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## Personality traits and eating disorders: Mediating effects of self-esteem and perfectionism<sup>1</sup>

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**ABSTRACT.** The purpose of this *ex post facto* study has been to test a structural model of the mediating roles of self-esteem and perfectionism in the relationship between personality traits and eating disorders (ED). The sample consisted of 155 women (from 18 to 31 years). Ninety three met the DSM-IV diagnostic criteria for some type of ED, 31 women formed the symptomatic group, with high risk of ED, and 31 women, the non-symptomatic group, without known pathology or alteration of eating behaviours. The instruments used were the MCMI-II, EDI-2, EAT-40 and BSQ. Data analysis was conducted using structural equation modelling by means of LISREL 8.71. The estimated model fit satisfactorily. The results confirm the relationship between schizoid, paranoid, self-destructive and borderline personality traits with ED, the role of self-esteem as the main mediating variable in the effect exerted by certain personality traits in ED, and perfectionism as a mediating variable of the effect of borderline personality traits on ED and self-esteem.

**KEY WORDS.** Personality traits. Eating disorders. Self-esteem. Perfectionism. *Ex post facto* study.

**RESUMEN.** El objetivo de este estudio *ex post facto* ha sido poner a prueba un modelo estructural sobre el papel mediador de la autoestima y el perfeccionismo en la relación entre los rasgos de personalidad y los trastornos de la conducta alimentaria (TCA). La muestra estuvo compuesta por 155 mujeres (18 a 31 años): 93 cumplían criterios diagnósticos DSM-IV para alguno de los tipos de TCA, 31 formaron el grupo sintomático, con alto riesgo de padecer un TCA y 31, grupo no sintomático, no presentaban patología conocida

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y sin alteraciones de la conducta alimentaria. Los instrumentos de evaluación utilizados fueron el MCMI-II, EDI-2, EAT-40 y BSQ. Para el análisis de los datos se utilizó el método de estimación de máxima verosimilitud mediante el programa LISREL 8.71. El modelo estimado se ajustó satisfactoriamente. Los resultados confirman la relación de los rasgos de personalidad esquizoide, paranoide, autodestructiva y límite con los TCA, el papel de la autoestima como principal variable mediadora en el efecto ejercido por ciertos rasgos de personalidad sobre los TCA y del perfeccionismo como variable mediadora del efecto del rasgo de personalidad límite sobre dichos trastornos y sobre la autoestima.

**PALABRAS CLAVE.** Rasgos de personalidad. Trastornos de la conducta alimentaria. Autoestima. Perfeccionismo. Estudio *ex post facto*.

Observations made in clinical environments as well as during the course of empirical research suggest a close relationship between personality disorders and eating disorders (ED) (Del Río, Torres, and Borda, 2002; Marañón, Echeburúa, and Grijalvo, 2007; Martín, Cangas, Pozo, Martínez, and López, 2009). A study by Sansone, Levitt, and Sansone (2005) presented a review of empirical studies that demonstrated the presence of personality disorders among people with some type of ED. Specifically, women suffering from anorexia nervosa, restricting subtype, were most frequently obsessive-compulsive, with rates ranging from 10% (Herzog, Keller, Lavory, Kenny, and Sacks, 1992) to 46% (Lilenfeld, Wonderlich, Riso, Crosby, and Mitchell, 2006) across different studies with samples of about 30 patients. Conversely, patients who are characterized by more impulsive behaviors, such as bulimia nervosa or binge-eating disorder, tend to more frequently present with personality disorders like borderline personality disorder (Zanarini, Reichman, Frankenburg, Bradford, and Fitzmaurice, 2010). This has been affirmed by the findings of several different studies, with rates ranging from 12% in a study by Herzog *et al.* (1992) with a sample of 88 women, to 37% and 43% in study by Van Hanswijck de Jounge, Van Furth, Lacey, and Waller (2003), which had samples of roughly 30 - 40 patients with purging behaviors, and 45.2% in a study conducted in Spain by Torres, Del Río, and Borda (2008), with a sample of 31 patients with purging bulimia nervosa.

The growing interest in studying the relationship between ED and personality traits stems, primarily, from the fact that in explanatory models of ED, personality variables have been included as predisposing or risk factors and/or traits that maintain those factors (Vitousek and Manke, 1994).

Several studies have reported that people with ED exhibit characteristics such as a high level of perfectionism, low self-esteem, obsession, rigidity, and dissatisfaction with their bodies, among others (Borda, Torres, and Del Río, 2008; Franco-Paredes, Mancilla-Díaz, Peck, and Lightsey, 2008). On the subject of body dissatisfaction, recent research studies have focused on the question of what are the determining factors of altered body image among young women (Wilcox and Laird, 2000; Zaitsoff, Fehon, and Grilo, 2009), since these may be the origin of the development of ED.

Among the variables studied, low self-esteem has been repeatedly considered a factor of relevance to vulnerability to developing and maintaining these disorders (Fairburn, Cooper, Doll, and Welch, 1999; Shea and Pritchard, 2007). Along that vein, in Spain, Gual *et al.* (2002), in a sample of 2,862 participants between the ages of 12 and 21 years old, reported a prevalence of elevated scores on the EAT-40 (Garner and Garfinkel, 1979) of 20.8% for participants that exhibited low self-esteem.

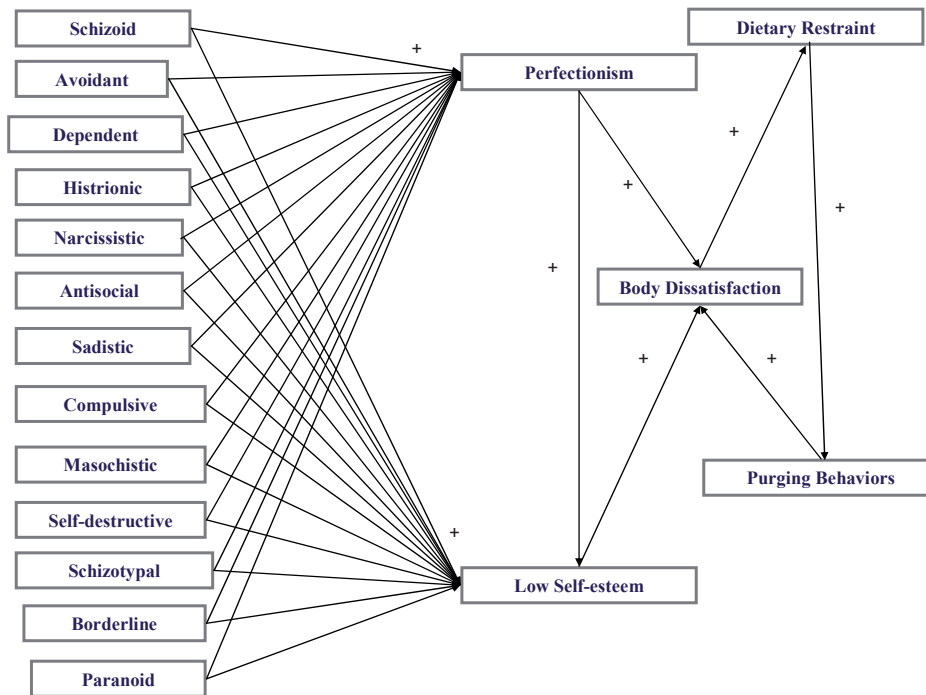
As for perfectionism, several studies have asserted it plays an important role in the development of ED (Bardone-Conea *et al.*, 2007). In the case of anorexia nervosa (AN), a perfectionist personality is a contributing factor to maintaining restrictive eating and thus, maintaining a low weight (Fairburn, Shafran, and Cooper, 1999). Similarly, Stice (2002), in his meta-analysis review, suggested that perfectionism may be a risk factor for symptoms of bulimia and a maintaining factor for eating pathology in general. Furthermore, multiple studies have posited that it may interact with other risk factors, acting as a predisposing or maintaining factor of eating pathology (Vohs *et al.*, 2001). They have concluded that perfectionism may become a predisposing personality trait, a risk factor for the development of ED (Lilenfield *et al.*, 2006).

Finally, in their study about perfectionism and self-esteem in the context of ED, Peck and Lightsey (2008) found support for the continuum model of ED proposed within the body of literature. They found that high levels of perfectionism and low self-esteem, together with the EDI-2 scales of ineffectiveness, body dissatisfaction, and interoceptive awareness, were able to differentiate between three different groups of eating pathology (non-symptomatic women, symptomatic women and women with ED) in terms of their severity. Nevertheless, they suggest that other factors may be involved in developing symptoms of ED (Petrie, Greenleaf, Reel, and Carter, 2009). Along this line, Dunkley and Grilo's (2007) work stands out. They used

structural equation modeling (SEM) to support the relation between perfectionism (identifying two dimensions of perfectionism, personal standards and self-critical evaluative concerns), low self-esteem, depressive symptoms and over-evaluation of shape and weight. They believed self-criticism is linked to the three variables in ED. They support that low self-esteem in an important mediational role that explains the relation between evaluative concerns perfectionism and depressive symptoms, of which self-criticism is a primary indicator (Dunkley, Blankstein, Masheb, and Grilo, 2006).

The objective of the present *ex post facto study* (Montero and León, 2007) was to test a theoretical structural model proposed by the authors of the mediating effects of self-esteem and perfectionism on the influence of personality traits, as studied by Millon (1998), on ED (see Figure 1). This model was created with consideration to the contributions of authors such as Bardone-Conea *et al.* (2007), Franco-Paredes *et al.* (2008), Gual *et al.* (2002), Peck and Lightsey (2008), and especially Dunkley and Grilo (2007).

As Figure 1 conveys, in the proposed model self-esteem and perfectionism would exercise a mediating role in the relationship between personality traits and the presence of body dissatisfaction, dietary restraint and purging behaviors. That is, possessing certain personality traits will influence the appearance and maintenance of ED indirectly, specifically; traits that reflect difficulty at the level of personal functioning and that involve intrapsychic conflicts and/or structural deficits. According to the proposed model, personality traits could affect directly and positively the levels of self-esteem and perfectionism. Therefore, the higher the scores on personality traits the higher the perfectionism, and the higher the scores of low self-esteem. On the other hand, both being a perfectionist and having low self-esteem would affect body dissatisfaction in two different ways. First, directly and positively; that is, the greater the perfectionism and levels of low self-esteem, the greater the body dissatisfaction. Second, indirectly, by creating a loop with the variables dietary restraint and purging behaviors. In other words, the greater the perfectionism and low self-esteem, the greater the body dissatisfaction; the greater the body dissatisfaction, the greater the dietary restraint; the greater the dietary restraint, the greater the number of purging behaviors; and the greater the number of purging behaviors, the greater the body dissatisfaction.



**FIGURE 1.** Proposed theoretical model of mediating effects of self-esteem and perfectionism in the relation between personality traits and eating disorders.

While conducting this study, the recommendations of Ramos-Álvarez, Moreno-Fernández, Valdés-Conroy, and Catena (2008) were taken into account.

## Method

### *Participants*

One hundred fifty-five women participated in the study, ranging in age from 18 to 31 years old ( $M = 22.89$ ,  $SD = 3.65$ ), of whom 93 met the diagnostic criteria for some type of ED according to the DSM-IV-TR (American Psychiatric Association, 2000): anorexia nervosa restricting subtype (ANr) ( $M = 22.23$ ,  $SD = 3.48$ ), anorexia nervosa purging subtype (ANp) ( $M =$

23.29,  $SD = 4.03$ ), and bulimia nervosa purging subtype (BNp) ( $M = 23.16$ ,  $SD = 3.45$ ).

Of the remaining 62 participants, 31 women were at high-risk of suffering from ED ( $M = 22.48$ ,  $SD = 3.72$ ), and exhibited its typical symptoms (scores on the EAT  $\geq 30$  points and on the BSQ  $> 104$ ) (mean EAT = 40.87 and mean BSQ = 132.48). Last, the other 31 were non-symptomatic ( $M = 22.61$ ,  $SD = 3.44$ ), or in other words, had no known pathology or alterations in eating behavior (scores on the EAT  $< 30$  points and on the BSQ  $\leq 104$ ) (mean EAT = 8.42 and mean BSQ = 61.26).

### Measures

The following tests were administered to the entire sample:

- Eating Attitudes Test (EAT-40) (Garner and Garfinkel, 1979). A version adapted by Castro, Toro, Salamero, and Guimerá (1991) was employed. This instrument evaluates behaviors and attitudes toward food, weight and exercise that are characteristic of AN. It is comprised of 40 items. Each item presents six response options (on a Likert-type scale) ranging from “*always*” to “*never*” and the authors obtained a global coefficient of validity of .61 ( $p < .001$ ). For the cut-off point of 30, a sensitivity of 67.9% and a specificity of 85.9% were obtained. The alpha coefficient of reliability for the AN group was .92. The authors performed a factor analysis, allowing three factors to be extracted, explaining 41% of the variance. They were the following: Factor I: *Diet and worries about eating*; Factor II: *Perceived social pressure and distress about eating*, and Factor III: *Psychobiological disorder*. The items that evaluate Factor I (range: 0-78) were used. This factor is highly stable and has adequate internal consistency. For the measurement and structural models, *Diet and worries about eating* was modeled as indicators of the dietary restraint latent factor.
- The Body Shape Questionnaire (BSQ) by Cooper, Taylor, Cooper, and Fairburn (1987) was utilized, a version adapted by Raich *et al.* (1996). This instrument evaluates the dissatisfaction produced by one’s own body. It consists of 34 items. Each item includes six response options (on a Likert scale) that range from “*never*” to “*always*.” The Spanish version has shown good internal consistency (Cronbach’s alpha = .97) and concurrent validity (Raich *et al.*, 1996). 105 points is considered the cut-off point. In the first study of the BSQ to be conducted in a

Spanish population, Raich, Deus, Muñoz, Pérez, and Requena (1991) found three factors that together explained 56.6% of the total variance: Factor 1: *Worrying about one's figure and feeling "fat"* explained 26.65% of the total variance. Factor 2: *Self-devaluation upon comparing one's own figure to that of others* explained 17.58% of total variance. Factor 3: *Behaviors concurrent with body shape dissatisfaction* explained 12.46% of the total variance. The total score on the instrument (range: 34-204) as well as scores on Factor 3 (range: 5-30) were employed. The total BSQ was used as a global measure of body shape dissatisfaction and the behavior concurrent with body shape dissatisfaction-items served as an indicator of the latent factor of purging behaviors.

- The Eating Disorders Inventory (EDI-2) by Garner, Olmsted, and Polivy (1983) was included, in a version validated for a Spanish sample by Corral, González, Pereña, and Seisdedos (1998). It evaluates the symptoms that normally accompany AN and BN. It is comprised of 91 elements. Each item presents six response options (on a Likert-type scale) that go from “never” to “always.” It provides scores on 11 scales that are clinically relevant to ED: *Drive for Thinness (DT)*, *Bulimia (B)*, *Body Dissatisfaction (BD)*, *Ineffectiveness-Low Self-Esteem (I)*, *Perfectionism (P)*, *Interpersonal Distrust (ID)*, *Interoceptive Awareness (IA)*, *Maturity Fears (MF)*, *Asceticism (A)*, *Impulse Regulation (IR)*, and *Social Insecurity (SI)*). With respect to reliability, the coefficients obtained varied between the scales from .80 to .92. The scales of ineffectiveness-low self-esteem (range: 0-30) and perfectionism (range: 0-18) were utilized. These two scales served as indicators of the low-esteem and perfectionism factors in the measurement and structural model.
- Millon's Clinical Multiaxial Inventory (MCMI-II) was employed, a version adapted to a Spanish population (Ávila, 2002; Millon, 1998). It consists of 175 items with a dichotomous response format (*true/false*). It evaluates different aspects of personality according to the DSM-III-R on 13 scales: 10 basic scales: *Schizoid*, *Phobic*, *Dependent*, *Histrionic*, *Narcissistic*, *Antisocial*, *Aggressive-sadistic*, *Compulsive*, *Passive-aggressive*, and *Self-destructive/masochistic*, and 3 scales of pathological personality: *Schizotypal*, *Borderline* and *Paranoid*. All of the inventory's scales reflect, to varying degrees, both “traits” and



“states.” With respect to reliability, the coefficients obtained varied between the scales from .70 to .90. The basic scales were utilized.

### Procedure

When selecting the sample, were controlled for sociodemographic variables in the interest of making all groups equal in terms of variables such as sex (constant), age (18-31), academic level, civil status and socioeconomic status. It started with two variables - age and level of education - in the group of women with pathology so that the other two groups would be equivalent to the first (see Table 1).

**TABLE 1.** Demographic characteristics of the sample ( $N = 155$ ).

	ANr <i>n</i> = 31		ANp <i>n</i> = 31		BNp <i>n</i> = 31		SG <i>n</i> = 31		NSG <i>n</i> = 31	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Age (range: 18-31)	22.23	(3.48)	23.29	(4.03)	23.16	(3.45)	22.48	(3.72)	22.61	(3.44)
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Marital status										
Married	2	(6.5)	2	(6.5)	1	(3.2)	1	(3.2)	2	(6.5)
Single	29	(93.5)	29	(93.5)	30	(96.8)	30	(96.8)	29	(93.5)
Academic level										
High school	5	(16.1)	5	(16.1)	6	(19.4)	6	(19.4)	6	(19.4)
Professional Training	5	(16.1)	6	(19.4)	6	(19.4)	6	(19.4)	5	(16.1)
University Education	21	(67.8)	20	(64.5)	19	(61.3)	19	(61.3)	20	(64.5)
Socio-economic level										
Low	7	(22.5)	5	(16.2)	9	(29)	9	(29)	8	(25.8)
Medium	14	(45.2)	13	(41.9)	13	(42)	13	(42)	12	(38.7)
High	10	(32.3)	13	(41.9)	9	(29)	9	(29)	11	(35.5)

*Note.* ANr: Restrictive anorexia nervosa; ANp: With purging/bulimic anorexia nervosa; BNp: With purging bulimia nervosa; SG: Symptomatic Group; NSG: Non-symptomatic group.

The 93 participants with ED had come to the Seville chapter of the Association in Defense of Attention to Anorexia Nervosa and Bulimia Nervosa (ADANER) seeking psychological treatment. They had experienced ED over the course of more than two years.

Symptomatic and non-symptomatic participants were collected through a stratified cluster sampling technique and using tables of random numbers or randomized digits. They were chosen from educational centers (trade schools, high schools and the Psychology Faculty), as well as from gyms in three districts of Seville.



All instruments were administered in accordance with the rules of applying and correcting them recommended by their respective authors. Prior to participation, participants signed the Protocol for Informed Consent, following Del Río's (2005) recommendations.

#### *Data analysis*

Before creating an estimated model, a correlational analysis was performed between the variables. The objective was to eliminate any independent variables whose correlation was greater than .7 in absolute value, thus eliminating problems of multicollinearity and improving the ratio between the number of variables and the sample size. In addition, some variables were eliminated from the analysis because of their low correlation with the dependent variables ( $r < .2$ ).

To estimate and diagnose the proposed model of structural equations, the LISREL 8.71 program was applied. The method of estimation used was that of maximum likelihood. Though this method requires a multivariate normal distribution, it is also quite robust when that condition is not met (Schemelleh-Engel, Moosbrugger, and Müller, 2003).

To perform the analysis, the "Model Development Strategy" (Jöreskog and Sörbom, 1993) was used. An initial, hypothetical model was proposed, stemming from the different theoretical contributions made by researchers on the subject. It was then successively modified based on indices of modification and on the significance of estimated coefficients. Any direct effects that were not significant were eliminated.

## **Results**

#### *Preliminary descriptive analysis*

Table 2 displays the means, standard deviations and correlations between the variables in the study's estimated model. As anticipated, low self-esteem and perfectionism were found to be positively correlated with borderline and self-destructive traits. Additionally, the schizoid characteristic was significantly related to low self-esteem and the paranoid trait was significantly related to perfectionism. Finally, both were positively correlated with body dissatisfaction, dietary restraint and the presence of purging behaviors.

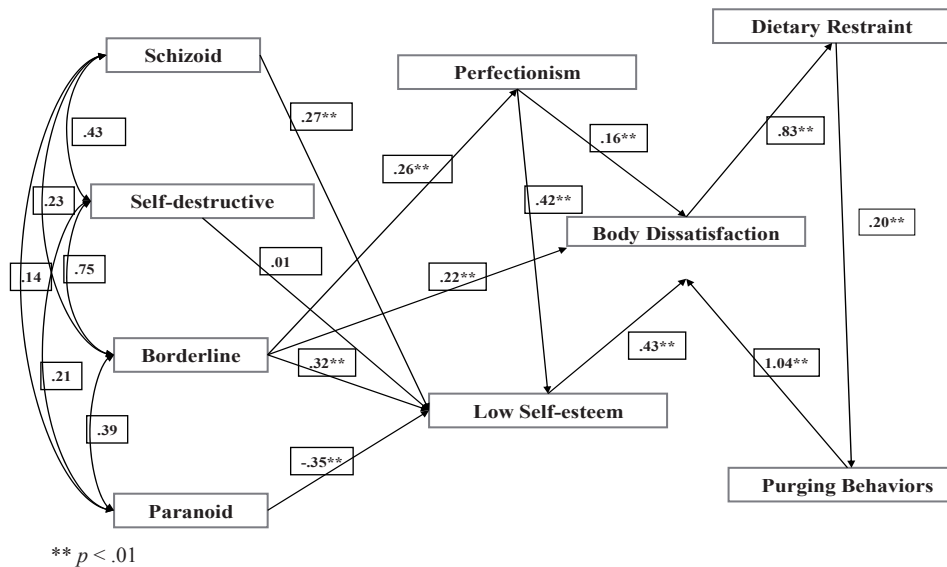
**TABLE 2.** Descriptive statistics and correlations between variables (N = 155).

	M	SD	LSE	Pe	BD	DR	PB	B	S	SD
Pe	5.43	(4.60)	.47**							
BD	129.43	(41.13)	.59**	.42**						
DR	32.44	(17.79)	.54**	.39**	.85**					
PB	14.97	(6.80)	.58**	.41**	.87**	.69**				
B	65.67	(21.69)	.37**	.26**	.42**	.36**	.39**			
S	64.54	(27.26)	.35**	.09	.28**	.23**	.29**	.23**		
SD	63.30	(25.18)	.38**	.17*	.36**	.28**	.34**	.75**	.43**	
Pa	63.18	(24.15)	-.10	.18*	.03	.06	-.06	.39**	.14	.21*

Note. LSE: Low self-esteem; Pe: Perfectionism; BD: Body dissatisfaction; DR: Dietary restraint; PB: Purging behaviors; B: Borderline; S: Schizoid; SD: Self-destructive; Pa: Paranoid.  
 \*\*  $p < .01$  \*  $p < .05$ .

*Model of mediation*

According to the strategy employed, the estimated model’s fit to the data was rather satisfactory (see Figure 2), as shown by the measures of goodness of fit included in Table 3 (see Table 3). The error terms were excluded from the figure although they were in fact estimated. Also, the measurement model was not included in the analysis because the ratio of number of participants to number of variables required would have been very small.



**FIGURE 2.** Structural model of self-esteem and perfectionism’s mediating effects in the relation between personality traits and eating disorders.

**TABLE 3.** Goodness of Fit Measures for the Structural Model.

Goodness of Fit Measures	<i>Absolute Fit Measures</i>			<i>Incremental Fit Measures</i>			
	MFF Ji-squared	Ji-squared	RMSEA	NFI	NNFI	CFI	IFI
Values collected	19.58 ( <i>p</i> = .42; <i>g.l.</i> = 19)	17.59 ( <i>p</i> = .55; <i>g.l.</i> = 19)	.0000 ( <i>p</i> = .86; <i>g.l.</i> = 19)	.98	1	1	1
Recommended values			< .08	> .90	> .90	Approx 1	Approx 1

*Note.* MFF: Minimum Fit Function; RMSEA: Root Mean Square Residual; NFI: Normed Fit Index; NNFI: Non-Normed Fit Index; CFI: Comparative Fit Index; IFI: Incremental Fit Index.

On another note, the proportion of explained variance for each of the dependent variables in the study exceeds or is close to, in most cases, 25% (see Table 4), so at the individual level, the effect size may be considered acceptable.

**TABLE 4.** Proportion of explained for the dependent variables in the Structural Measurement Model.

<i>Variables</i>	<i>Low Self-esteem</i>	<i>Perfectionism</i>	<i>Body Dissatisfaction</i>	<i>Dietary Restraint</i>	<i>Purging Behaviors</i>
Explained Variance	53%	93%	58%	31%	22%

Generally, it may be said that the majority of the proposed relationships in the theoretical model are confirmed in the estimated model (see Figure 2). Nevertheless, some direct relationships that were not found to be significant ( $p \geq .05$ ;  $|t| < 2$ ) were eliminated. Thus, the direct effects of schizoid, self-destructive and paranoid characteristics on perfectionism were not confirmed. The phobic, dependent, histrionic, narcissistic, antisocial, aggressive-sadistic, compulsive, passive-aggressive and schizotypal traits were eliminated as well. Also take note that the estimated model includes a new relationship not hypothesized in the theoretical one, between the variables borderline personality and body dissatisfaction.

As expected, these personality traits were directly and positively related to low self-esteem, except for the paranoid one which, contrary to what was hypothesized in the initial model, influences levels of low self-esteem directly and negatively. That is to say, the greater the paranoia, the lower the

level of low self-esteem, or in other words, the higher the self-esteem. Conversely, only the borderline personality trait affected levels of perfectionism directly and positively. Similarly, as commented upon earlier, that trait also directly influenced levels of body dissatisfaction, in view of the estimated model.

According to the initial model low, self-esteem is related directly and positively only with the variable body dissatisfaction, indirectly affecting, by means of the latter, the variables dietary restraint and purging behaviors. Also consider that perfectionism directly, positively affects body dissatisfaction as well as levels of self-esteem. In this way, it indirectly affects dietary restraint and purging behaviors in two ways. First, the effect is mediated by body dissatisfaction and second, through self-esteem and body dissatisfaction.

Therefore, in addition to self-esteem and perfectionism, the variable body dissatisfaction is significantly and positively related to dietary restraint and purging behaviors. In support of the hypotheses about dietary restraint, body dissatisfaction was found to have a direct relationship, while its effect over purging behaviors is indirect because it is mediated by dietary restraint.

Additionally, it is worth mentioning that purging behaviors directly and positively affect levels of body dissatisfaction, producing an effect in the shape of a loop: greater body dissatisfaction leads to greater dietary restraint; more dietary restraint leads to more purging behaviors; and more purging behaviors lead to greater body dissatisfaction (see Figure 2).

With respect to the statistical significance of the direct effects, note that they all exhibited a high level of significance ( $p < .01$ ) except for the direct effect of the self-destructive personality trait on perfectionism, which was not found to be significant ( $t = .13$ ). The results highlight the direct effects of schizoid and paranoid personality traits on low self-esteem ( $t = 4.02$ ;  $t = -5.29$ , respectively), the effect of self-esteem on body dissatisfaction ( $t = 5.80$ ), of perfectionism on low self-esteem ( $t = 6.90$ ), and of body dissatisfaction on dietary restraint ( $t = 18.15$ ) and purging behaviors ( $t = 15.06$ ).

Similarly, in light of the values presented in Table 5 of standardized indirect effects, it is apparent that the indirect effects with the greatest statistical significance were the borderline personality trait on dietary restraint ( $t = 5.36$ ) and purging behaviors ( $t = 5.44$ ), as well as the indirect effects of borderline and paranoid personality traits on body dissatisfaction ( $t = 3.89$ ;  $t$

= -3.81, respectively). The indirect effects of the self-destructive personality trait did not achieve statistical significance.

**TABLE 5.** Matrix of Indirect Standardized Effects of the Independent Variables on the Dependent Variables.

	Borderline	Schizoid	Self-Destructive	Paranoid
Low Self-esteem	.43**	-.27**	-.01	-.35**
Perfectionism	.26**	-.-	-.-	-.-
Body Dissatisfaction	.45**	.12**	.01	-.15**
Dietary Restraint	.37**	.10**	.00	-.12**
Purging Behaviors	.39**	.10**	.01	-.13**

\*\*  $p < .01$

In light of the estimated model's (Figure 2) description of the direct effects and the indirect effects displayed in Table 5, the results confirm that self-esteem is the primary mediating variable of the relationship between personality traits and the development of ED. Similarly, perfectionism was found to be an important mediating variable of the effect of the borderline personality trait on ED and on self-esteem. Body dissatisfaction also had a mediating effect. It mediates the effect of personality traits in general, through low self-esteem, on dietary restraint eating and purging behaviors, and particularly the effect of borderline personality on dietary restraint and purging behaviors.

## Discussion

The scientific literature suggests that psychological constructs and processes play an important role in increasing ED. Perfectionism and self-esteem are among the psychological predisposing factors most frequently cited (Sassaroli and Ruggiero, 2005). On the other hand, aside from research on the comorbidity between personality disorders (Verardi, Nicastro, McQuillan, Keizer, and Rossier, 2008) and ED, scarcely any contributions have been made toward determining the specific influence of personality traits and disorders.

In the present study, the objective was to test a structural model that was created based on the contributions of various authors including, as cited abo-

ve, Bardone-Conea *et al.* (2007), Dunkley and Grilo (2007), Franco-Paredes *et al.* (2008), Gual *et al.* (2002), Peck and Lightsey (2008), and Vohs *et al.* (2001), in order to examine the effects of personality traits on ED through the mediating roles of self-esteem and perfectionism. The authors suggest that, in general, most of the relationships proposed in the theoretical model were confirmed in the estimated model. Also, the mediating effects of self-esteem and perfectionism were demonstrated, which are referenced in the scientific literature (Dunkley and Grilo, 2007; Stice, Schupak-Neuberg, Shaw, and Stein, 1994). For example, in the adjusted model low self-esteem and perfectionism appear to be mediating variables in the effects on the variables body dissatisfaction, dietary restraint and purging behaviors.

The mediating effect of self-esteem was confirmed to be the main mediator in the relationship between personality traits and the development of ED. According to the authors, women with ED pay an excessive amount of attention to the body's appearance to such an extreme that they tend to evaluate themselves overall based on body image. In other words, self-esteem as a global dimension would exist as a function of body satisfaction, and would involve continuously comparing themselves to other women and negatively filtering the messages of social interactions toward themselves (Grossbard, Lee, Neighbors, and Larimer, 2009).

As anticipated, and in support of the literature, low self-esteem is directly and positively related only with the variable body dissatisfaction, exerting through this last variable its effect on the variables dietary restraint and purging behaviors. These results are consistent with those of previous studies such as one by Peck and Lightsey (2008) in which they showed that people with lower self-esteem and greater body dissatisfaction experience more symptoms of ED. Some of these studies have emerged from an interest in determining the influence of sociocultural factors on body dissatisfaction and appearance in the general population (Agras, Bryson, and Hammer, 2007). In fact, as early as 1994, Stice *et al.* suggested that people with low self-esteem recognize trying to make themselves fit the sociocultural cannon in order to gain acceptance.

With regards to results, the existing data (Carretero, Raich, Sánchez, Ru-siñol, and Sánchez, 2009; Mendelson, McLaren, Gauvin, and Steiger, 2002) show that body image is a predictive factor of self-esteem, though they are understood as distinct constructs. These authors, who studied the relationship between self-esteem and body image in 177 women with and without

ED, found that women with ED scored lower on measures of self-esteem and body image. These results emphasize the importance of understanding the role of cognition, mostly of a negative kind, in social acceptance among these women. This demonstrates that self-esteem depends on the importance others attribute to body image, that is, on the social importance of the body. Conversely, women without ED tend to consider that internal attributions of the importance of body image are the key to self-esteem. On the other hand, Dunkley *et al.* (2006), demonstrated that the relation between self-criticism (dimension of perfectionism) and over-evaluation of shape and weight was partly mediated or explained by low self-esteem and depressive symptoms.

In support of theoretical model, consider that several studies focusing on the importance of sociocultural pressure have demonstrated that the discrepancy between reality and the “ideal of thinness” generates body dissatisfaction. That dissatisfaction becomes an important predictor of the onset of adolescent strategies geared toward losing weight (Neumark-Stzainer *et al.*, 2006), dietary restraint and purging behaviors (Dunkley, Wertheim, and Paxton, 2001).

From a cognitive model, it is suggested that people who overestimate their body weight and shape compensate for their dissatisfaction with their appearance by exercising excessive control over their diet and weight. Furthermore this perspective highlights the fact that low self-esteem is the main risk factor for the start of this type of inadequate eating behavior (Pritchard, 2010). Along those lines, results similar to those obtained in the present study were observed in a study by Ross and Wadde (2006). In an earlier study, they indicated the importance of overestimating body weight and shape as a mediating factor between low self-esteem and bulimic behaviors. In their 2006 study, using a sample of 111 female students between 18 and 25 years of age, Ross and Wadde concluded that self-esteem is the main predictor of worrying about weight and shape and that the latter variable was an important predictor of dietary restraint. Finally, along the lines of the present study, the relationship between self-esteem and both inappropriate behaviors, dietary restraint and purging behaviors, was totally mediated by worries about one’s weight and shape.

Concerning perfectionism, certain holes remain as to the specific role this variable plays in developing and maintaining ED. However, various studies have demonstrated that perfectionism may precede, maintain or be the effect of AN and that, at times, it may persist through recovery (Lilenfeld



*et al.*, 2006). With that in mind, they conclude in the review (Nilsson, Sundbom, and Hägglof, 2008) that perfectionism is not just a state associated with the active phase of illness. They suggest that, in fact, its symptoms may even increase during recovery.

Similar results have been found in studies of BN. Vohs *et al.* (2001), for example, asserted the relationship between low self-esteem, a high level of perfectionism and experiencing bulimic behaviors. A recent study indicated that perfectionism activates inappropriate cognitive and behavioral modes of functioning (Welch, Miller, Ghaderi, and Vaillancourt, 2009) and is related to psychological distress with symptoms such as body dissatisfaction and unusual eating behaviors, all of which are risk behaviors and considered in this study.

On the subject of perfectionism, following the pattern established by prior research, the findings confirm that it directly and positively affects body dissatisfaction, yet also levels of self-esteem, which we had not considered in the theoretical model. In this way, it indirectly influences dietary restraint and purging behaviors in two different ways. First, the effect is mediated by body dissatisfaction; second, it is mediated by low self-esteem and body dissatisfaction, to greater effect. Certainly, perfectionism would influence low levels of body satisfaction and self-esteem, which would in turn create greater eating restriction and/or the presence of purging behaviors (Delinsky and Wilson, 2008).

According to the authors the continuous, incessant and almost desperate search for psychological wellbeing through satisfaction with one's body image is a path laden with obstacles. Perfecting oneself to be perfect and achieve a sense of false happiness, bearing in mind that a distorted perception of one's figure is one of the main characteristics of AN, or understanding perfectionism in terms of behavioral and cognitive self-control, in life in general and particularly in the case of ED, BN especially, would justify the persistence of body dissatisfaction, dietary restraint and purging behaviors over time.

At the outset of this study, the authors proposed that a direct and positive relationship would be established between the personality traits and the personal variables low self-esteem and perfectionism. Among the different personality traits, as anticipated, the relationships involving traits that present intrapsychic conflicts, which respond to a pattern of structural deficits and alterations in the functioning of personality, were those that were significant:

the borderline, paranoid and self-destructive traits. Also, low self-esteem was found to have considerable weight in developing and maintaining ED. This effect is even greater in women who have difficulties unifying the different aspects of their personalities. For those who have difficulty experiencing pleasure, on the other hand, the schizoid trait has a direct effect on self-esteem. The scientific literature on this topic is nonexistent, or at least, there is almost no empirical data to compare the results of this study.

As expected, the personality traits studied were found to be related directly and positively with low self-esteem, except for the paranoid trait which, contrary to the hypothesized in the initial model, was found to influence levels of low self-esteem directly, but also negatively. It is only logical to posit that, given the important role played by interpersonal behavior and perceived feedback from others for personal assessment, especially so in the case of ED, cognitive biases occur when interpreting the messages of others. This presumably stems from the need to be approved of and accepted by them. This situation makes people about a threat that can negatively affect our self-esteem. Ergo, the authors propose a positive relationship. Beyond that influence, though, is the notion that people with ED make false assumptions about themselves, such that a certain level of paranoia actually acts to protect self-esteem. In view of Millon's (1998) theory and their own perceptions of themselves, people with a paranoid personality style, reluctant to trust anyone, tend to reflect attitudes such as feeling important and proud of their independence and self-control, and perceiving themselves as capable of conquering any obstacle that may arise, among others. That is to say, they exhibit characteristics similar to people with high self-esteem and therefore have less risk of developing ED.

As for the schizoid trait, similar to the case of the paranoid one, as proposed in the theoretical model, it has a direct, positive relationship with ED. For patients with ED, the schizoid style would be characterized by a tendency to increasingly distance themselves from others, feeling unable to adapt, feelings of emptiness, and an illogical, ineffective and useless pattern of behavior. They feel lost and marginalized in life and in social relations, the fruit of a poor cognitive style, due to an inability to become involved in emotional and social processes. These characteristics explain why, taking this glum view of life in general and of themselves in particular, those with low self-esteem might initiate altered eating behaviors. Furthermore, they

have difficulty producing a change for the better in their lives because of their cognitive style.

On another note, self-destructive personality has a direct, positive effect on low self-esteem, though that effect was not found to be statistically significant. However, consider Millon's suggestion that having personality traits with structural deficits itself implies a self-destruction.

Self-destructive people possess intrapsychic structures that are intrinsically opposed. For example, he or she might think they will be more loved the more they suffer, which creates the conviction that when seeking appreciation and to be valued by others, they should first look for suffering. By disdaining and underestimating themselves, they try to avoid humiliation and to draw protection and recognition.

For ED patients, a self-destructive style, which is especially cognitive, attacks their competence and self-esteem. In fact, therapeutic intervention is geared toward improving low self-esteem from the very beginning because that motivates the work of changing permanent personality structures. It is crucial to mention that when one's perceptions of him or herself are formed into a poor self-image, it has the effect of maintaining dysfunctional cognitive habits and therefore, perpetuating ED.

Finally, regarding the borderline personality trait, it was found to be directly, positively related to low self-esteem, as posited in the theoretical model. The scientific bibliography on this subject conveys a large presence of this trait and its associated personality disorder in patients with ED (Torres *et al.*, 2008; Van Hanswijk de Jougé *et al.*, 2003). On the other hand, low self-esteem is considered a relevant factor to having a vulnerability to developing and maintaining these disorders.

According with these research, this study confirms the mediating effect of low self-esteem in people with a borderline personality style. In other words, for women with a borderline personality and low self-esteem who begin to exhibit risk behaviors for developing ED, this trait will favor perpetuating the disorder. Their lack of emotional maturity, constant changes in mood and dichotomous thinking style play against such individuals. For ED patients with a strong tendency to devalue themselves it can be difficult to believe that others can have a good image of them. Others' appreciation directly affects self-esteem, and perceiving a lack there of generates a lot of insecurity and instability, which in turn increases the effect of this trait, favoring the perpetuation of ED.

Of the personality traits considered in the present study, borderline alone directly, positively affected levels of perfectionism. This makes sense when viewed in relation to a result that was not considered in the initial model. The borderline personality trait, according to the estimated model, also has an influence on levels of body dissatisfaction. On a related note, Peck and Lightsey (2008) point out that perfectionism directly, positively affects body dissatisfaction as well as levels of self-esteem. On the other hand, these results concur with the findings obtained by Dunkley, Zuroff, and Blankenstein (2003). These authors, additionally, include in their structural model self-criticism as a relevant variable in the relationship between perfectionism, body satisfaction and weight. As a matter of fact, Gustafsson, Edlund, Kjellin, and Norring (2009) suggest that a positive self-evaluation, particularly with regard to physical and psychological characteristics, seems to be a protective factor. Lastly, remember that the results of the present study, as suggested above, follow a path laid by Stice *et al.* (1994), Vohs *et al.* (2001), Welch *et al.* (2010) and Zanarini *et al.* (2010).

By way of conclusion, it appears that self-esteem plays an important role as the main mediating variable in the relationship between personality traits and ED. The results also emphasize the importance of perfectionism as a mediating variable of the effect of the borderline personality trait on ED and self-esteem. Furthermore, the findings highlight the mediating role of body dissatisfaction in the effect of personality traits in general on dietary restraint and purging behaviors, by way of self-esteem. This is especially true of the effect of borderline personality on dietary restraint and purging behaviors.

This study opens up a novel line of future research: the joint study of personality traits and more traditionally studied constructs of ED such as self-esteem, perfectionism and body dissatisfaction (Hindell, 2009). The results of the present research may have important practical implications in the understanding of and approach to ED in three important areas: prevention, treatment and prognosis. With that in mind, the study by O'Donohue and Cucciare (2007) is a specific contribution of how borderline personality disorder can impact patient presentations in medical settings.

The limitations observed in this study were that due to the novel nature of this study and that there is scarcely any scientific literature that relates ED to any personality disorder other than borderline, it was difficult to compare and contrast the results with other studies. On the other hand, another limita-

tion could be the use of MCMI-II as the sole instrument for the evaluation of personality traits. As a matter of fact, authors such as Fernández-Montalvo and Echeburúa (2006) and Marañón, Grijalvo, and Echeburúa (2007) found that self-report measures in general and those of MCMI-II in particular tend to overdiagnose personality disorders as compared to specific clinical interviews (Ramklint, Jeansson, Holmgren, and Ghaderi, 2010). In other words, the findings reported based on self-report questionnaires are potentially limited due to the problem inherent in such methods (Dunkley and Grilo, 2007). Nevertheless, were used instruments that are reasonably well-established psychometrically.

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