

THE MEDIATOR ROLE OF SOCIAL PHYSIQUE ANXIETY ON BODY IMAGE AND ORTHOREXIA AMONG ADULT WOMEN IN A PROVINCE IN THE MEDITERRANEAN REGION OF TURKEY

Ersin Uskun^{1*}, Kıymet Batmaz¹, Gamze Albayrak¹, Mustafa Develi¹, Ahmet Nesimi Kişioğlu¹, Özgür Önal¹

¹ Faculty of Medicine, Department of Public Health, Süleyman Demirel University, Isparta, Turkey

ORCID: E.U. 0000-0001-6446-0186; K.B. 0000-0002-3615-7953; G.A. 0000-0003-1261-3042; M.D. 0000-0001-7397-8673; A.N.K. 0000-0003-2301-140X; Ö.Ö. 0000-0001-6514-2120

Corresponding author: Ersin Uskun, **E-mail:** ersinuskun@gmail.com

Received: 26.05.2023; **Accepted:** 05.10.2023; **Available Online Date:** 31.01.2024

©Copyright 2021 by Dokuz Eylül University, Institute of Health Sciences - Available online at <https://dergipark.org.tr/en/pub/jbachs>

Cite this article as: Uskun E, Batmaz K, Albayrak G, Develi M, Kişioğlu AN, Önal Ö. The Mediator Role of Social Physique Anxiety on Body Image and Orthorexia among Adult Women in a Province in the Mediterranean Region of Turkey. J Basic Clin Health Sci 2024; 8: 129-136.

ABSTRACT

Purpose: Orthorexia nervosa (ON) has garnered increasing attention in the literature as a relatively new eating disorder characterized by an excessive preoccupation with healthy eating, which can result in malnutrition and other health problems. While studies have established a link between body image and ON, the role of social physique anxiety (SPA) as a mediator in this relationship remains unclear. The present study aimed to address this gap by examining the mediating role of SPA in the relationship between body image and ON in women.

Material and Methods: A total of 647 women aged 18 to 65 years were recruited from a Province in the Mediterranean Region of Turkey. The causal steps approach (Baron and Kenny method) was used in the statistical evaluation of the mediation model and the realization of the steps testing the mediation model was evaluated. The hypothesized mediation model was tested with the PROCESS macro for SPSS models in Model 4 using a bootstrapping approach to assess the significance of indirect effects.

Results: After controlling for the effects of age, education, marital status, employment status, body mass index (BMI), and weight perception for consistency with BMI, the results of regression analyses supported the mediating effect of SPA on the relationship between body image and ON.

Conclusion: It follows from these findings that the inclusion of strategies aimed at reducing negative body image perception and SPA may contribute to improved prevention efforts aimed at reducing ON among Turkish women.

Keywords: Body image, eating disorders, social interaction, women's health, mediator variable.

INTRODUCTION

Healthy eating awareness has become a primary focus for individuals in developed societies. However, developing an obsession with this issue can often

lead to disruption of eating patterns and, in the long run, eating disorders. Due to their increasing prevalence and associated socioeconomic burdens,

eating disorders are recognized as a global public health issue (1).

Orthorexia Nervosa (ON) is a condition where individuals become excessively fixated on consuming pure and healthy foods to improve their health. It is not yet officially recognized as a separate diagnosis in the DSM-5-TR (2). Some researchers argue whether ON should be classified as a subtype of Anorexia Nervosa or Obsessive-Compulsive Disorder (OCD), or as a distinct disorder (3, 4). ON begins with a healthy preference for a balanced diet that gradually becomes an unhealthy obsession, characterized by obsessive thoughts, compulsive behaviors, and self-punishment (5-7). ON shares many similarities with other eating disorders, involving significant weight loss, anxiety, perfectionism, and the desire to maintain control (7). The prevalence of ON varies widely, ranging from 7% to 82%, with an increase in frequency observed in recent years (6). Women who are more interested in dieting, such as dancers, gymnasts, and models who need to maintain a certain weight, are at higher risk for ON (8).

Body image is the mental representation of one's own body and influences relationships with the outside world (9). Throughout history, individuals have wanted to conform to cultural body standards to be accepted (10) which has shaped the view of the human body (11). Women tend to view themselves from an outsider's perspective, leading to self-objectification (12, 13). Cognitive-behavioral models suggest that negative body image can lead to eating disorders, especially in women (14). This can lead to ON tendencies and eating disorders like bulimia and anorexia (13, 15). Studies have supported these findings (16, 17). Based on this, the current study proposed hypothesis 1: body image could positively predict women's ON significantly.

Individuals are concerned with how they are perceived by others in terms of their physical appearance and often aim to make a positive impression (18, 19). However, failing to achieve this goal can lead to distressing emotions, known as "social physique anxiety" (20). This type of anxiety has been linked to eating disorders and is becoming increasingly prevalent as people prioritize being liked and approved of. Additionally, conflicting information about healthy eating habits in the media can contribute to this anxiety, particularly in women. All these factors may contribute to the rise of ON in

women in the future, highlighting the importance of examining the relationship between body image and ON.

According to studies on the association between SPA and ON, persons with higher SPA have a higher ON inclination, and especially women, make an effort to be thinner, resulting in eating disorders (21, 22). It has been observed that social physical anxiety has different mechanisms of action in studies investigating the variables associated with eating attitude. The evidence obtained is that SPA has a mediating effect. However, it is also stated that the mediating effect of SPA in the relationship between body image and eating disorders may be valid for populations particularly susceptible to experiencing both body-related concerns and eating disorders and cannot be generalized (23). There is not enough research in the literature investigating the link between SPA and ON. More investigation needs to be made in vulnerable groups to obtain clearer evidence of the mediating effect of SPA.

As a result, based on previous research and theories, we presented Hypothesis 2: SPA would mediate the relationship between body image and ON. To summarize, we constructed a mediation model to study the association between women's body image and ON, as well as the mediating influence of SPA. Figure 1 depicts the theoretical model.

MATERIALS AND METHODS

Participants

This cross-sectional analytical observational study targeted women aged 18-65 living in a province in the Mediterranean Region of Turkey as of March 2022, with a total population of 135819. A sample size of 768 was determined using Open-Epi software, with a 50% prevalence, 95% confidence interval, 5% variation, and design effect of 2. The sample size obtained was sufficient for mediation analysis in the developed model according to the literature. Because it was reported in a cross-sectional study that 422 participants were required and adequate to evaluate a moderate mediation effect size using the bootstrap method to achieve 80% power (24). Using convenience sampling methods, 647 adult women were reached by face-to-face interviews with individuals who agreed to participate in the study at a total of eight booths set up in 3 main streets and the university campus in the settlement where the study was conducted, with a reach level of 84.3%.

Measures

The Body Image Scale, developed by Secord and Jourard and translated into Turkish by Hovardaoglu, is a 40-item questionnaire that measures satisfaction with various bodily parts and functions (25, 26). Responses are rated on a 5-point Likert scale ranging from 1 ("I don't like it at all") to 5 ("I like it very much"). Scores range from 40 to 200, with higher scores indicating greater satisfaction with one's body. The scale is one-dimensional and consists entirely of positive statements. There is no cut-off score, and body image is evaluated based on the mean score. The adapted scale demonstrated high internal consistency with a Cronbach Alpha coefficient of 0.93.

The Social Physique Anxiety Scale (SPA) is a 12-item inventory developed by Hart et al. to assess anxiety related to one's physique when judged by others (20). Balli and Asci validated its use for the Turkish population (27). The inventory uses a five-point Likert scale, with some items reverse-scored. The Turkish adaptation of the scale uses a 7-item version with a reliability of 0.83. There are no sub-dimensions or cut-off points, and scores range from 7 to 35, with higher scores indicating greater concern about one's appearance.

Donini et al. developed the Healthy Eating Obsession Scale (ORTO-15) to assess individuals' obsession with healthy eating (28). The self-assessment test consists of 15 questions and its Turkish validity and reliability study was conducted by Arusoglu (29). Four items were deleted from the scale adapted to Turkish (ORTO-11). A single item of the scale is scored in the opposite direction. Orthorexic tendencies are scored 1 point and regular eating behaviors are scored 4 points in the scale. The total score of the scale is the sum of all items, and low scores indicate a predisposition to ON. The cut-off point of the scale corresponds to the 25% cut-off value to determine the prevalence of orthorexia. In our study, those with an ORTO-11 score below 23 were considered orthorexic. The Cronbach's alpha coefficient of the scale was reported as 0.62.

Personal Information Form contains seven questions that inquire about the individual's age, educational status, marital status, height and weight, employment status, and thoughts about her own weight. Body mass index (BMI) was calculated by dividing weight in kg by height in m squared. Those with a BMI of <18.5 were classified as underweight, those with a BMI of 18.5-24.9 as normal, those with a BMI of 25-

29.9 as overweight, and those with a BMI of 30 or higher as obese (30). When women's BMIs were compared to their perceptions about their own weight, overweight and obese by BMI were combined and presented as overweight/obese in a single group.

Procedure

Participants were interviewed by a member of the research team. After briefing about the content of the study (body/eating attitudes) and the anonymous nature of their participation, the women who gave written informed consent completed a paper-and-pencil questionnaire. No economic or academic incentives were offered to participants in exchange for participation. The data were collected in two months in March and April 2022. and its later amendments or comparable ethical standards. Ethical approval was granted by the Suleyman Demirel University Faculty of Medicine Clinical Research Ethics Committee (Date: January 26, 2022; No: 28).

Data analyses

The independent variables were age, educational status, marital status, height and weight, body mass index (BMI), employment status, and thoughts about her own weight in this study. The dependent variable was orthorexia nervosa status. Additionally, the mediating effect of SPA on the relationship between body image and ON in women has been investigated in this study. SPA is the mediating variable. As covariates, age, education level, marital status, employment status, consistency of BMI, and weight perception were introduced.

The hypothesized mediation model was tested with the PROCESS macro for SPSS models in Model 4 (to examine the Body Image → SPA → ON agent sequence) (Figure 1) using a bootstrapping approach to assess the significance of indirect effects (31). To obtain the robust standard error and Bootstrap confidence interval of parameter estimation, 5000 Bootstrap samples (each with a sample size of 647 people) were selected. The causal steps approach (Baron and Kenny method) was used in the statistical evaluation of the mediation model and the realization of the steps testing the mediation model was evaluated (32). The associations under investigation are considered statistically significant when the 95% confidence interval (CI) obtained using a bias-corrected and accelerated bootstrapping technique does not contain zero. All continuous variables were

standardized prior to performing the described regression analyses. As a result, regression coefficients (B) are displayed in their standardized form.

RESULTS

Table 1 presents the demographic characteristics of the participants; whose average age was 30.4 (SD = 11.2). A significant majority of the group was comprised of those with university or higher education (n= 519, 80.2%), single (n= 446, 68.9%), and working or studying (n= 568, 87.8%). Participants' BMI and weight perception were compared, and they were classified as compatible or non-compliant. The majority of women (n= 511, 79.0%) perceived their weight consistently with their BMI.

Orthorexia was discovered in 20.2% of the participants (n = 131). The mean body image score of the participants was 145.3 (SD= 22.3), the SPA score was 19.3 (SD= 5.1), and the ON was 26.1 (SD= 4.3). Body image was shown to be positively related to ON ($r= 0.08$, $p<0.05$) and negatively related to SPA ($r=-0.39$, $p<0.001$). SPA and ON trends are declining as body image satisfaction rises. ON was adversely associated with SPA ($r=-0.25$, $p<0.001$). The ON trend increases as the SPA increases. Age has no correlation with any of the key variables.

The summary of direct and indirect effects of body image on orthorexia nervosa are shown in Figure 1 and Table 2. The effects of body image and education status on the mediating variable SPA were negative and significant, according to path a. Body image satisfaction was lower ($B = -0.09$, $SE = 0.01$, $t = -10.78$, $p<0.001$), and not having a university or higher education ($B=-2.15$, $SE = 0.58$, $t = -3.72$, $p<0.001$) increased SPA. In path c' and b, SPA was found to significantly reduce the score of ORTO 11 and thus increase the trend of ON ($B= -0.22$, $SE = 0.04$, $t = -6.37$, $p<0.001$, respectively). In path c, in which the overall effect is assessed, the body image increased significantly the score of ORTO 11 (without a mediated effect of the SPA), i.e., it was shown that it reduced the trend of ON ($B= 0.02$, $SE = 0.01$, $t = 2.25$, $p<0.05$). In path c', the significance of the body image with ORTO 11 was completely eliminated when the analysis included SPA ($B= -0.01$, $SE = 0.01$, $t = -0.37$, $p>0.05$). The mediation effect of SPA was statistically significant ($\gamma=0.02$, $SE=0.01$, 95% CI [LLCI= 0.01, ULCI= 0.03]). In this context, SPA had an enhancing role as a mediator in the effect of body image on ON.

In this case, SPA was found to be a full mediator. In other words, the effect of body image on ON was determined to be realized through SPA. While body image dissatisfaction has no direct effect on ON, it does increase the ON trend by increasing SPA.

DISCUSSION

The mediating effect of SPA on the relationship between body image and ON in women has been investigated in this study. The mediator variable, which can also be defined as the intervening variable, is known as the variable that transmits the effect of the independent variable (prediction variable) to the dependent variable (result variable). The mediator variable (M), which functions as a link between the independent variable (X) and the dependent variable (Y), aids in explaining the effect of the independent variable on the dependent variable. In other words, the mediator variable is one that explains how and why a relationship between two variables exists (32). In this study, the SPA variable (M) provides the link between the independent variable body image (X) and the dependent variable ON status (Y). SPA is the mediator variable that helps us to understand the relationship between body image and ON. According to Baron and Kenny, a variable that is claimed to be a mediator variable (M) is defined as a mediating variable if it satisfies the necessary conditions one after the other (32). According to this approach, also known as the traditional method, the mediation effect in the mediating effect model shown in Figure 1 can be statistically tested as follows:

- As the first condition; X must significantly affect Y (path c). In our study, body image (X) significantly affected ON status (Y) ($B=0.02$, $p<0.05$).
- As the second condition, X must significantly affect M (path a). In our study, body image (X) significantly affected SPA (M) ($B=-0.09$, $p<0.001$).
- As the third condition; M should significantly affect Y when X and M are included in the regression analysis together (path b). In our study, when body image (X) and SPA (M) were included in the regression analysis, SPA (M) significantly affected ON status (Y). ($B=-0.22$, $p<0.001$).

If there is a non-significant relationship between X and Y, it is said to be a full mediation effect, and if there is a decrease in the relationship between X and Y, it is said to be a partial mediation effect (path c'). In our study, when body image (X) and SPA (M) were included in the regression analysis, a non-significant relationship was found between body image and ON

Table 1. Participants' demographic characteristics

Variables	n	%
Total	647	100.0
Gender		
Female	647	100.0
Education status		
University and above	519	80.2
Other	128	19.8
Marital status		
Single	446	68.9
Married	201	31.1
Working status		
Working or student	568	87.8
Not working or retired	79	12.2
Body mass index		
Underweight	60	9.3
Normal	433	66.9
Overweight	111	17.2
Obese	43	6.6
Consistency of weight perception		
Consistent	511	79.0
Inconsistent	136	21.0
Orthorexia nervosa status		
Normal	516	79.8
Orthorexic	131	20.2
	Mean	Standard deviation
Age	30.41	11.21

Table 2. Summary of direct and indirect effects of body image on orthorexia nervosa

Outcome variable	Predictors	Fitting index		Regression coefficients				
		R ²	F	B	SEB	LLCI	ULCI	
Social Physique Anxiety (Path a)		0.18	22.66**					
	Age (ref: ≤30)			0.72	0.69	-0.64	2.08	
	Education status (ref: university and above)			-2.15	**	0.58	-0.11	-0.07
	Marital status (ref: single)			-0.14		0.68	-3.29	1.02
	Working status (ref: working/student)			0.32		0.70	-1.05	1.69
	Consistency of weight perception (ref: inconsistent)			0.56		0.46	-0.34	1.46
	Body image			-0.09	**	0.01	-0.11	-0.07
Orthorexia Nervosa (Path c' and Path b)		0.07	7.32**					
	Age (ref: ≤30)			-0.22	0.62	-1.43	0.99	
	Education status (ref: university and above)			-0.95	0.52	-1.97	0.07	
	Marital status (ref: single)			0.79	0.61	-0.40	1.98	
	Working status (ref: working/student)			-0.58	0.62	-1.79	0.65	
	Consistency of weight perception (ref: inconsistent)			-0.32	0.41	-1.12	0.48	
	Body image (direct effect on orthorexia)			-0.01	0.01	-0.02	0.01	
Social Physique Anxiety			-0.22	**	0.04	-0.29	-0.16	
Orthorexia Nervosa (Path c)		0.02	1.68					
	Age (ref: ≤30)			-0.38	0.64	-1.63	0.86	
	Education status (ref: university and above)			-0.47	0.53	-1.51	0.58	
	Marital status (ref: single)			0.82	0.62	-0.41	2.04	
	Working status (ref: working/student)			-0.65	0.64	-1.90	0.61	
	Consistency of weight perception (ref: inconsistent)			-0.45	0.42	-1.27	0.38	
	Body image (indirect effect on orthorexia)			0.02	*	0.01	0.01	0.03

LLCI: Lower Level of the 95% Confidence Interval. ULCI: Upper Level of the 95% Confidence Interval. *p<0.05, and **p<0.001

(path c', B=-0.01, p>0.05). Therefore, it was determined that SPA had a full mediating effect in this relationship. Each proposed condition must be provided step by step in this evaluation method. In our study, all of these steps were provided step by step. We found that SPA played a mediating role in the link of body image to ON, which also verified our

hypothesis 2. For some time, researchers have recognized that there is a link between body image and eating behaviours (14,16,17). According to Barnes and Caltabiano, high body image scale scores influence ON status (16). ON-prone individuals, according to Barthels et al., have very inflexible notions about a healthy body image (17).

We discovered a substantial association between body image and ON in the c path of the interactions evaluated in our research. The ON tendency diminished as the individuals' body image improved. Women's body image was found to have a significant effect on SPA. The SPA has been found to be higher in women who are dissatisfied with their bodies. According to the literature, women are less content with their bodies than males. Furthermore, studies have reported that as women's dissatisfaction with their bodies increases, so does SPA (33, 34). It is understandable for the individual to experience such anxiety about her body in social life. In fact, it is well known in the literature that people who are stigmatized about their bodies face devaluation and humiliation in their social environment (35). Overweight people face more discrimination in hiring, college admission, employment and income, dating, medical care, the media, and advertising. They have fewer opportunities for themselves (36). It is expected that the anxiety of being subjected to such treatment in social situations to increase the individual's level of anxiety.

The results of our study revealed a significant positive association between SPA and ON tendency in Turkish women, indicating that women with higher SPA scores have a greater susceptibility to ON. These findings align with previous research demonstrating that individuals with higher SPA scores tend to have a desire to achieve a thinner physique, which can potentially lead to disordered eating behaviours (21, 22). However, it is important to note that comparing SPA and ON alone may not provide a comprehensive understanding of the complex interplay between body image, SPA, and

ON. Given the limited literature on this topic, further investigation is warranted.

Furthermore, our study revealed that when examining the joint effect of body image and SPA on ON tendency, SPA emerged as a significant mediator, while the effect of body image on ON tendency disappeared. These novel findings suggest that SPA may fully mediate the relationship between body image and ON tendency in Turkish women. To the best of our knowledge, no prior research has investigated the interplay between these variables in the context of ON. As such, our study highlights the need for additional research to further explore and compare the complex associations between body image, SPA, and ON.

Limitations

The limitations of this study are that the study group consists entirely of women, is highly educated, has a high employment rate and is relatively young. This may have led to higher orthorexia scores compared to the general population. In addition, such a group may have higher body perception concerns and social physical anxiety. Therefore, the findings obtained may have been more pronounced than they actually were, unlike the population. Most probably, the reason for this situation is that no probability sample selection was made and data was collected by convenience sampling.

In our country, studies conducted in women on this subject were generally conducted in adolescent and young adult groups. In our study, although the majority of the participants were young, it is an advantage that middle-aged and older women were also included. In addition, considering the studies

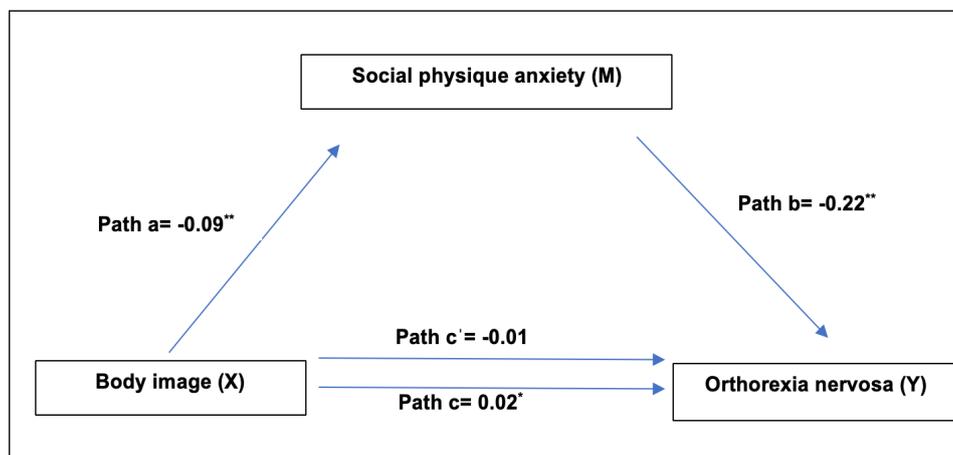


Figure 1. Mediation model of social physique anxiety on the relationship between body image and orthorexia nervosa (* $p < 0.05$, and ** $p < 0.001$)

examining SPA and body image together in the literature, the fact that the mediating role of SPA on ON was revealed is an additional contribution.

Future studies that use age classification to represent older individuals, especially for adults, may provide more reliable results about the population for the level of ON in women. On the other hand, the ON status of male individuals needs to be determined.

CONCLUSION

In light of our findings, it can be concluded that body image and SPA are significant determinants of ON among Turkish women. The increase in body dissatisfaction and physique anxiety play a crucial role in the development of ON. Our study shows that SPA acts as a full mediator in the relationship between body image and ON, whereby an increase in body dissatisfaction leads to increased SPA, which, in turn, increases the likelihood of ON. Interventions aimed at reducing SPA among individuals may be an effective strategy for reducing ON and other eating disorders associated with body image issues. Given the limited research on SPA and body image together, this study's identification of the mediating role of SPA on ON can pave the way for future research in this area. Further research is needed to explore the complex interplay between body image, SPA, and ON, and to develop effective interventions for preventing and treating these disorders among vulnerable populations.

Acknowledgement: The authors would like to thank all participants for their help in the study.

Author contribution: EU participated conceptualization, design, supervision, materials, data collection and processing, analysis-interpretation, literature review, writing and critical review. KB participated design, supervision, materials, data collection and processing, analysis-interpretation, literature review, writing and critical review. GA participated supervision, materials, data collection and processing, analysis-interpretation, literature review, writing and critical review. MD participated supervision, materials, data collection and processing, analysis-interpretation, literature review, writing and critical review. ANK participated analysis-interpretation, literature review, writing and critical review. ÖÖ participated analysis-interpretation, literature review, writing and critical review.

Conflict of interests: The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Approval was granted by the Suleyman Demirel University Faculty of Medicine Clinical Research Ethics Committee (Date: January 26, 2022; No: 28).

Funding: The authors received no financial support for the research, authorship, and/or publication of this article.

Peer-review: Externally peer-reviewed.

REFERENCES

1. Crow S. The economics of eating disorder treatment. *Current Psychiatry Reports* 2014; 16:14-16.
2. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders V*. 5th ed. Washington, DC: American Psychiatric Association; 2013.
3. Dell'Osso L, Abelli M, Carpita B, Pini S, Castellini G, et al. Historical evolution of the concept of anorexia nervosa and relationships with orthorexia nervosa, autism, and obsessive-compulsive spectrum. *Neuropsychiatric Disease and Treatment* 2016;12:1651-1660.
4. Vandereycken W. Media hype, diagnostic fad or genuine disorder? Professionals' opinions about night eating syndrome, orthorexia, muscle dysmorphia, and emetophobia. *Eating Disorders* 2011;19:145-155.
5. Bratman S. Orthorexia vs. theories of healthy eating. *Eating and Weight Disorders* 2017;22:381-385.
6. Chaki B, Pal S, Bandyopadhyay A. Exploring scientific legitimacy of orthorexia nervosa: A newly emerging eating disorder. *Journal of Human Sport and Exercise* 2013;8:1045-1053.
7. Koven NS, Abry AW. The clinical basis of orthorexia nervosa: Emerging perspectives. *Neuropsychiatric Disease and Treatment*. 2015; 11:385-394.
8. Duran S, Cicekoglu P, Kaya E. Relationship between orthorexia nervosa, muscle dysmorphic disorder (bigorexia), and self-confidence levels in male students. *Perspectives in psychiatric care* 2020;56:878-884.
9. Schilder P. *The Image and appearance of the human body*. 1st ed. London: Routledge; 1999.
10. Murray S. In *The Fat Female Body*. 1st ed. London: Palgrave Macmillan; 2008.
11. Tylka TL. Positive psychology perspectives on body image. *Encyclopedia of Body Image and Human Appearance* 2012;2:657-663.
12. Bailey KA, Cline LE, Gammage KL. Exploring the complexities of body image experiences in middle age and older adult women within an exercise context: The simultaneous existence of negative and positive body images. *Body Image*. 2016; 17:88-99.

13. Osa ML, Calogero RM. Orthorexic eating in women who are physically active in sport: a test of an objectification theory model. *Body Image* 2020; 35:154-60.
14. Jackson AM, Cox AE, Sano Y, Parker L, Laniga, J. Body image and eating behaviors: a latent profile analysis. *Body Image* 2022;41:396-405.
15. White M, Berry R, Rodgers RF. Body image and body change behaviors associated with orthorexia symptoms in males. *Body Image* 2020;34:46-50.
16. Barnes MA, Caltabiano ML. The interrelationship between orthorexia nervosa, perfectionism, body image and attachment style. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity* 2017;22:177-184.
17. Barthels F, Meyer F, Pietrowsky R. Orthorexic eating behavior: A new type of disordered eating. *Ernahrungs Umschau* 2015; 62:156-161.
18. Lantz C, Hardy C, Ainsworth B. Social physique anxiety and perceived exercise behavior. *Journal of Sport Behavior* 1997;20:83-93.
19. Schlenker BR, Leary MR. Social anxiety and self-presentation: a conceptualization model. *Psychological Bulletin* 1982;92:641-669.
20. Hart EA, Leary MR, Rejeski WJ. Tie measurement of social physique anxiety. *Journal of Sport and Exercise Psychology* 1989;11:94-104.
21. Eriksson L, Baigi A, Marklund B, Lindgren EC. Social physique anxiety and sociocultural attitudes toward appearance impact on orthorexia test in fitness participants. *Scandinavian Journal of Medicine and Science in Sports* 2008;18:389-394.
22. Thompson AM, Chad KE. The relationship of social physique anxiety to risk for developing an eating disorder in young females. *Journal of Adolescent Health* 2002;31:183-189.
23. Alcaraz-Ibáñez M, Sicilia Á, Díez-Fernández DM, Paterna A. Physical appearance comparisons and symptoms of disordered eating: The mediating role of social physique anxiety in Spanish adolescents. *Body Image* 2020;32:145-149.
24. Pan H, Liu S, Miao D, Yuan Y. Sample size determination for mediation analysis of longitudinal data. *BMC Medical Research Methodology* 2018;18:32.
25. Secord PF, Jourard SM. The appraisal of body-cathexis: body-cathexis and the self. *Journal of Consulting Psychology* 1953;17:343-347.
26. Hovardaoglu, S. Body image scale. *Psychiatry Psychology Psychopharmacology* 3P 1993;1:26-27.
27. Balli O, Asci H. Reliability and validity of social physique anxiety scale. *Hacettepe Journal of Sport Sciences* 2006;17:11-19.
28. Donini LM, Marsili D, Graziani MP, Imbriale M, Cannella C. Orthorexia nervosa: validation of a diagnosis questionnaire. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity* 2005;10:e28-e32.
29. Arusoglu G, Kabakci E, Koksall G, Merdol TK. Orthorexia nervosa and adaptation of ORTO-11 into Turkish. *Turkish Journal of Psychiatry* 2008; 19:283-291.
30. World Health Organization (WHO). Obesity: preventing and managing the global epidemic: report of a who consultation on obesity Geneva 3-5 June 1997 (Repr. 2004).
31. Hayes A. Introduction to mediation, moderation, and conditional process analysis: a regression-based approach. 3rd ed. New York, NY: The Guilford Press; 2022.
32. Baron M, Kenny DA. The moderator-mediator variable distinction in social psychological research: conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology* 1986;51:1173-1182.
33. Cepikkurt F, Coskun F. Social physique anxiety and body image satisfaction levels of collegian dancers. *Pamukkale Journal of Sport Sciences* 2010;1:17-24.
34. Thompson AM, Chad KE. The relationship of pubertal status to body image, social physique anxiety, preoccupation with weight and nutritional status in young females. *Canadian Journal of Public Health* 2000;91:207-211.
35. Puhl RM, King KM. Weight discrimination and bullying. *Best Practice Research Clinical Endocrinology Metabolism* 2013;27:117-127.
36. Calogero RM, Tylka TL, Mensinger JL, Meadow A, Daniélsdóttir S. Recognizing the fundamental right to be fat: a weight-inclusive approach to size acceptance and healing from sizeism. *Woman Therapy* 2019;42:22-44.