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The mediating role of self-criticism, experiential avoidance and negative urgency on the relationship between ED-related symptoms and difficulties in emotion regulation

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Declarations

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The mediating role of self-criticism, experiential avoidance and negative urgency on the relationship between ED-related symptoms and difficulties in emotion regulation

Abstract

Objective: Difficulties in emotion regulation are thought to play a transdiagnostic role across eating disorders (ED). In the current study, we explored with a path analysis the mediating role of self-criticism, experiential avoidance and negative urgency on the relationship between ED-related symptoms and dimensions of difficulties in emotion regulation.

Method: Participants were 103 female outpatients recruited at a Portuguese ED hospital unit, diagnosed with an ED, aged 14 to 60 years old (*M* = 28.0, *SD* = 10.5), body mass index (BMI) ranging from 11.72 to 39.44 (*M* = 20.1, *SD* = 5.4).

Results: The path analysis resulted in a model with an adequate fit to the data (SRMR = .05; RMSEA = .07 [.00, .12], PCLOSE = .269; TLI = .97; IFI = .99; GFI = .95). A final model in which the relationship between ED-related symptoms and dimensions of difficulties in emotion regulation was mediated by self-criticism, experiential avoidance and negative urgency, accounted for a variance of 71% for Strategies, 57% for Nonacceptance, 62% for Impulses, 56% for Goals, and 20% for Clarity.

Conclusion: Results suggest that self-criticism, experiential avoidance and negative urgency, combined, are relevant in the relationship between ED-related symptoms and difficulties in emotion regulation. ED treatment and emotion regulation skills may be enhanced through the inclusion of specific components that target self-criticism, experiential avoidance and negative urgency, as they become prominent during the therapeutic process.

Key practitioner Message:

- Self-criticism, experiential avoidance and negative urgency, combined, are significant mediators in the relationship between ED-related symptoms and difficulties in emotion regulation

- ED treatment and emotion regulation skills may be enhanced through the inclusion of specific adjunctive components that target self-criticism, experiential avoidance and negative urgency, as they become prominent during the therapeutic process.

Keywords: eating disorders; weight and shape concerns; compensatory behaviors; self-criticism; experiential avoidance; negative urgency; difficulties in emotion regulation

Data availability statement. The data that support the findings of this study are available from the corresponding author upon reasonable request.

Abbreviations

AN – anorexia nervosa

BED – binge-eating disorder

BMI – body mass index

BN – bulimia nervosa

CMT – compassionate mind training

ED – eating disorders

GFI – goodness-of-fit index

IFI - Bollen's incremental fit index

IQR – interquartile range

Ku – kurtosis

ML – maximum likelihood

NA – negative affect

OSFED –other specified feeding/eating disorder

RMSEA – root-mean-square error of approximation

Sk – skewness

SRMR – standardized root-mean-square residual

TLI – Tucker–Lewis's index

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1 | Introduction

Difficulties in emotion regulation are a prevalent feature across psychopathology (Gross, 1998; Kring & Werner, 2004; Werner & Gross, 2010). According to Gross (1998), emotion regulation involves the ability to identify and modulate (i.e., maintain, increase, decrease) the experience of emotions in favor of one's valued life goals or immediate needs. The multidimensional model of emotion regulation outlined by Gratz and Roemer (2004), posits that an adaptive emotion regulation encompasses: the awareness and acceptance of one's emotional states; the ability to engage in goal-directed behaviors and inhibit impulsive behaviors; the contextual flexibility to select adaptive emotion regulation strategies; and the willingness to experience a certain degree of difficult/painful emotions, while remaining committed to valued life goals.

Difficulties in emotion regulation were conceptualized as transdiagnostic processes across eating disorders (ED; e.g., Mallorquí-Bagué et al., 2017; Munguía et al., 2021; Werner & Gross, 2010). A systematic review by Lavender and colleagues (2015a) showed that, when compared to healthy controls, ED-diagnosed individuals display limitations in the four dimensions of the multidimensional model of emotion regulation. Studies' results highlighted the role of disordered eating behaviors as maladaptive strategies to regulate unwanted emotions (e.g., Aldao et al., 2010; Buckholdt et al., 2015; Heatherton, & Baumeister, 1991; Lavender & Anderson, 2010; Smyth et al., 2007). For instance, according to Haynos and Fruzzetti's (2011) empirically-driven transactional model of emotion regulation in anorexia nervosa (AN), AN-related disordered eating behaviors (e.g., eating restraint, excessive exercise) may be conceptualized as short-term "escaping behaviors" from negative emotions. Thus, ED-diagnosed individuals might feel compelled to engage in compensatory behaviors to cope with heightened negative affect (e.g., Engel et al., 2005).

Notably, Lavender and colleagues (2016) explored reciprocal associations between bulimic behaviors and negative affect (NA), showing significant increases of NA after purging behaviors. Accordingly, Seidel and colleagues (2016) conducted an ecological momentary assessment study with AN-diagnosed patients, founding that weight-related rumination predicted subsequent NA increase. As suggested by Racine and Horvath (2020), these findings support the idea that ED-related symptoms do not necessarily result in the reduction of NA. In fact, it may increase in the long-term (e.g., Haynos & Fruzzetti, 2011), contributing to perpetuate bi-directional interactions between ED symptoms and difficulties in emotion regulation (e.g., Agüera et al., 2019; Eichen et al., 2017). Whereas it is generally established that difficulties in emotion regulation maintain ED symptomatology (Racine & Horvath, 2020), and emotion regulation improvements predict better results in treatment (e.g., Machado et al., 2020; Mallorquí-Bagué et al., 2017; Peterson et al., 2020; Rowsell et al., 2016; Wonderlich et al., 2014; Wonderlich et al., 2015; Wolz et al., 2015), it remains pivotal to understand the mechanisms accountable for the maintenance of emotion regulation difficulties in ED.

In a recent network meta-analysis (Leppanen et al., 2022), rumination and non-acceptance of emotional states were the maladaptive strategies more frequently associated with ED. Results from other studies found heightened self-criticism in ED-diagnosed patients (e.g., Duarte et al., 2016; Fennig et al., 2008; Goss, 2011; Goss & Allan, 2014; Steindl et al., 2017). Self-criticism encompasses a dominant-subordinate or a stigmatizing and persecutory self-to-self form of relationship (often recruited with the function of self-correcting and/or attacking), steaming from feelings of inadequacy and/or hatred towards one's personal attributes or outcomes (e.g., Gilbert, 2000; Gilbert et al., 2004). Accordingly, Wonderlich and colleagues (2015) considered high self-discrepancy (not exclusively related to body-related aspects, but to several domains of the self), as central for the onset and maintenance of ED-related symptoms in bulimia nervosa (BN), and related to increased NA. As previously hypothesized by Heatherton and Baumeister (1991), the impetus to escape the aversive experience of harsh self-discrepant and self-critical appraisals, may lead to subsequent experiential avoidance. In fact, Moroz and Dunkley (2015; 2019) corroborated this rationale, founding significant

and positive associations between self-critical perfectionism and experiential avoidance, with longitudinal cross-lagged results confirming that the first significantly predicted the latter. A predisposition towards experiential avoidance may persist over time in individuals with higher levels of self-critical perfectionism, in order to sidestep aversive self-awareness (Moroz & Dunkley, 2019), which is ineffective in the long-term (e.g., Hayes et al., 1996).

In fact, experiential avoidance – one's unwillingness to experience private internal events (e.g., bodily sensations, thoughts, emotions) – has received attention in the context of emotion regulation (e.g., Hayes et al., 1996), and is conceptualized as a function present in maladaptive emotion regulation strategies (Boulanger et al., 2010). Particularly, AN and BN-diagnosed individuals display deficits in emotional acceptance and greater experiential avoidance, comparing to controls (e.g., Brockmeyer et al., 2014; Lavender et al., 2015b; Rawal et al., 2010; Wildes et al., 2010), which may be related to heightened NA and difficulties in its regulation (e.g., Brockmeyer et al., 2014; Sandoz et al., 2010). Likewise, Wolz and colleagues (2015) offered evidence for the interrelation between high harm avoidance and specific dimensions of emotion regulation (e.g., engage in goal-directed behaviors; select adaptive emotion regulation strategies) in ED samples.

Additionally, Castilho (2011) has provided empirical evidence on the association between self-criticism and experiential avoidance in patients diagnosed with borderline personality disorder, suggesting that higher levels of self-criticism combined with NA, may prompt coping mechanisms in the form of experiential avoidance or impulsive behaviors. In fact, negative urgency – a predisposition to avoid NA through impulsive behaviors (e.g., Combs & Smith, 2012; Cyders & Smith, 2008; Pearson et al., 2015) is related to emotion dysregulation across psychopathology (e.g., Linehan & Dexter-Mazza, 2008), and is present in ED samples (e.g., Agüera et al., 2020; Lavender et al., 2015b; Mallorquí-Bagué et al., 2020). Even though emotion-avoidance strategies and emotion-driven behaviors may comprise maladaptive efforts to control aversive emotional experiences, they prevent effective emotion regulation (Barlow et al., 2011).

Although self-criticism, experiential avoidance and negative urgency have been theoretical and empirically related to emotion dysregulation and ED, fewer studies explored pathways through which they may, combinedly, influence each other and emotion regulation difficulties.

Goals in this study

Thus, the goal in this study was to: a) characterize an ED sample in terms of ED-related symptoms, difficulties in emotion regulation, and transdiagnostic psychological processes; and b) explore, through a path analysis, the role of self-criticism, experiential avoidance and negative urgency as mediators on the relationship between ED-related symptoms and specific dimensions of difficulties in emotion regulation. We expect significant associations between the variables in study, and hypothesize that self-criticism mediates the association between ED-related symptoms and difficulties in emotion regulation, mainly through the pathways of experiential avoidance and negative urgency.

2 | Methods

Participants

Participants were *N* = 103 outpatients recruited at a Portuguese hospital unit. Participants' ages ranged from 14 to 60 years old (*M* = 28.0, *SD* = 10.5, median = 25.0, interquartile range [IQR] = 14.0), and body mass index (BMI) ranged from 11.72 to 39.44 (*M* = 20.1, *SD* = 5.4, median = 18.04, IQR = 5.9). Forty-five participants (44.1%) completed high school, while 36 (35.3%) completed or were currently attending a college level degree. Most participants were single (*n* = 71; 69.6%) and 23.5% were married or cohabiting (*n* = 24).

Participants were diagnosed by a staff psychiatrist, according the Diagnostic and Statistical Manual of Mental Disorders – fifth edition (DSM–5; APA, 2013) criteria. Thirty-eight participants met criteria for anorexia nervosa restricting type (AN-R; 36.9%), 10 for anorexia nervosa binge eating/purging type (AN-BP; 9.7%), 28 for bulimia nervosa (BN; 27.2%), 8 for binge-eating disorder (BED; 7.8%) and 19 for other specified feeding/eating disorder (OSFED; 18.4%). Twenty-seven

participants (26.7%) reported a current treatment duration up to 24 months, while 54 participants (53.5%) reported a longer treatment duration. Finally, 79 participants (76.7%) reported current use of psychiatric medication.

Measures

Participants completed a set of self-report questionnaires, including sociodemographic, clinical and anthropometric data.

The Eating Disorders-15 (ED-15; Tatham et al., 2015) is a 15-item self-report questionnaire to assess problematic eating attitudes and behaviors, over the previous week. Two attitudinal scales – weigh and shape concerns, and eating concerns – are composed from 10 items, rated in a 7-point Likert scale ranging from 0 (Not at all) to 6 (All the time). Five additional items capture the presence of problematic eating behaviors - binge-eating episodes, vomiting episodes, laxative misuse days, eating restraint days, and excessive exercise days (e.g., "…on how many days in the past week have you restricted or dieted in order to control your weight?"). The current study used the Portuguese version of the scale (Rodrigues et al., 2019), that revealed a good internal consistency (e.g., Cronbach´s alpha of .91). For the purpose of this study, a variable was created – compensatory behaviors – reflecting the kind of compensatory behavior, ranging from 0 to 4, used by a participant in the previous week (self-induced vomiting, laxative misuse, eating restraint, and excessive exercise).

The Forms of Self-criticizing/attacking and Self-reassuring Scale (FSCRS; Gilbert et al., 2004) is a 22-item self-report questionnaire to assess self-criticism and self-reassurance. Three subscales are derived – inadequate self (e.g., "I am easily disappointed with myself"), hated self (e.g., "I have become so angry with myself that I want to hurt or injure myself"), and reassured self (e.g., "I am able to remind myself of positive things about myself"). The items are rated in a 5-point Likert scale ranging from 0 (Not at all like me) to 4 (Extremely like me). For the purpose of this study, a variable of self-criticism was calculated as the sum of the inadequate-self and hated-self subscales. In the Portuguese

version (Castilho & Pinto-Gouveia, 2011), the FSCRS revealed acceptable internal consistency levels (Cronbach's alphas of .89, .62 and .87 for the inadequate self, hated self and reassured self respectively, in a non-clinical sample).

The Acceptance and Action Questionnaire - II (AAQ-II; Bond et al., 2011) is a 7-item self-report questionnaire to assess experiential avoidance and psychological inflexibility, referring to psychological attitudes (e.g., attempts to avoid) that one might adopt in the face of unwanted/unpleasant internal experiences (e.g., thoughts, emotions). The items are rated in a 7-point Likert scale ranging from 1 (Never true) to 7 (Always true), and an overall score is derived. In the Portuguese version (Pinto-Gouveia et al., 2012), the AAQ-II revealed good internal consistency levels with Cronbach's alphas above .89 in clinical and non-clinical samples.

The UPPS-P Impulsive Behavior Scale—Negative Urgency Subscale (UPPS-P; Whiteside et al., 2005) is a 12-item self-report subscale questionnaire to assess negative urgency, one's tendency to experience impulsive behaviors upon negative emotions. The items are rated in a 4-point Likert scale ranging from 1 (strongly agree) to 4 (strongly disagree) and an overall score reflecting negative urgency is derived. Participants in this study completed the Portuguese version of this subscale (Lopes et al., 2013).

The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) is a 36-item self-report questionnaire to assess difficulties in emotion regulation, through six dimensions of emotion regulation: limited access to adaptive emotion regulation strategies (strategies); nonacceptance of emotional responses (nonacceptance); lack of awareness of emotional responses (awareness); difficulties controlling impulses in the face of negative emotions (impulse); difficulties in engaging goal-directed behaviors in the face of negative emotions (goals); and lack of clarity of emotional responses (clarity). The items are rated in a 5-point Likert scale ranging from 1 (almost never applies to me) to 5 (almost always applies to me). In the Portuguese version (Coutinho et al., 2010), the DERS

revealed good internal consistency levels in a non-clinical sample, with a Cronbach's alpha of .92 for the overall score.

Procedures

The procedures in the current study were conducted in accordance with the Declaration of Helsinki and the guidelines from the institutions' Ethics Committees. Participants in this study were patients recruited at a Portuguese hospital unit specialized in the treatment of ED. Patients referred by their physicians were informed by a certified psychologist on the study goals and its voluntary and confidential nature. After agreeing to participate and signing (or their legal tutors) an informed consent form, participants completed the Portuguese versions of the self-report questionnaires.

Statistical analysis

To verify the presence of univariate and multivariate outliers, z-score values (< 3.29 or > 3.29) and the Mahalanobis distance (D^2; p1 and p2 < .001) were calculated. Values of skewness and kurtosis (Sk < 3; Ku < 10; Kline, 2005) were considered to examine the data response distribution. Descriptive statistics (means, standard deviations, minimum and maximum values) and the internal consistency (Cronbach's alpha coefficients) of the variables' scales were calculated. Pearson's (*r*) correlation coefficients were used to examine the associations between the variables in study, and indicators of multicollinearity (*r* > .85; Weston & Gore, 2006). Linear regression models were conducted as a preliminary analysis to identify global predictors of overall emotion regulation difficulties.

The maximum likelihood (ML) model's estimation method was used in the path analysis, and the significance of direct, indirect and total effects was examined through Bootstrap resampling with bias-corrected percentile method and 95% confidence intervals (Marôco, 2010). The following fit indices were considered to examine the goodness-of-fit of the final model: the standardized root-mean-square residual (SRMR; values < .08 considered acceptable); the root-mean-square error of approximation (RMSEA; values < .08 considered acceptable); the Tucker–Lewis's index (TLI), the

Bollen's incremental fit index (IFI), and the goodness-of-fit index (GFI; values > .95 indicating a good fit; e.g., Arbuckle, 2008; Hooper et al., 2008; Hu & Bentler, 1999). Following Weston and Gore's (2006) guidelines, alternative models were tested. First, the model initially hypothesized (Supplementary figure 1) was tested. In line with recent studies' results (e.g., Bardeen et al., 2012; Hallion et al., 2018; Lee et al., 2016; Osborne et al., 2017), the awareness dimension was excluded due to the absence of significant associations with the remaining variables in study. Second, an alternative model's fit with direct effects between all the exogenous and the endogenous variables was tested. In order to achieve a statistically acceptable model, non-significant paths were removed and modification indices suggesting covariance between item's residuals was allowed upon theoretical reasonability. The chi-square difference (χ^2_{diff}) test was used to test differences between nested models' fit (Schermelleh-Engel et al., 2003; Weston & Gore, 2006). A final re-specified model was presented (Figure 1).

The statistical analyses were performed using IBM® SPSS® Statistics 25.0.0.2. The path analysis was tested with IBM® SPSS® Amos™ 27.0.

3 | Results

No multivariate and univariate outliers were found. The coefficients of Sk varied between .57 (ED-15, compensatory behaviors) and -.35 (UPPS-P, negative urgency), and the coefficients of Ku varied between .59 (DERS, clarity) and -1.30 (DERS, nonacceptance), demonstrating the absence of severe deviations to a normal response distribution.

3.1 | Descriptive statistics and reliability of the measures in study

The means, standard deviations, range, and Cronbach's alpha coefficients for all variables are presented in table 1. Regarding the nature of compensatory behaviors used by the participants in this sample (the presence of self-induced vomiting, laxative misuse, eating restraint and excessive exercise), 35% (*n* = 36) reported the absence of compensatory methods during the previous week, 26.2% (*n* = 27) reported the presence of one compensatory behavior, 21.4% (*n* = 22) reported two

compensatory behaviors, 13.6% (*n* = 14), reported the presence of three compensatory behaviors, and 3.9% (*n* = 4) reported having used four distinct compensatory behaviors during the previous week.

3.2 | Associations between the variables in study

Table 2 presents Pearson's (*r*) correlation coefficients between the variables. Overall, all the variables showed a significant medium to large positive magnitude of correlation with each other. The reassured self (subscale of the FSCRS) was negatively associated with the remaining variables. No significant associations were found between Awareness (subscale of the DERS) and the variables of interest. A significant association between BMI and negative urgency was found (r = .32). Age revealed significant and small magnitudes of correlation with self-reassurance (r = .22), experiential avoidance (r = .24), and negative urgency (r = .25).

3.3 | Path analysis

A multiple linear regression was calculated to predict participant's emotion regulation difficulties (DERS) based on weight and shape concerns (ED-15_WSC), compensatory behaviors (ED-15), self-criticism (FSCRS), experiential avoidance (AAQ-II), and negative urgency (UPPS-P). A significant regression equation was found (F (5, 96) = 53.95, p < .001), with an R^2 = .74. The overall model revealed that self-criticism, b = .22, t(96) = 2.26, p = .026, and negative urgency, b = .58, t(96) = 8.06, p < .001, were significant predictors of difficulties in emotion regulation, while weight and shape concerns, b = -.01, t(96) = -0.18, p = .858, compensatory behaviors, b = -.01, t(96) = -0.74, p = .941, and experiential avoidance, b = .17, t(96) = 1.78, p = .079, were not.

The first model calculated according to the study's hypothesis (Supplementary figure 1) resulted in an inadequate fit to the data (SRMR = .11; RMSEA = .20 [.17, .23], PCLOSE = .000; TLI = .72; IFI = .81; GFI = .71), with non-significant paths between the Awareness subscale and remaining variables. After that, a model examining 43 parameters was tested, in which direct effects between

all the exogenous and the endogenous variables were considered (SRMR = .08; RMSEA = .31 [.26, .36], PCLOSE = .000; TLI = .42; IFI = .85; GFI = .77). After removing non-significant paths and allowing items residuals' covariances, a re-specified model with 35 parameters was run, revealing an adequate fit to the data (SRMR = .05; RMSEA = .07 [.00, .12], PCLOSE = .269; TLI = .97; IFI = .99; GFI = .95). The χ^2 difference test was significant ($p < .01$), indicating statistical superiority of the re-specified model. The final model, aligned with the study's hypothesis, accounted for a final variance of 71% for Strategies, 57% for Nonacceptance, 62% for Impulses, 56% for Goals, and 20% for Clarity. Figure 1 displays the statistical diagram of the final model, with standardized regression weights and square multiple correlations (R^2). Standardized and unstandardized regression coefficients, and bias-corrected confidence intervals are available in Supplementary information.

(Insert figure 1 around here)

4 | Discussion

This study, conducted in a transdiagnostic ED sample, presented a model examining the mediation role of self-criticism, experiential avoidance and negative urgency in the relationship between ED-related symptoms and difficulties in emotion regulation.

In agreement with previous studies' results (e.g., Brockmeyer et al., 2014; Castilho, 2011; Fennig et al., 2008; Lavender & Anderson, 2010; Mallorquí-Bagué et al., 2020; Werner & Gross, 2010; Wolz et al., 2015), the variables in study were significantly associated.

In the path analysis, higher levels of ED-related symptoms (weight and shape concerns and compensatory behaviors) were associated to greater self-criticism which, in turn, had a direct effect on Strategies and Nonacceptance, and an indirect effect on the remaining dimensions of emotion regulation. Pinto-Gouveia and colleagues (2014) previously discussed, under the light of the evolutionary model (e.g., Gilbert, 2000), the central role of pursuing thinness and engaging in compensatory behaviors as a result of criticism towards one's personal attributes, and subsequent attempts to avoid feelings of inferiority and rejection from others. In its turn, relying on social ranking-focused strategies (e.g., compensatory behaviors) is ineffective in generating a sense of

safeness and acceptance, rather backfiring into increased self-criticism (Gilbert et al., 2009), which may explain the positive association between ED-related symptoms and self-criticism. In the path analysis, higher levels of self-criticism were significantly associated to increased experiential avoidance, negative urgency, and overall difficulties in emotion regulation. These results are aligned with previous findings (e.g., Castilho, 2011; Moroz & Dunkley; 2015; 2019), suggesting that individuals prone to a critical/hostile self-to-self relation, may reveal increased levels of experiential avoidance and emotion-driven behaviors, as maladaptive coping strategies (Gilbert & Procter, 2006), which may reinforce long-term emotion dysregulation. Present results are aligned with this rational, inasmuch experiential avoidance levels were positively associated to Strategies, Impulse and Goals, and higher levels of negative urgency were related to increased difficulties in emotion regulation in all dimensions. Notably, a covariance between experiential avoidance and negative urgency's residuals was allowed to improve the model fit. It is hypothesized that both variables may share functional commonalities as maladaptive attempts to suppress the aversive experience of self-criticism. These results seem to be consistent with theoretical underpinnings conceptualizing both emotional avoidance strategies and emotion-driven behaviors as attempts to escape intense emotional experiences (Barlow et al., 2011). However, in the long run, emotional avoidance and emotion-driven strategies leave little opportunity for one to become aware, identify and tolerate challenging emotional states, which may explain the positive contribution of experiential avoidance and negative urgency to difficulties in emotion regulation.

Clinical implications

This study's results point to the potential of targeting self-criticism, emotion-avoidance strategies and emotion-driven behaviors to improve emotion regulation skills in ED-diagnosed patients. In line, Agüera and colleagues (2012; 2019) emphasized the relevance of fostering emotion regulation skills in ED patients with specific adjuvant components. This may be informed through the comprehensive assessment of relevant psychological processes (e.g., Schaefer et al., 2021). According to Gilbert and Procter (2006), interventions specifically focused in fostering self-

compassionate regulatory skills (such as the compassionate mind training; CMT) may be useful with clients with high levels of self-criticism, which has been reinforced by Goss and Allan (2014) in respect to ED patients. Accordingly, Steindl and colleagues (2017) provided specific recommendations for the incorporation of Compassion-focused therapy components in ED treatment. Neff and Tirch (2013) previously highlighted the crosswise usefulness of self-compassion training to promote psychological flexibility (e.g., experiential acceptance). Likewise, bringing therapeutic focus to the experiential practice and training of compassion, acceptance and emotion-based strategies, may constitute effective top-down pathways to target difficulties in emotion regulation.

Limitations and future studies

Limitations must be considered in the interpretation of the present study's results. First, this study's cross-sectional design prevents causality inference. Longitudinal studies are needed to understand reciprocal relationships between the variables. Second, this study was based on a clinical sample constituted by women with a wide age range, diagnosed with an ED. Although the wide age range and the transdiagnostic nature of the sample poses a strength due to its inclusiveness, studies on larger clinical samples would allow testing the models' invariance across ED diagnoses, age and gender, as well as running path analysis with latent variables, preventing potential attenuation or inflation effects. Additionally, although beyond the scope of this study, the validity of the measures' factorial structure in this specific sample was not confirmed through factor analysis. Finally, despite the theoretical and empirical background supporting the choice of variables, the complex interaction between ED-related symptoms and difficulties in emotion regulation cannot be entirely captured in this path analysis, and future studies are necessary to explore further maladaptive and adaptive processes relevant for ED.

Conclusion

Results suggest that self-criticism, experiential avoidance and negative urgency, combined, are relevant to understand the relationship between ED-related symptoms and difficulties in emotion

regulation. ED treatment and emotion regulation skills may be enhanced through the inclusion of specific adjunctive components to the therapeutic process, that target self-criticism, experiential avoidance and negative urgency, as they become prominent during the therapeutic process.

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Table 1. Descriptive statistics and reliability of the variables in study

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Measures	*M (SD)*	Min-Max	α
ED-15			
WSC	3.1 (2.0)	0 - 6	.93
EC	3.3 (1.6)	0 - 6	.79
Total score	3.2 (1.7)	0 - 6	.93
DERS			
Strategies	22.7 (8.4)	8 - 40	.87
Nonacceptance	17.5 (7.8)	6 - 30	.94
Impulse	16.2 (6.2)	6 - 28	.82
Goals	15.9 (5.3)	5 - 25	.80
Clarity	13.2 (3.6)	5 - 25	.47
Awareness	18.3 (5.6)	6 - 29	.81
Total score	103.8 (28.5)	31 - 139	.95
AAQ-II			
Total score	30.0 (13.1)	7 - 49	.96
FSCRS			
Reassured self	12.7 (7.7)	0 - 29	.90
Self-criticism	28.7 (14.4)	0 - 56	.93
UPPS-P			
Negative urgency	32.8 (7.8)	13 - 48	.91

Note. N = 103. ED-15 – Eating Disorder-15; WSC – Weight and shape concerns; EC – Eating concerns; DERS – Difficulties in Emotion Regulation Scale; AAQ-II – Acceptance and Action Questionnaire-II; FSCRS – Forms of Self-Criticizing/Attacking and Self-Reassuring Scale; UPPS-P – Impulsive Behavior Scale.

Table 2. Pearson's (*r*) correlation coefficients between the variables in study

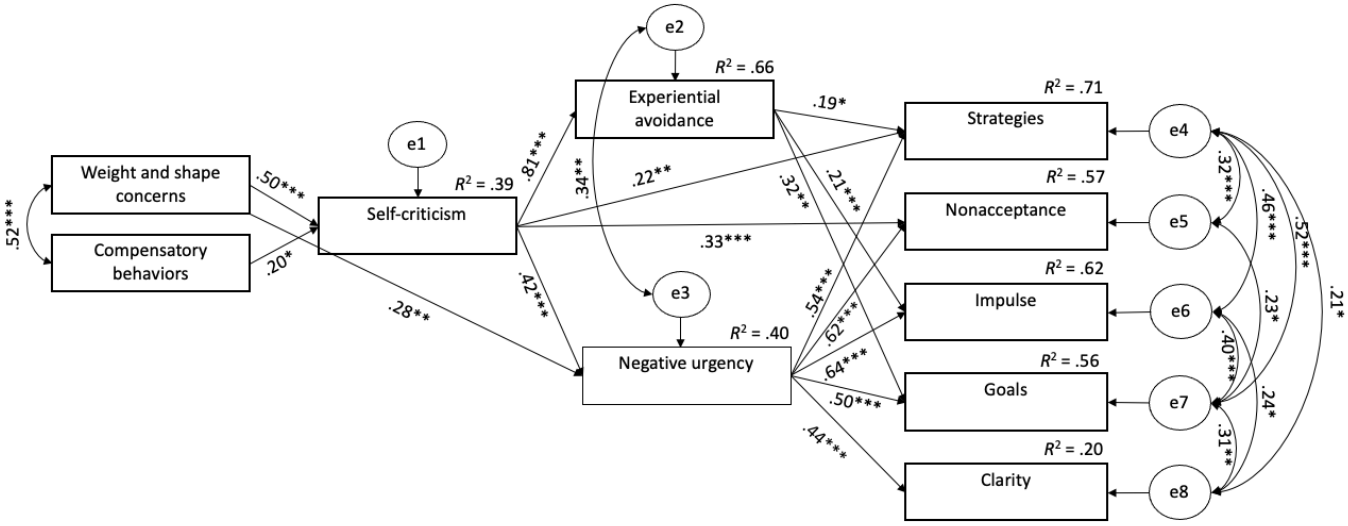
Table 2. Pearson's (*r*) correlation coefficients between the variables in study

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. ED-15_WSC	—													
2. ED-15_EC	.74 **	—												
3. ED-15_Total score	.97 **	.89 **	—											
4. ED-15_ CB	.52 **	.62 **	.59 **	—										
5. FSCRS_Reassured self	-.53 **	-.36 **	-.50 **	-.33 **	—									
6. FSCRS_Self-criticism	.61 **	.51 **	.62 **	.46 **	-.68 **	—								
7. AAQ-II_Total score	.55 **	.39 **	.52 **	.33 **	-.61 **	.81 **	—							
8. UPPS-P_Negative urgency	.55 **	.45 **	.55 **	.37 **	-.44 **	.58 **	.64 **	—						
9. DERS_Strategies	.53 **	.50 **	.55 **	.33 **	-.53 **	.70 **	.72 **	.78 **	—					
10. DERS_Nonacceptance	.53 **	.46 **	.54 **	.34 **	-.45 **	.64 **	.60 **	.71 **	.78 **	—				
11. DERS_Impulse	.38 **	.34 **	.39 **	.33 **	-.33 **	.55 **	.64 **	.77 **	.82 **	.66 **	—			
12. DERS_Goals	.44 **	.37 **	.44 **	.30 *	-.42 **	.61 **	.66 **	.69 **	.82 **	.70 **	.76 **	—		
13. DERS_Clarity	.41 **	.32 *	.40 **	.28 *	-.38 **	.42 **	.41 **	.44 **	.53 **	.47 **	.50 **	.55 **	—	
14. DERS_Awareness	-.05	-.03	-.05	-.03	.10	-.07	-.11	-.12	-.01	.00	.06	.05	.33 **	—
15. DERS_total score	.51 **	.45 **	.52 **	.35 **	-.46 **	.66 **	.67 **	.76 **	.91 **	.84 **	.87 **	.87 **	.69 **	.26 *

Note. N = 103. ED-15 – Eating Disorder-15; WSC – Weight and shape concerns; EC – Eating concerns; CB – Compensatory behaviors; FSCRS – Forms of Self-Criticizing/Attacking and Self-Reassuring Scale; AAQ-II – Acceptance and Action Questionnaire-II; UPPS-P – Impulsive Behavior Scale; DERS – Difficulties in Emotion Regulation Scale.

* $p < .01$, ** $p < .001$

Figure 1. A statistical diagram of the path model for the association between weight and shape concerns and compensatory behaviors, and dimensions of difficulties in emotion regulation, mediated by self-criticism, experiential avoidance and negative urgency (N = 103). Non-significant relationships are not displayed. * $p < .05$, ** $p < .01$, *** $p < .001$



Supplementary Figure 1. Conceptual diagram of the model for the path analysis with hypothesized relationships.