciation. Furthermore, results offer relevant contributions for research and clinical practice in the field of body image and eating difficulties providing empirical support for targeting cognitive defusion and self-compassionate attitude as protective emotion regulation strategies against eating psychopathology.

## **Keywords:**

Body mass index (BMI); Body image discrepancy (BID); Body image-related cognitive fusion; Body appreciation; Eating psychopathology

## **Introduction**

Several authors have argued that weight and body image dissatisfaction are key factors to explain eating psychopathology (Huon et al., 2002; Neumark-Sztainer, Wall, Story & Perry, 2003; Stice, Marti, & Durant, 2011; Stice, Presnell, & Spangler, 2002). In fact, scientific research has documented that women who present a higher Body Mass Index (BMI) and a higher body image discrepancy (that is, who perceived their body as significantly discrepant from the social and culturally ideal thin figure; Mond et al., 2013) tend to engage in disordered eating attitudes and behaviours (such as dieting, binge eating, purging or excessive exercise (Ferreira, Palmeira, & Trindade, 2014; Mendes, Ferreira, & Marta-Simões, 2016; Stice et al., 2011; Trindade & Ferreira, 2014). Despite the direct impact of these body image-related variables, there is evidence that its impact on eating psychopathology may be influenced by different emotion regulation processes (Ferreira et al., 2014; Mond et al., 2013; Pinto-Gouveia et al., 2014; Segal, Teasdale, & Williams, 2004). Furthermore, several accounts pointed out that the different processes used by individuals to cope with their weight and body image seem to explain the disordered eating behaviours, and are associated with emotional and physical health consequences (Mond et al., 2013; Mond, Hay, Rodgers, & Owen, 2011; Muennig, Jia, Lee & Lubetkin, 2008). According to acceptance and commitment therapy (ACT; Hayes, 2004) human suffering is not originated from the occurrence or content of undesired experiences (such negative perceptions of one's body image), but rather results from how one relates to these internal events (Segal et al., 2004). Literature has suggested that high psychological inflexibility, characterized by the inability to accept and to be flexible in the presence of undesired thoughts, emotions and sensations, is marked by central processes of

experiential avoidance and cognitive fusion (ACT; Hayes, 2004; Hayes, Strosahl, & Wilson, 2012).

Currently, body and eating psychopathology difficulties have been defined as problems of psychological inflexibility, that is, the inability of behaving flexibly while dealing with negative sensations, thoughts and feelings (Merwin et al., 2011). In fact, empirical studies have shown the pernicious role of psychological inflexibility-related processes in eating psychopathology considering that it contributes for the increase of negative body image and eating disorder symptoms (e.g., Ferreira, Pinto-Gouveia, & Duarte, 2011; Mancuso, 2016; Sandoz, Wilson, & DuFrene, 2010; Timko, Juarascio, Martin, Fahertya, & Kalodnera, 2014; Wendell, Masuda & Le, 2012). In accordance, disordered eating may be conceptualized as maladaptive strategies to avoid the unwanted body image-related internal experiences (e.g., Ferreira et al., 2014; Ferreira & Trindade, 2014; Wendell et al., 2012). Furthermore, several accounts suggest that the promotion of psychological flexibility related with body image may be an important protective emotion regulation strategy against disordered eating (e.g., Ferreira, Trindade, Duarte, & Pinto-Gouveia, 2013; Hayes & Pankey, 2002; Sandoz et al., 2010; Trindade & Ferreira, 2014).

Over the years, literature has shown the mediator role of different emotion regulation processes in the relationship between body image-related variables and eating psychopathology, focusing almost exclusively on the maladaptive ones. However, recently some investigators pointed out the need of a larger investment in the study of adaptive regulation processes (Tylka, 2011), such as self compassion. The ability to be self-compassionate promotes more useful and effective strategies and actions (Neff, Hsieh, & Dejitterat, 2005; Neff, 2003a, 20003b) and is associated with positive psychological functioning and emotional health (Neff, 2003a). Moreover, growing

evidences revealed the protective properties of these compassionate competencies on eating psychopathology (Ferreira et al., 2013).

Beyond that, body image is a multidimensional concept that comprises positive and negative characteristics (Cash, 2002). In the past, researchers were focused on describing and predicting negative body image such as body dissatisfaction, but currently the main purpose is identifying, predicting, and promoting adaptive body attitudes such as body appreciation (Avalos, Tylka, & Wood-Barcalow, 2005) stating that body appreciation is inversely related to body dissatisfaction (Avalos et al., 2005; Tylka & WoodBarcalow, 2015b). In point of fact, body appreciation is a central characteristic of positive body image conceptualized as the detention of a compassionate attitude towards one's own self and body image, i.e., the ability to be kind and understanding toward perceived flaws in appearance, and recognize them as shared by all (Marta-Simões, Mendes, Oliveira, & Ferreira, 2016). More specifically, body appreciation is characterized by (a) hold favorable opinions regarding the body (independently of actual physical appearance), (b) accept the body despite body weight, body shape and imperfections, (c) respect the body by meeting the needs and engaging in healthy behaviors, and (d) protect the body by rejecting media-promoted unrealistic appearance ideals (Avalos et al., 2005). Lately, this concept emerged as promising for research, prevention, treatment, and educational settings (Cook-Cottone, 2015; TylKa & Wood-Barcalow, 2015a, 2015b; Wood-Barcalow, Tylka, & Augustus-Horvath, 2010) due to the fact of being related with several indicators of psychological well-being (e.g., proactive coping, positive affect and self-compassion; Avalos et al., 2005; Tylka, 2012; Wasylkiw, MacKinnon, & MacLellan, 2012).

The current study aims to enhance recent research about the impact of different (maladaptive and adaptive) emotion regulation processes in eating psychopathology. Specifically, this study aims to clarify the distinct effect of body image-related cognitive fusion and body appreciation, in the relationship between negative perception of one's body image and disordered eating behaviours, while controlling the effect of BMI. It is hypothesized that body image-related cognitive fusion may exacerbate the impact of body image discrepancy on the engagement in disordered eating attitudes and behaviours. On the other hand, it is expected that body appreciation may lessen the impact the negative perception of one's body image on eating psychopathology 'severity.

## **Material and methods**

### **Participants**

Participants were 369 women from general population, aged from 18 to 55 years old ( $M = 26.84$ ;  $SD = 8.74$ ). Participants' Body Mass Index (BMI) present a  $M = 23.21$  and  $SD = 4.90$ , which corresponds to normal weight values, according to the conventional classification (WHO, 1995). Furthermore, the sample's BMI distribution revealed to be equivalent to the female Portuguese population's BMI distribution (Poínhos et al., 2009).

### **Measures**

Before answering to the self-report measures, participants provided demographic information (e.g., gender, age and education level) and the current weight and height, posteriorly used to calculate BMI.

**Body Mass Index** (BMI); Participants' BMI was calculated from the Quetelet Index from self-reported participants' height and weight ( $\text{Kg}/\text{m}^2$ ).

**Figure Rating Scale** (FRS; Thompson & Altabe, 1991; Ferreira, 2003); FRS is an instrument to assess body image. This scale includes nine silhouettes from different dimensions, which are presented in an ascending order from number 1 (the thinner body shape) to number 9 (the larger body shape). In this study, participants were asked to choose two silhouettes: one that best represent the current body image and another that best represents the ideal one. The degree of discrepancy between current and idealized body image was calculated through the difference between these two silhouettes. This scale has a good temporal reliability, as well as a good convergent and divergent validities (Thompson & Altabe, 1991).

**Cognitive Fusion Questionnaire-Body Image** (CFQ-BI; Ferreira, et al., 2013); CFQ-BI is a 10-item self-report measure of body image-related cognitive fusion (e.g., "I tend to get very entangled in my thoughts concerning my body or body image"). Participants were asked to select a number on a 7-point scale (1 = "Never true" to 7 = "Always true") which best represent their agreement with each item. Higher scores on CFQ-BI indicate higher levels of cognitive fusion or entanglement with unwanted thoughts regarding one's body image. This scale presents a unidimensional structure and revealed good psychometric properties in the original study ( $\alpha = .97$ ).

**Body Appreciation Scale-2** (BAS-2; Tylka & Wood-Barcalow, 2015a; Marta-Simões et al., 2016); BAS-2 is a 10-item measure design to assess individuals' acceptance and respect for their bodies, regardless of its appearance (e.g., "I take a positive attitude toward my body" or "I appreciate the different and unique characteristics of my body").

Participants were asked to rate their agreement with each sentence on a 5-point scale (1 = "Never" to 5 = "Always"). BAS-2 revealed to be a psychometric sound positive body image measure (with alpha ranging between .93 and .97 in different samples; Tylka & Wood-Barcalow, 2015a).

***Eating Disorder Examination Questionnaire*** (EDE-Q; Fairburn & Beglin, 1994; Machado et al., 2014). The EDE-Q is a 36-item self-report questionnaire of disordered eating based on the EDE's interview, which is considered a "gold standard" measure of eating disorder psychopathology. This measure comprises four subscales: restraint, eating concern, shape concern, and weight concern, which allow to obtain a global score of eating psychopathology. The items are rated for their frequency of occurrence and for their severity, within 28-days' time frame from 0 to 6. This scale revealed good reliability ( $\alpha = .94$ ) and the capacity to discriminate cases from non-cases of eating disorders.

## **Procedures**

The current study is part of a wider Portuguese research about the impact of emotional experiences and emotion regulation processes in the psychological functioning and mental health.

To conduct the current study all ethical requirements were met. Participants gave their written informed consent after being fully informed about the voluntary and confidential nature of their participation and also about the purpose, procedures and the aims of the study. Participants answered to a set of self-report measures during 10-15 minutes. Participants were collected through private messages on Facebook and were

asked to share with two more friends (Exponential Non-Discriminative Snowball Sampling method).

The original sample comprised 392 individuals of both genders (17 men and 375 women) with ages ranging from 17 to 57 years old. However, according to the aims of this study, only 369 women were selected. The data cleaning procedure excluded: (a) male participants; (b) participants younger than 18 or older than 55 years old.

### **Data analysis**

Data analyses were performed using IBM SPSS Statistics 20 (IBM Corp, 2011) and path analyses were examined using the software AMOS (Arbuckle, 2008).

Descriptive statistics (means and standard deviations) were used to explore the final sample's characteristics in the study variables. Further, Pearson product-moment correlation were conducted (Cohen, Cohen, West, & Aiken, 2003) and coefficients were analyzed in order to explore the relationships established between Body Mass Index (BMI), Body image discrepancy (BID), Body image-related cognitive fusion (CFQ-BI), Body appreciation (BAS\_2) and disordered eating attitudes and behaviours (EDE-Q). The magnitudes of results were discussed taking into account Cohen's guidelines, in which correlations ranging between .1 and .3 are considered of weak magnitude, moderate above .3 and strong, those correlations equal or superior to .5, considering a significance level of .05 (Cohen, Cohen, West, & Aiken, 2003)

Path analysis were performed to assess whether body mass index and body image discrepancy (entered as exogenous variables) predict disordered eating attitudes and behaviours (considered as an endogenous variable), through the mechanisms of body image-related cognitive fusion and body appreciation (entered as mediator variables).

The Maximum Likelihood method was conducted to estimate the regression coefficients and fit statistics. Furthermore, a set of goodness-of-fit indices were used to examine the adequacy of the model to the empirical data (e.g., CMIN/DF, CFI, TLI, RMSEA: REF). Resorting to the Bootstrap resampling procedure, the significance of the paths was examined, with 5000 samples and 95 % bias-corrected confidence intervals (CI) around the standardized estimates of total, direct and indirect effects. Effects with values under 0.05 were considered statistically significant.

## **Results**

### **Preliminary data analyses**

The analysis of Skewness and Kurtosis values seems to confirm the assumption of the distribution's normality of the variables studied (Kline, 2005). The data's suitability was tested by preliminary analyses, pointing to linearity, independence of errors, normality, homocedasticity, as well as to the singularity and absence of multicollinearity between variables (Field, 2004).

### **Descriptive and correlations analyses**

The descriptive statistics and Pearson's correlation are presented for the total sample ( $N = 369$ ) on Table 1.

Results demonstrated that body mass index (BMI) presented positive associations with body image discrepancy (BID), with body image-related cognitive fusion (CFQ-BI) and with disordered eating attitudes and behaviours (with strong, weak and moderate magnitudes, respectively). Furthermore, BMI were significantly and negatively associated with body appreciation, albeit weak magnitude. In turn, a positive correlation

was found between body image discrepancy and body image-related cognitive fusion and EDE-Q (with moderate and strong magnitudes, respectively). On the other hand, BID revealed a negative and moderate association with body appreciation and body image-related cognitive fusion was negatively and strongly associated with body appreciation. Also, this variable was positively and strongly correlated with EDE-Q. Finally, body appreciation showed a negative and strong association with the engagement in disordered eating attitudes and behaviours.

**Table 1** Cronbach's alpha ( $\alpha$ ), Means ( $M$ ), Standard Deviations ( $SD$ ), and intercorrelation scores on self-report measures ( $N=369$ )

Measures	$M$	$SD$	$\alpha$	1	2	3	4	5
1. BMI	23.21	4.90	-	1	-	-	-	-
2. BID	.92	1.02	-	.56***	1	-	-	-
3. CFQ_BI	25.31	13.6	.97	.15**	.36***	1	-	-
4. BAS-2	36.15	7.33	.94	-.27***	-.48***	-.67***	1	-
5. EDE_Q	1.57	1.25	.93	.37***	.60***	.72***	-.67***	1

*Note.* BMI = Body Mass Index; BID = Body Image Discrepancy; CFQ-BI = Cognitive Fusion Questionnaire-Body Image; BAS\_2 = Body appreciation scale 2; EDE-Q = Eating Disorder Examination Questionnaire. \*\* $p<.01$ ; \*\*\* $p<.001$

### Path analysis

The goal of path analysis was to test the role played by body image-related cognitive fusion (CFQ\_BI) and body appreciation (BAS\_2) in the association between body discrepancy (BID) and disordered eating attitudes and behaviours (EDE\_Q), when controlling the effect of BMI.

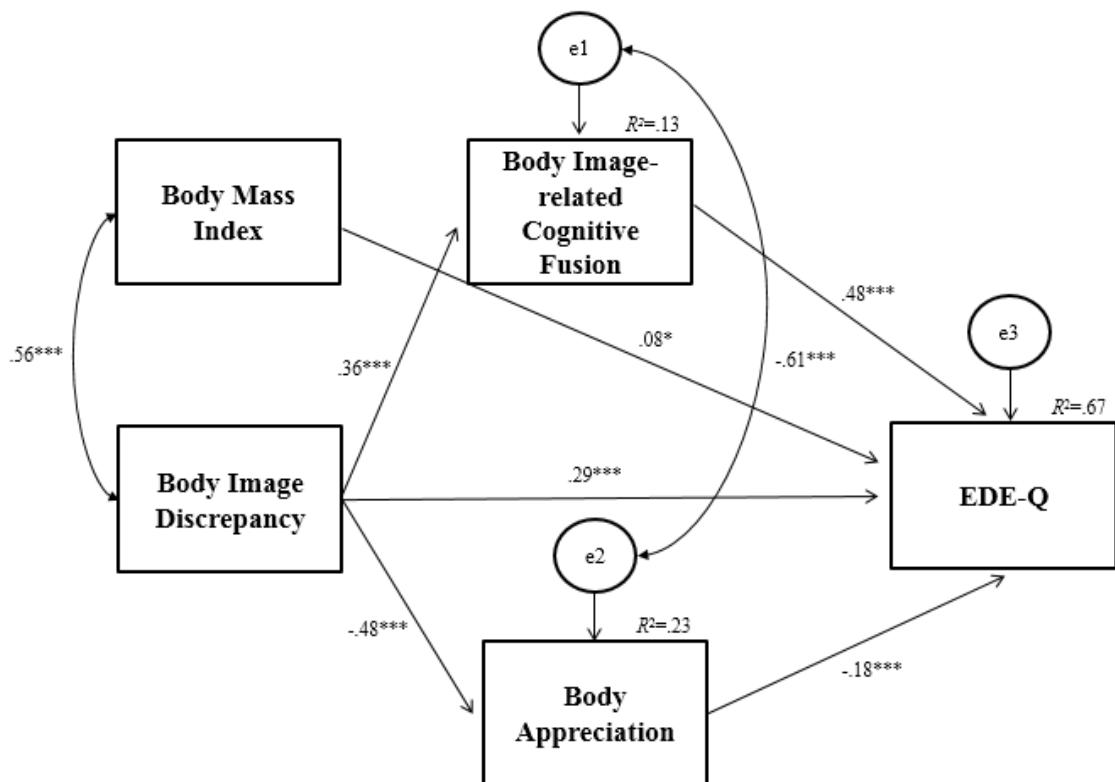
The tested model was explored through a fully saturated model (i.e., with zero degrees of freedom), comprising 15 parameters and explained 67% of the eating psychopathology's variance (EDE\_Q). In this model two paths were not significant: the direct effect of body mass index on body appreciation ( $b_{BMI} = -.009$ ;  $SE_b = .082$ ;  $Z = -.113$ ;  $p = .910$ ) and on body image-related cognitive fusion ( $b_{BMI} = -.210$ ;  $SE_b = .123$ ;  $Z = -1.703$ ;  $p = .088$ ). In accordance with these results, the non-significant paths were eliminated and the model recalculated. All path coefficients were statistically significant ( $p < .05$ ) and in the expected directions.

The readjusted model presented an excellent model fit, with a non-significant Chi-square [ $\chi^2_{(2)} = 2.903$ ;  $p = .234$ ] and reveled an excellent fit to the empirical data (CMIN/DF = 1.452; CFI= .999; TLI=.995; RMSEA= .035, IC= .000 - .115;  $p=.505$ ; Kline, 2005).

The final model (Figure1) explained 13%, 23% and 67% of the CFQ\_BI, BAS\_2 and EDE\_Q's variance, respectively.

Specifically, body image discrepancy presented a direct effect of .36 ( $b_{BID} = 4.610.$ ;  $SE_b = .622$ ;  $Z = 7.413$ ;  $p = <.001$ ) on body image-related cognitive fusion of -.48 ( $b_{BID} = -3.464.$ ;  $SE_b = .328$ ;  $Z = 10.568$ ;  $p = <.001$ ), on body appreciation of .29 ( $b_{BID} = .354$ ;  $SE_b = .049$ ;  $Z = 7.226$ ;  $p = <.001$ ), and on EDE\_Q. In turn, body mass index only showed a direct effect of .08 ( $b_{BMI} = .021$ ;  $SE_b = .009$ ;  $Z = 2.264$ ;  $p = .024$ ) on EDE\_Q. Furthermore, body image-related cognitive fusion and body appreciation had a direct effect on EDE\_Q of .48 ( $b_{CFQ\_BI} = .047$ ;  $SE_b = .004$ ;  $Z = 11.901$ ;  $p = <.001$ ), and of -.18 ( $b_{BAS\_2} = -.031$ ;  $SE_b = .007$ ;  $Z = -4.163$ ;  $p = <.001$ ), respectively. Moreover, the analysis of the indirect effects allowed us to identify that body image discrepancy presented an indirect effect on EDE\_Q, of .26 (95% CI = .20 to .33), which was partially mediated through the mechanisms of body image-related cognitive fusion and body appreciation.

Overall, the model accounted for 67% of EDE\_Q and revealed that the impact of body image discrepancy in eating psychopathology was partially carried by body image-related cognitive fusion and body appreciation.



**Figure 1.** Final path model. Note: Standardized path coefficients among variables are presented. All path coefficients are significant at the .05 level; \* $p < .05$ ; \*\*\* $p < 0.001$ .

## Discussion

Recent research shed light that the association of a higher BMI and a higher body image discrepancy may predict a larger engagement in disordered eating behaviours (Ferreira et al., 2014; Mendes et al., 2016; Trindade & Ferreira, 2014). Despite the direct impact of these variables, there is evidence that its role on eating psychopathology may be influenced by different emotion regulation processes (Ferreira et al., 2014; Mond et

al., 2013; Pinto-Gouveia et al., 2014; Segal et al., 2004). Therefore, the present study aimed to explore how body image-related cognitive fusion and body appreciation mediate the impact of a key risk factors of eating psychopathology (body image discrepancy) on the engagement in disordered eating behaviours, while controlling the effect of BMI.

Our findings seem to corroborate literature (Huon et al., 2002; Neumark-Sztainer et al., 2003; Stice et al., 2011; Stice et al., 2002) and are in accordance with our hypothesis, showing that BMI and body image discrepancy are positively associated with eating psychopathology severity. Furthermore, these results confirm previous studies disclosing that body image-related cognitive fusion (e.g., Ferreira et al., 2014; Ferreira & Trindade, 2014; Ferreira et al., 2013; Trindade & Ferreira, 2014) and body appreciation (Avalos et al., 2005) presented a strong association on EDE-Q (with negative and positive correlations, respectively).

A path analysis further examined these associations by testing the impact of body image discrepancy on EDE-Q, and the mediator role of body image-related cognitive fusion and body appreciation, while controlling the effect of BMI. Findings revealed that the tested model explained 67% of eating psychopathology's variance and presented an excellent model fit. Furthermore, results indicated that women who present a higher BMI and who perceived their body as significantly discrepant from the social and culturally ideal thin figure, have a greater tendency to engage in disordered eating attitudes and behaviours. Moreover, body image discrepancy revealed a positive direct effect on disordered eating and an indirect effect mediated by increased body image-related cognitive fusion and a decreased body appreciation. In other words, the current findings indicated that negative body image perception directly explains the engagement in

disordered eating behaviours, but its impact is also operated through the mechanisms of body image-related cognitive fusion and body appreciation.

The proposed model allowed us to confirm the distinct effect of body image-related cognitive fusion and body appreciation, and its crucial role as an emotion regulation processes that mediate the impact of body image subjective experiences on eating psychopathology. These conclusions point out that, even the perceived discrepancy between one's current and idealized body image directly impact the engagement in disordered eating attitudes and behaviours, when fused with their thoughts about body image, women tend to respond to it as facts or as truths, triggering experiential avoidance strategies (attempts to escape, avoid, change or control experiences). These strategies make internal experiences more painful (Hayes, Luoma, Bond, Masuda, & Lillis, 2006; Hayes, Strosahl, Wilson et al., 2004; Hayes et al., 1996) and hamper the adoption of adaptive behaviours (Gross, 2002). On the other hand, body appreciation due to the ability to be kind and understanding toward perceived *flaws* in appearance, and recognize them as shared by all (Marta-Simões et al., 2016) reduces the impact of these body image-related variables in eating psychopathology 'severity. Our findings indicate that body image-related cognitive fusion and body appreciation are key processes to explain the impact of negative body image on the engagement in disordered eating behaviours. In point of fact, the present paper argues that the impact of body image discrepancy in the tendency to eating psychopathology is mediated through high levels of body image-related cognitive fusion and low levels of body appreciation.

However, some limitations should be noticed. Firstly, the main limitation of the present study is its cross-sectional nature, which does not allow the inference of causal relationships between the variables. In the future research, longitudinal research should

be conducted to determine the directions of the studied associations over time. Another limitation is the use of a sample exclusively composed of women from the general population. Even though the engagement in disordered eating behaviours is much more prevalent in females, upcoming studies should investigate this model in male samples and analyses the differences between both genders. Furthermore, it would be important explore this model in clinical samples (e.g., obese and eating disordered patients). Lastly, another possible limitation is related to the use of self-report measures that could skew and compromise the generalization of the data. Thus, future research should include other assessment methods, in order to corroborate obtained results.

Despite these limitations, the present study seems to corroborate the hypothesis that the impact of body image discrepancy in disordered eating attitudes and behaviours is partially carried by the effect of maladaptive and adaptive emotion regulation processes, that is, by higher levels of cognitive fusion and low levels of body appreciation.

Additionally, our results seem to offer relevant contributions for research and clinical practice in the field of body image and eating difficulties, providing empirical support for targeting cognitive defusion and self-compassionate attitude as protective emotion regulation strategies against eating psychopathology.

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