

# French validation of orthorexia assessment scale ORTO-15 and its links with eating and body image disorders



Laboratoire de Psychologie  
EA 4139

Natalija Plasonja<sup>1</sup> & Greg Décamps<sup>1</sup>

<sup>1</sup>Laboratoire de Psychologie EA 4139, Université de Bordeaux, France.  
natalija.plasonja@u-bordeaux.fr



## Background:

Bratman's studies on Orthorexia

- Definition : **pathological obsession over the consumption of healthy food** (1997)
- Specificity : focus placed on food's **quality** and **health properties**

Assessment

- Most used scale: **ORTO-15** (Donini *et al.*, 2005). It has been used in many studies (Valera *et al.*, 2014; Kiss-Leizer *et al.*, 2019)
- Several validations in different languages (Brytek-Matera *et al.*, 2014; Missbach *et al.*, 2015)
- No French validation**

Characteristics

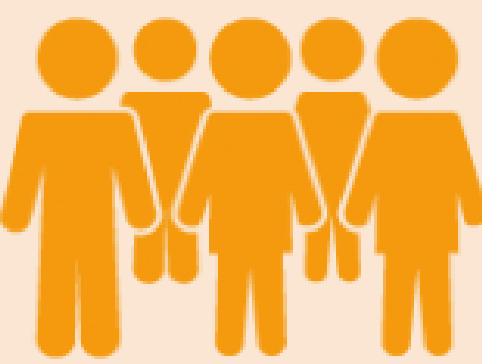
- Studies on Orthorexia focused on the links with other eating disorders
- Links with body image disorders are not specified

## Objective:

- Validation of a French adaptation of the ORTO-15 scale and study of its psychometric properties
- Specify the relationships between orthorexia, eating and body image disorders

## Methods:

### Participants and procedure:

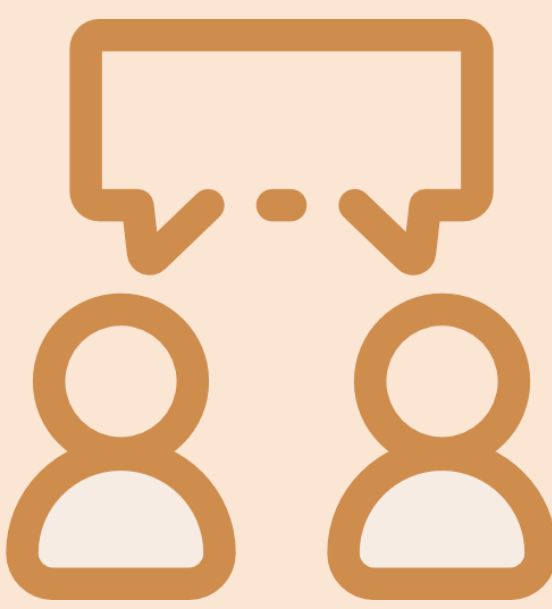


- 414 subjects
- 89 % female
- 18 to 25 years old (*mean age*=21.71, *SD*=1.96)
- Data collection:** social media
- Design:** transversal study



### Measures :

- ORTO-15 scale
- Eating Attitudes Test (EAT-26)
- Binge Eating Scale (BES)
- Multidimensional Body Self Relations Questionnaire- Appearance Scale (MBSRQ-AS)



### Translation procedure:

**Vallerand's (1989) back translation procedure :**  
ORTO-15: Italian → French

**Pre-test :** sample (*n*=5) of young adults

## Results :

### Factorial structure of the ORTO-15

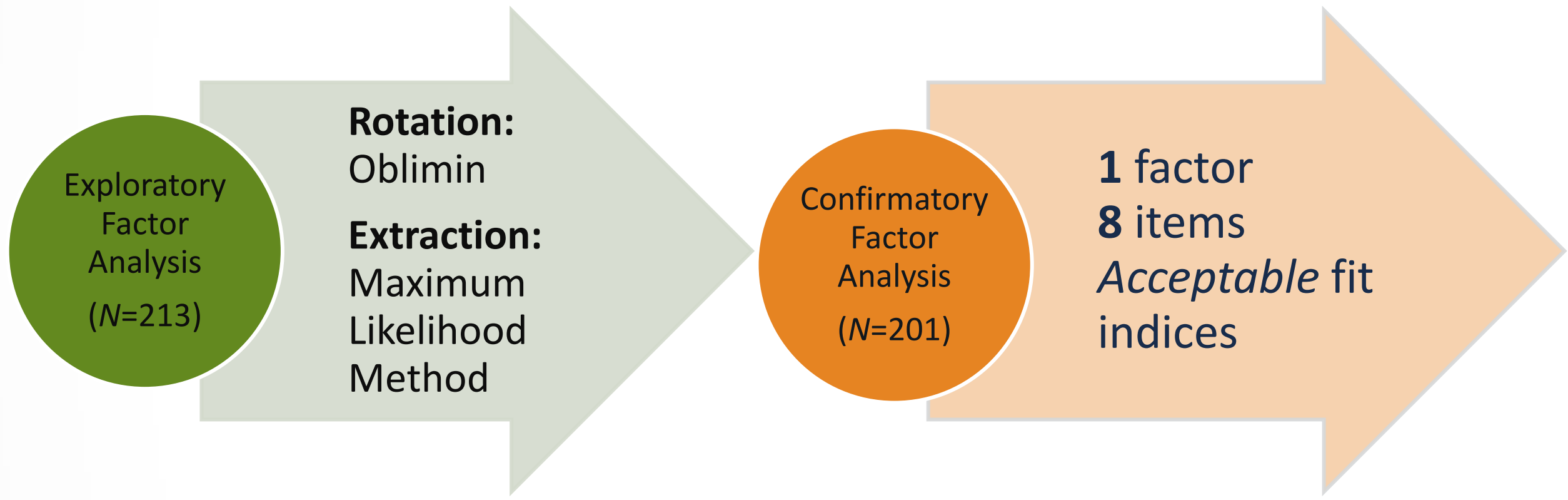


Table 1 : Factor loadings of ORTO-8 scale

Items	Loadings
1. Quand vous mangez, faites-vous attention aux calories des aliments? 1. When eating, do you pay attention to the calories of the food?	-0.36
3. Dans les 3 derniers mois, penser à la nourriture a-t-il été pour vous un objet de préoccupation? 3. In the last 3 months, did the thought of food worry you?	0.56
4. Vos choix alimentaires sont-ils conditionnés par vos préoccupations concernant votre état de santé? 4. Are your eating choices conditioned by your worry about your health status?	0.53
6. Etes-vous disposé(e) à dépenser plus d'argent pour avoir une alimentation saine? 6. Are you willing to spend more money to have healthier food?	0.42
7. Penser à une alimentation saine vous préoccupe-t-il pendant plus de trois heures par jours? 7. Does the thought about food worry you for more than three hours a day?	0.62
10. Pensez-vous que la conviction de vous alimenter sainement augmente l'estime que vous avez de vous-même? 10. Do you think that the conviction to eat only healthy food increases self-esteem?	0.76
11. Estimez-vous que la consommation d'une nourriture saine modifie votre style de vie (fréquence de sortie aux restaurants, du temps passé avec vos amis...)? 11. Do you think that eating healthy food changes your life-style (frequency of eating out, friends, ...)?	0.59
12. Estimez-vous que la consommation d'aliments sains puisse améliorer votre aspect physique? 12. Do you think that consuming healthy food may improve your appearance?	0.50
Cronbach's Alpha	0.65

Table 2 : Confirmatory Factor analysis fit indices of ORTO-8 scale

$\chi^2$	Degree of freedom	$\chi^2/df$	<i>p</i>	RMSEA	SRMR	AGFI	CFI	TLI
58.6	20.0	2.93	0.00	0.098	0.063	0.87	0.88	0.84

Note. RMSEA : Root Mean Square of Approximation ; SRMR : Standardized Root Mean Square Residual ; AGFI : Adjusted Goodness of fit ; CFI : Comparative Fit Index ; TLI : Tucker-Lewis Index

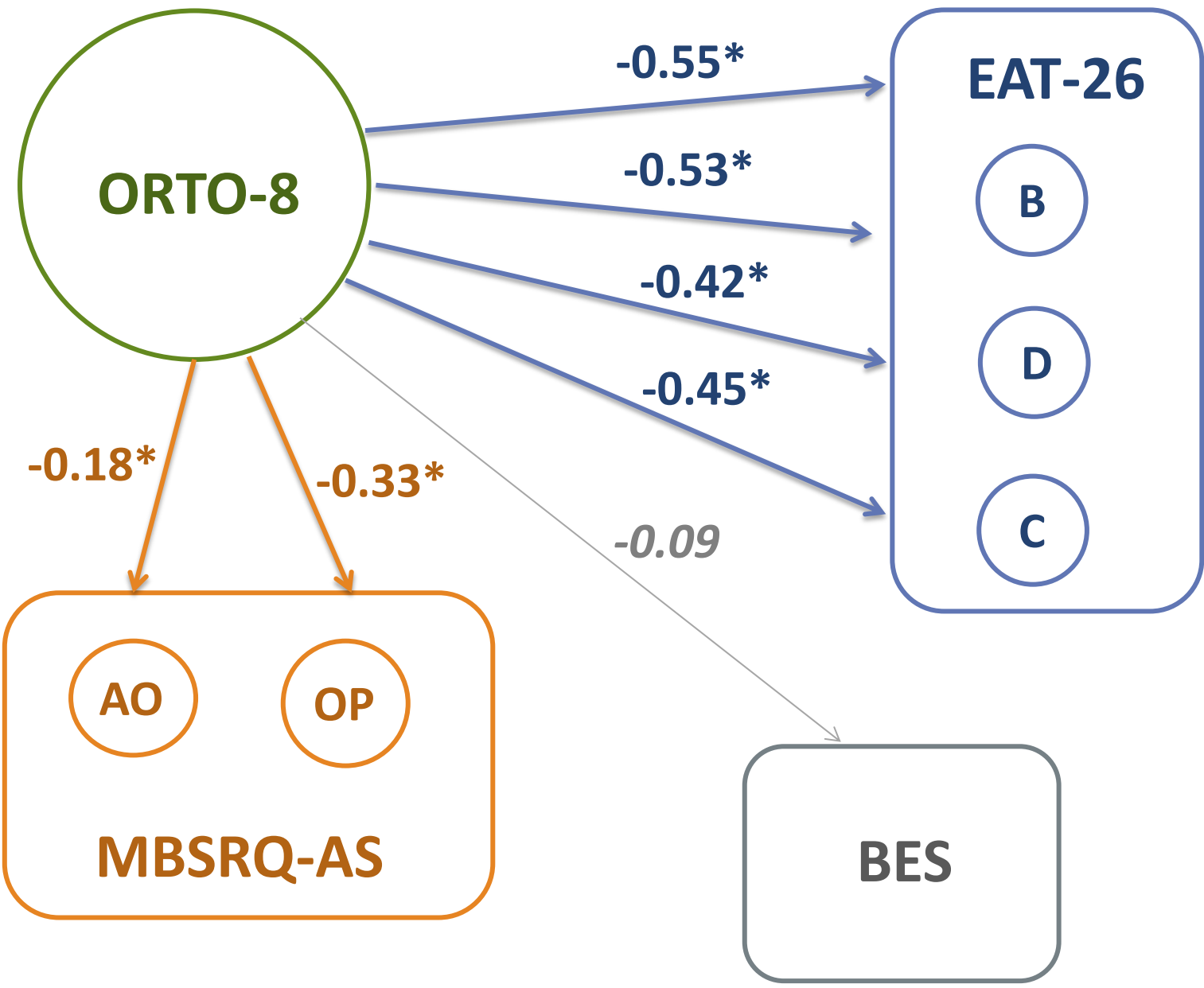
### Links between orthorexia, eating and body image disorders

Correlations between ORTO-8 and:

- EAT-26: negative correlations with **Bulimia, Dieting, Oral control** and **General score**
- MBSRQ-AS: negative correlations with **Appearance orientation** and **Overweight preoccupations**. No correlations with the 3 other subscales
- BES: no links with the **binge eating disorder**

NB : low score at ORTO-8 indicate high risk for orthorexia

Figure 1 : Correlations between orthorexia, eating and body image disorders



Note. EAT-26: Eating Attitudes Test ; B : Bulimia scale ; D : Dieting scale ; C: Oral control scale ; MBSRQ-AS: Multidimensional Body Self Relations Questionnaire-Appearance Scale ; AO: Appearance Orientation scale ; OP: Overweight Preoccupation scale ; BES: Binge Eating Scale

## Conclusion:

- ✓ Acceptable psychometric properties of ORTO-8.
- ✓ Orthorexia may be considered as an eating disorder and should be distinguished from the binge-eating disorder.
- ✓ Orthorexia is related to body image preoccupations but not to body satisfaction.
- ✓ Further studies on orthorexia are needed to precise its:
  - predictors
  - consequences
  - definition
  - assessment

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# French validation of ORTO 15 and its links with eating and body image disorders

Natalija Plasonja\*, University of Bordeaux, France  
Greg Décamps, University of Bordeaux, France

## Background

Although orthorexia nervosa was first described by Steven Bratman (1997) as a pathological obsession over the consumption of healthy food, its nature remains unclear. People suffering from orthorexia tend to spend great amounts of time planning, purchasing and preparing healthy meals, they have developed great self-discipline in order to restrict their diets, they experience feelings of guilt and shame whenever the diet rules are broken and feel superior over those whose eating behaviour is not “pure” (Bratman, 1997 ; Donini, Marsili, Graziani, Imbriale, & Cannella, 2004 ; McComb & Mills, 2019). Some authors consider it as an eating disorder (Donini *et al.*, 2004). However, others see it either as one of the variations of anorexia nervosa, bulimia or avoidant/restrictive food intake disorder (Strand, 2004 *in* Arusoglu, Kabakci, Koksall & Merdol, 2008 ; McComb & Mills, 2019) or as a preliminary phase of one of those eating disorders (MacEvilly *in* Brytek-Matera, Donini, Krupa, Poggiogalle & Hay, 2015). The main distinction between orthorexia nervosa and other eating disorders relies on the fact that the person’s focus is not placed on the quantity of the food but rather its quality and health properties. However, the results of these studies, mainly based on Donini’s ORTO-15 assessment scale (Donini, Marsili, Graziani, Imbriale & Cannella, 2005), remain limited to certain countries and cannot be generalized to every culture. Moreover, recent studies suggest that research on orthorexia should not be limited to eating disorders and behaviour but should include body image disorders as well (Almeida, Vieira Borba & Santos, 2018 ; Brytek-Matera *et al.*, 2015).

The aim of this study was to propose a French adaptation of the ORTO-15 scale, explore its psychometric properties and the relationships between orthorexia, eating and body image disorders.

## Methods

### Subjects

414 subjects (89% female), aged from 18 to 25 years old (*mean age*= 21.71, *SD*= 1.96) participated in the study. Fifty eight participants were withdrawn from the study (fifty were older than the age inclusion criteria and there was missing data for eight other participants). Participants were invited to take part in the survey via an online link distributed through specific groups on social media. Prior to the study, participants were informed of its objectives and were asked

to complete an informed consent form specifying the terms of the study and its anonymity.

### Procedure

Participants completed the online French versions of the following tests: the ORTO-15 scale, the Eating-Attitudes Test (EAT-26), the Binge Eating Scale (BES) and the Multidimensional Body Self Relations Questionnaire-Appearance Scale (MBSRQ-AS).

The original version of the ORTO-15 scale, written in Italian, was previously adapted and translated to French using the Vallerand’s back-translation procedure (1989). Two bilingual speakers (fluent in both French and Italian) were recruited for the back-translation procedure. One of the speakers was in charge of the translation from Italian to French while the other person performed the back-translation, from French to Italian. The two translators then compared the two Italian versions (the original and the post-translation one) and concluded that there were no differences between the two. The French translation was pretested within a small sample ( $n=5$ ), after which minor corrections were made in order to create the final version, retained for the rest of the study.

## Results

Exploratory and Confirmatory Factor Analysis were conducted on two randomly created samples ( $n=213$  and  $n=201$ , respectively).

Exploratory Factor Analysis, performed with an oblique rotation, proposed a single-factor structure of the scale. The correlation matrix of the items revealed that three items (items 2, 5 and 15) didn’t correlate with the rest of the scale. Therefore, those items were withdrawn, as well as four other items (items 8, 9, 13 and 14) whose factor loadings were too weak ( $< .30$ ). The eight remaining items explained 31% of variance and Cronbach’s alpha was equal to 0.65.

Different fit indices from the Confirmatory Factor Analysis allowed us to confirm the existence of a unique factor of the scale with eight items (2 fit indices out of 6 were considered as satisfactory and the other four were slightly below the conditions of acceptability). The name given to the French version of the scale is ORTO-8.

According to the correlation coefficients (Table I), the score of ORTO-8 is negatively correlated to eating disorders ( $\rho =$

-0.50,  $p<0.01$ ), to Appearance Orientation ( $rho=-0.18$ ,  $p<0.01$ ) and Overweight Preoccupation scales ( $rho=-.33$ ,  $p<0.01$ ), indicating that people suffering from orthorexia tend to have higher levels of eating disorders, are more preoccupied with being overweight and place more importance on their appearance. Orthorexia is not linked to the binge eating score ( $rho=-0.09$ ,  $p>0.5$ ).

## Conclusion

ORTO-8 demonstrated correct psychometric properties, similar to other adaptations of the ORTO-15 scale. A single-factor structure had already been identified in other studies, such as those by Arusoglu *et al.* (2008), Varga *et al.* (2014) and Missbach *et al.* (2015), proposing an 11-items or 9-items scales, respectively. The most frequently excluded items from various adaptations of the ORTO-15 scale correspond mostly to those excluded from the French version (items 2, 8, 9, 13, 14 and 15). Even though the results of the confirmatory factor analysis and Cronbach's alpha may be interpreted as a weakness of the ORTO-15 test, they remain identical to those found in other validation studies. It may be due to the complexity of the orthorexic phenomenon, which brings together attitudes, cognitions and behaviours that are not necessarily related or could manifest themselves in simultaneous ways. Therefore, more studies are needed to improve the definition of orthorexia.

The correlations between ORTO-8 and other tools indicate that **orthorexia could be considered as an eating disorder but should be distinguished from the binge-eating disorder**. The findings support the idea of the existence of **body image disorders within orthorexia**. Further studies are needed to precise if these disorders are predictors of orthorexia or its consequence, and to improve its definition and assessment.

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**Table I**  
Spearman correlations between orthorexia score and other assessment tools used in two samples ( $n1=414$ ,  $n2=198$ )

	1	2	3	4	5	6	7	8	9	10	11
1. BMI <sup>a</sup>	-										
2. Age <sup>a</sup>	0.02	-									
3. ORTO-8 <sup>a</sup>	-0.08	-0.08	-								
4. EAT-26 <sup>a</sup>	0.07	-0.02	-0.50**	-							
5. B <sup>a</sup>	0.08	-0.01	-0.53**	0.80**	-						
6. D <sup>a</sup>	0.07	-0.03	-0.43**	0.94**	0.67**	-					
7. C <sup>a</sup>	0.04	-0.02	-0.45**	0.90**	0.67**	0.75**	-				
8. AE <sup>a</sup>	-0.27**	0.08	0.07	-0.41**	-0.31**	-0.43**	-0.36**	-			
9. AO <sup>a</sup>	-0.03	-0.04	-0.18**	0.31**	0.21**	0.29**	0.33**	-0.15**	-		
10. BS <sup>a</sup>	-0.23**	0.06	0.07	-0.42**	-0.31**	-0.43**	-0.37**	0.77**	-0.22**	-	
11. OP <sup>a</sup>	0.19**	-0.01	-0.33**	0.70**	0.55**	0.68**	0.63**	-0.50**	0.37**	-0.50**	-
12. SW <sup>a</sup>	0.78**	-0.02	-0.07	0.16**	0.15**	0.15**	0.15**	-0.42**	0.05	-0.37**	0.31**
13. BES <sup>b</sup>	0.13*	0.17	-0.09	0.13	0.17**	0.13	0.03	-0.13	-0.05	-0.23**	0.18*

Note. a: Sample  $n1=414$ ; b: Sample  $n2=198$ ; BMI: Body Mass Index; EAT-26: Eating Attitudes Test; B: Bulimia scale; D: Dieting scale; C: Oral control scale; AE: Appearance evaluation; AO: Appearance Orientation scale; BS: Body areassatisfaction scale; OP: Overweight Preoccupation scale; SW: Self-classification weight; BES: Binge Eating Scale; \* $p<0,05$ ; \*\* $p<0,01$