

Factors that contribute to the body image concern of female college students

Fatores que contribuem para preocupação com a imagem corporal de estudantes universitárias

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ABSTRACT: Objective: To estimate the contribution of sociodemographic and labor variables and body mass index to body image concern. **Methods:** In order to estimate body image concern, the Body Shape Questionnaire (BSQ) and the Weight Concerns Scale (WCS) were applied. A confirmatory factor analysis of scales was carried out. The reason χ^2 by degree of freedom ratio (χ^2/df), Comparative Fit Index (CFI), Normed Fit Index (NFI), and root mean square error of approximation (RMSEA) were used. Convergent validity was assessed through the average variance extracted and composed reliability and the internal consistency through standardized Cronbach's alpha coefficient (α). A structural model was developed, and the body image concern was the second-order main construct. The model appropriation was evaluated based on the goodness-of-fit indices. The z test was used to estimate the significance of trajectories (β) using a 5% significance level. **Results:** Totally, 595 female college students participated in the study, with a mean age of 20.42 ± 2.44 years. The entire model, with the inclusion of all independent variables, showed unsatisfactory adjustment and was refined. The final model presented a satisfactory adjustment ($\chi^2/df = 5.75$; CFI = 0.87; NFI = 0.85; RMSEA = 0.09) with inclusion of medication use because of studies ($\beta = 0.08$; $p = 0.04$), academic performance ($\beta = 0.09$; $p = 0.02$), economic class ($\beta = 0.08$; $p = 0.03$), and body mass index ($\beta = 0.44$; $p < 0.001$). This model explained 22% of body image concern. **Conclusion:** Medication use due to studies, academic performance, economic class and body mass index significantly contribute to body image concern.

Keywords: Body image. Scales. Body Mass Index. Women. Students. Questionnaires.

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RESUMO: *Objetivo:* Estimar a contribuição de variáveis sociodemográficas, laborais e do índice de massa corporal para a preocupação com a imagem corporal. *Métodos:* Para estimar a preocupação com a imagem corporal foram utilizadas as escalas *Body Shape Questionnaire* (BSQ) e *Weight Concerns Scale* (WCS). Foi realizada análise fatorial confirmatória das escalas e utilizados os índices Razão χ^2 e graus de liberdade (χ^2/gl), *Confirmatory Fit Index* (CFI), *Normed Fit Index* (NFI) e *Root Mean Square Error of Approximation* (RMSEA). A validade convergente foi estimada por Variância Extraída Média e Confiabilidade Composta e a consistência interna pelo Alfa de Cronbach padronizado (α). Foi confeccionado um modelo estrutural sendo a preocupação com a imagem corporal o construto central de segunda ordem. A adequação do modelo foi avaliada com base nos índices de ajustamento. O teste z foi utilizado para estimar a significância das trajetórias (β) utilizando-se 5% de significância. *Resultados:* Participaram 595 estudantes universitárias com média de idade de $20,42 \pm 2,44$ anos. O modelo completo, com a inserção de todas as variáveis independentes, apresentou ajustamento insatisfatório e foi refinado. O modelo final apresentou ajustamento satisfatório ($\chi^2/gl = 5,75$; CFI = 0,87; NFI = 0,85; RMSEA = 0,09) com a inclusão do consumo de medicamento devido aos estudos ($\beta = 0,08$; $p = 0,04$), desempenho acadêmico ($\beta = 0,09$; $p = 0,02$), classe econômica ($\beta = 0,08$; $p = 0,03$) e índice de massa corporal ($\beta = 0,44$; $p < 0,001$). Esse modelo explicou 22% da preocupação com a imagem corporal. *Conclusão:* O consumo de medicamentos devido aos estudos, o desempenho acadêmico, a classe econômica e o índice de massa corporal contribuem significativamente para a preocupação com a imagem corporal.

Palavras-chave: Imagem corporal. Escalas. Índice de massa corporal. Mulheres. Estudantes. Questionários.

INTRODUCTION

Body image is a multidimensional abstract concept from psychological, social, and behavioral factors. This is a mental representation that a person develops of his/her body, and it is strongly influenced by cultural and environmental aspects^{1,2}.

Body image assessment can be done through psychometric scales that estimate aspects regarding body image, such as body shape concern, body weight concern, attitudes upon the body, and muscle structure concern³.

Body shape and body weight concerns are important aspects that are usually investigated alone in order to evaluate the body image concern⁴⁻⁷. These constructs have been analyzed because they might indicate the perceptions and/or perceptible alterations associated with the image that subjects possess of their own body, which could be strategic to identify early marked distortions that may pose an impact on these subjects' health².

Literature presents several scales to estimate such aspects. Among them, the Body Shape Questionnaire (BSQ)⁵, the Weight Concerns Scale (WCS)⁷, the Body Image Avoidance Questionnaire (BIAQ)⁸, and the Silhouette Scale⁹ are more seen.

The BSQ and WCS scales were provided to evaluate body shape concern and body weight concern, respectively. The development of scales aimed at the female population because, according to literature¹⁰⁻¹³, they are more concerned with body image aspects than men.

Some studies¹⁴⁻¹⁶ state that female college students present an excessive concern about their bodies. The university context has been reported as an interference in satisfaction/dissatisfaction with the body¹⁴⁻¹⁹, owing to gain of autonomy, group pressures, and self-criticism. Thompson²⁰ highlights that it is important to identify variables that might contribute to body image concern. Some studies report that social variables such as economic class and educational level^{21,22}; labor variables such as academic performance, course year, presence of paid work, and medication use owing to studies^{11,23}; and anthropometric ones such as body mass index (BMI) and waist circumference^{16,24} reveal a significant association with body image perception.

Hence, on the basis of the importance that body image concern might pose effect on some people's daily life, this study was carried out with the aim of estimating the contribution of sociodemographic and labor variables and BMI to body image concern, which is assessed through body shape and body weight concern. Thus, this study sought to test the hypothesis of sociodemographic and labor variables and BMI significant contribution to body image concern.

METHODS

STUDY DESIGN AND SAMPLE OUTLINE

This is an observational cross-sectional study, with a nonprobabilistic sample. Female college students, older than 18 years, enrolled in 2012 on undergraduation courses (Pharmacy-Biochemistry, Languages, Pedagogy, Public Administration, Economy, and Social Sciences) of *Universidade Estadual Paulista* (Unesp), in Araraquara (São Paulo) campus, Brazil, were invited to take part in the study.

The minimum sample size was estimated considering the need of 10 respondents per assessed parameter; which resulted in a minimum estimation of 240 participants. In addition, a 20% loss rate was considered; therefore, the sample minimum size was corrected to 300 students^{25,26}. However, because this study aimed at developing a predictive model that could represent the population, we opted for working with a larger sample so that statistical tests could be taken. This decision was based on the fact that larger samples tend to provide more accurate results, with decrease of sample error impact, thus providing results that are closer to the population index^{26,27}.

INSTRUMENTS

In order to estimate body image concern, the BSQ and WCS scales were used in the Portuguese version, validated for Brazilian female college students by Da Silva, Dias, Maroco, and Campos²⁸ and Dias, Silva, Maroco, and Campos²⁹, respectively. The choice for these psychometric scales was based on their international range when applied to measure the constructs “body image concern” and “body weight concern,” in their satisfactory psychometric proprieties in different samples and owing to their practicability, as they are short instruments with easy comprehension.

The BSQ was suggested by Cooper, Taylor, Cooper, and Fairburn⁵ in a one-factor model to assess body shape concern in women. The full version of the scale reveals 34 self-completion items with six-point Likert type answers. Di Pietro and Silveira⁶ presented the Portuguese version of the scale. Evans and Dolan³⁰ introduced different short versions of the BSQ with 8 and 16 items. Both the full and short versions had been previously tested²⁸ for the study sample. The eight-item short version (BSQ-8) comprised the items 5, 11, 15, 20, 21, 22, 25, and 28 and showed better adjustment to the sample ($\chi^2/df = 2.60$; CFI = 0.98; NFI = 0.97; RMSEA = 0.04; AIC = 84.07; BIC = 157.75; BCC = 84.46). Therefore, it was the version used in this article.

Killen et al.⁷ introduced the WCS in a one-factor model to assess body weight concern in women. The scale includes five self-completion items with seven-point Likert type answers. Dias, et al.²⁹ recommended the Portuguese version. The authors verified in the validation study that the scale showed a greater adjustment in a sample with Brazilian female college students ($\chi^2/df = 8.43$; CFI = 0.98; NFI = 0.98; RMSEA = 0.08).

The instruments used in this study were applied after original authors of the scales sent their permissions for use.

STUDY VARIABLES

The investigated dependent variable was body image concern, including the constructs “body shape concern” and “body weight concern”, which were measured using the BSQ and WCS, respectively, as previously described.

The independent variables age (in complete years), head of the family’s educational level, and economic class were investigated. The two last ones were assessed through the recommendation of the Brazilian Association of Research Companies³¹. The variables associated with academic field included the investigation of course year, self-reported performance in the course (classified as excellent, good, regular, or bad), presence or absence of labor activity together with studies, and medication use frequency (never, usually, or sometimes) because of studies. No information about the type of medication used was found in the medication use research, because the only goal of the study was to identify the need of medication use to relieve pressures from academic activities, regardless the presented reason. With regard

to how the academic performance was evaluated (self-reported in categories), this option was done based on the idea that student's perception evaluation as to his/her own performance is not necessarily associated with his/her real performance in the course (assessed through final mean). The survey of students' academic history together with undergraduate section could certainly present a more accurate estimative of the real academic performance of the participant; however, many times, performance feeling is different from the real one. Thus, for this research, more important than the real student's performance was the perceived performance, because it suffers a direct self-criticism reflex and of how the student feels about university environment pressures. Hence, we chose to investigate students' self-reported performance.

Referred³² weight and height information was also collected to measure the BMI (kg/m²). We must highlight that the use of such measures, in epidemiological studies, as a replacement of real measures, has been supported in literature³³⁻³⁵.

PROCEDURES AND ETHICAL ASPECTS

Female students completed the instruments inside their classrooms together with the teacher in charge of the theoretical discipline, who also authorized their application in writing. Before receiving the instruments, the participants were informed about the research objective and ethical rules. It was a voluntary participation. Questionnaires were identified with a number code.

The Research Ethics Committee in Human Beings of the School of Pharmaceutical Sciences (UNESP) approved the study (protocol CEP/FCF/Car number 16/2010). Only female students older than 18 years who signed the free informed consent participated in the study.

EVALUATION OF PSYCHOMETRIC PROPRIETIES

Given that only female students who completed the instruments were included in this article, the adjustment evaluation of factorial structures from the BSQ-8 and WCS to the sample, before its inclusion in the predictive model, was again carried out. Hence, the confirmatory factorial analysis was done through the similarity maximum method. The indices were χ^2/df (χ^2 by degree of freedom ratio), CFI, NFI, and RMSEA³⁶. They were considered appropriate when $\chi^2/df \leq 2.0$; CFI ≥ 0.90 ; NFI ≥ 0.80 ; and RMSEA ≤ 0.10 ³⁶. The internal consistency was measured through standardized Cronbach alpha coefficients (α), and it was appropriate when $\alpha \geq 0.70$ ³⁷.

The convergent validity was estimated through the average variance extracted (AVE) and composed reliability (CR), and they were proper if AVE ≥ 0.50 and CR ≥ 0.70 ^{36,38}.

STRUCTURAL MODEL

The collected data were included in a structural model, in which the body image concern was the main second-order construct formed by the BSQ-8 and WCS³⁶ scales.

The independent variables “age,” “BMI,” “course year,” “head of the family’s educational level,” “economic class,” “presence of labor activity together with studies,” “use of medication owing to studies,” and “academic performance” were tested. The model adjustment was assessed using the χ^2/df , CFI, NFI, and RMSEA adjustment indices. The paths (β) were estimated, and their significance evaluated through the z test. A 5% significance level was used for decision taking.

The final model comprised only variables whose paths were significant ($p < 0.05$)^{39,40}.

The analyses were conducted in the softwares IBM SPSS Statistics (version 21, IBM SPSS, Chicago, IL) and AMOS 21.0 (IBM SPSS, Inc.).

RESULTS

Of the 949 female college students invited, 752 agreed in taking part of the study (answer rate = 79.2%); however, owing to lack of completion of some items from the inventories, 157 students were removed. The sample, therefore, comprised 595 female students, with the age mean of 20.42 (SD = 2.44) years. The students’ distribution according to the variables of interest is shown in Table 1.

The majority of students reported good performance in the course (64.7%), no need of taking medication owing to studies (71.6%), and no labor activities together with studies (69.9%). In addition, most of the students mentioned that the head of their families had completed high school or higher education (47.0%) and belonged to high social classes (A = 29.1 and B = 51.9%).

The average BMI was 22.38 (SD = 3.74) kg/m². With regard to the nutritional status that is classified from cut points to adults (≥ 20 years)⁴¹ and adolescents (18 – 20 years)⁴², 4.9% of the female students were considered malnourished, 76.8% eutrophic, and 18.3% overweight (overweight/obesity).

The adjustment of the BSQ-8 ($\lambda = 0.54-0.82$; $\chi^2/df = 3.11$; CFI = 0.98; NFI = 0.97; RMSEA = 0.06) and WCS ($\lambda = 0.51 - 0.79$; $\chi^2/df = 3.97$; CFI = 0.98; NFI = 0.98; RMSEA = 0.07); the convergent validity (BSQ-8: AVE = 0.50, CR = 0.88; WCS: AVE = 0.50; CR = 0.82); and internal consistence (BSQ-8: $\alpha = 0.88$; WCS: $\alpha = 0.77$) of the sample were appropriate.

The adjustment of the entire structural model, including all the independent variables, was unsatisfactory (Table 2). Only the variables medication use, academic performance, economic class, and BMI presented a significant contribution for body image concern; thus, they were added to the final model.

Table 1. Characterization of the students according to the variables of interest, Araraquara, São Paulo, Brazil, 2012.

Characteristic	n	%
Course year		
First year	256	43.0
Second year	152	25.5
Third year	122	20.5
Fourth year	55	9.3
Fifth year	10	1.7
How would you classify your performance in the course?		
Excellent	37	6.2
Good	385	64.7
Regular	155	26.0
Bad	18	3.1
Have you ever needed to take any type of medication because of your studies?		
Never	426	71.6
Sometimes	145	24.4
Frequently	24	4.0
Do you work?		
No	416	69.9
Yes	179	30.1
Head of the family educational level		
Illiterate/Incomplete middle school	9	1.5
Complete middle school/incomplete elementary school	49	8.2
Complete elementary school/incomplete high school	49	8.2
Complete high school/incomplete college	214	35.1
Complete college	274	47.0
Economic class (monthly mean income)		
Class A (BRL 8,295.00 to BRL 11,480.00)	173	29.1
Class B (BRL 2,656.00 to BRL 4,754.00)	309	51.9
Class C (BRL 962.00 to BRL 1,459.00)	104	17.5
Class D+E (BRL 680.00)	9	1.5

The final structural model is seen in Figure 1. Although the model explicative power ($r^2 = 0.22$) is below the desired, it indicated a significant contribution of the variables economic class ($p = 0.030$), medication use owing to studies ($p = 0.041$), academic performance ($p = 0.025$) and BMI ($p < 0.001$) in the body image concern.

DISCUSSION

This study analyzed the contribution of sociodemographic and labor variables and of the BMI to female college students' body image concern, using the technique of structural equation modeling for estimating the predictive model. We hope that the obtained results would help other investigators, as variables that can be included in the educational protocols were identified, which seek to act preventively in the population with the aim of minimizing damage owing to the excessive concern of subjects with their own bodies, such as food behavior alterations and/or food disorders.

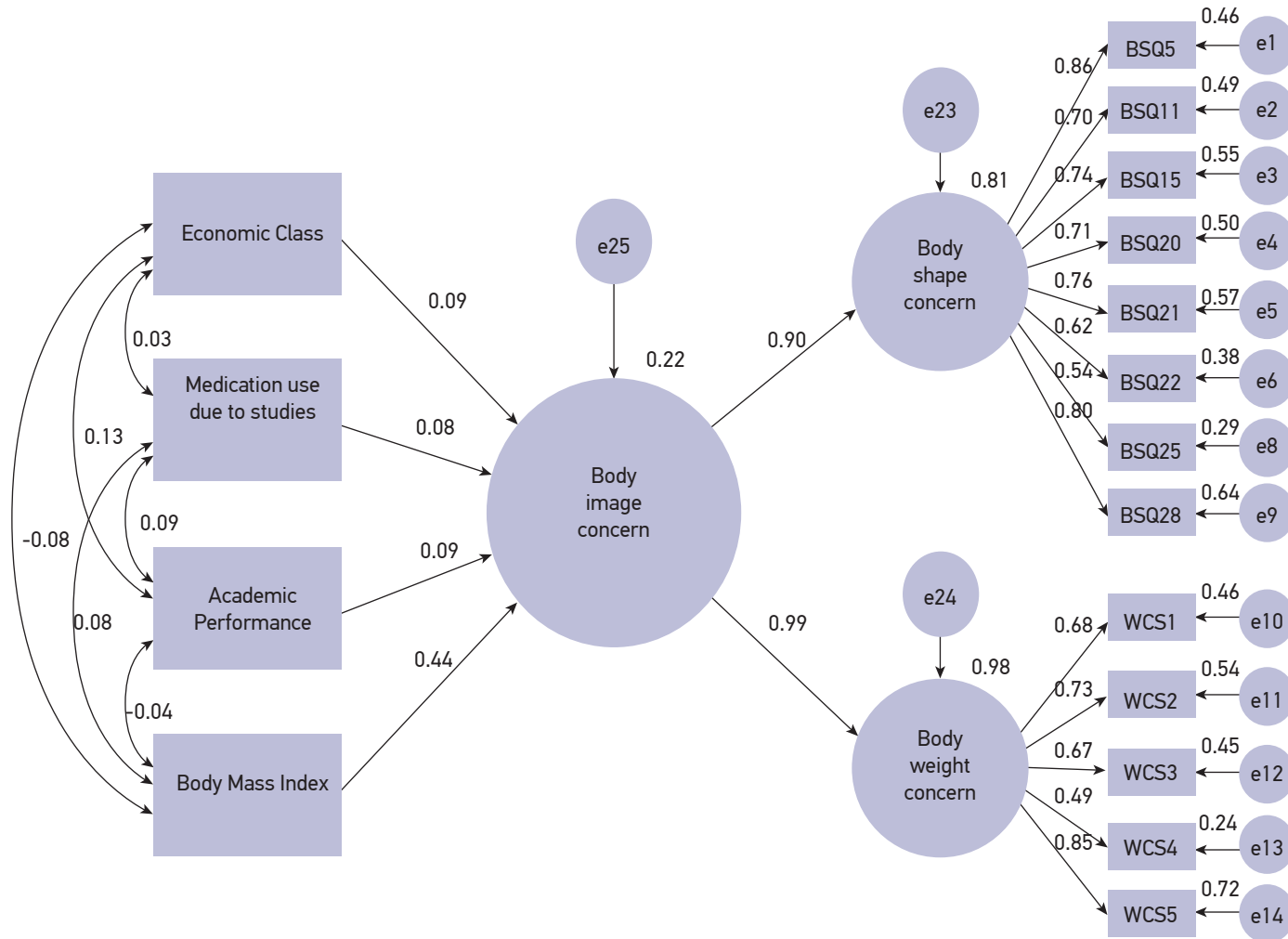
Subjects who frequently use medications because of studies, who reported good academic performance, who belong to the highest socioeconomic classes, and who presented higher BMI were seen in this study more concerned with their body image; therefore, they might be more vulnerable to the development of food disorders.

We must emphasize that body image concern was assessed in this study using the combination of two sides (body shape concern and body weight concern) (Figure 1). This might strengthen the acquisition of body image concern concept. Furthermore, the psychometric characteristics of the instruments were measured and tested before their inclusion in the

Table 2. Structural model including all independent variables of the study in body image concern of female college students, Araraquara, São Paulo, Brazil, 2012.

Variable	β	Standardized β	Standard error	p-value
Medication use because of studies	0.131	0.078	0.067	0.050*
Academic performance	0.139	0.091	0.061	0.023*
Age	-0.021	-0.054	0.017	0.227
Presence of labor activity	0.022	0.011	0.083	0.792
Head of the family educational level	-0.036	-0.038	0.037	0.333
Family economic level	0.105	0.080	0.053	0.049*
Body mass index	0.113	0.449	0.012	<0.001*
Course year	0.030	0.054	0.024	0.212

Explained variance = 0.22; χ^2 by degree of freedom ratio = 4.282; Confirmatory Fit Index = 0.878; Normed Fit Index = 0.848; root mean square error of approximation = 0.074; *values below significant minimum ($p < 0.05$).



χ^2 by degree of freedom ratio = 5.750; Confirmatory Fit Index = 0.871; Normed Fit Index = 0.849; root mean square error of approximation = 0.089.

Figure 1. Structural model adjusted to the sample of female college students, Araraquara, São Paulo, Brazil, 2012.

predictive model, which, besides not being a commonly done strategy in the literature, is essential to perform a more accurate estimative of the construct.

The low explainable power of the model (Figure 1) found in this study points out the need of adding more variables that might be associated with body image concern but were not included. There are a great number of variables that could be associated with the construct (psychological, behavioral, cognitive, psychosocial, among others), which make the creation of a single and complete predictive model more difficult. Thus, studies in this area need to be constantly performed with the aim of testing the contribution of different variables to body image concern. On the basis of these studies, the significant variables can be identified and grouped into a more complete model that might be created from previous evidence. Hence, in this article, initial evidence on the operationalization of the body image concern construct in female college students was presented, which can be included in future protocols, both for investigators and for area professionals who want to act educationally/preventively/curatively.

The variables medication use due to studies, academic performance, economic class, and BMI showed a significant contribution to body image concern. This is, therefore, a sign of the importance of using them in later studies that might extend this investigation.

Sepulveda, Carrobbles, and Gandarilhas²⁴ found that female college students are more vulnerable to physical-appearance issues because of the high stress and anxiety in the university medium. The authors also revealed that students who are too self-critical in achieving good performance in academic activities might have a higher probability of taking drugs to relieve their exhaustion and the pressures they experience. These outcomes might explain the significant contribution of academic performance and medication use because of studies to body image concern (Figure 1). They open an opportunity of conducting future investigations to identify why the medication was used, what type of medication was used, the student's psychosocial profile, among others.

Another result in agreement with literature^{22,43-45} is that the higher the socioeconomic class, the higher the body image concern. This was explained by Maruf, Akinpelu, and Udoji²¹, based on the point that less economically favored subjects have the tendency of accepting body changes and food behavior as a way of social ascension following the improvement of acquisitive power and food access.

With regard to BMI, our data reinforce literature information^{46,47} that support a positive, strong, and significant relation between BMI and body image concern. This has also been confirmed in different populations^{4,12,47,48}. Subjects considered as overweight or obese show more body concern than the eutrophic and underweight ones. It is important to emphasize this result is in agreement with other studies that used the BMI calculated from the self-reported weight and height^{12,48} and those that measured^{4,47} these parameters directly. Thus, we need to focus on the importance of including this variable in clinical and/or epidemiological contexts of investigation and/or monitoring of body concern,

as this measure is described in several studies as one of the most important factor to be investigated when studies and/or treatments are conducted involving body image and its distortions.

Hence, we suggest the conduction of more studies that might include other demographic, labor, social, clinical, and psychological variables with the aim of identifying the factors that might increase the predictive capacity of the proposed model. Besides, the performance of studies using real weight and height measurements (measured) and academic grades from students might be interesting for a future comparison with data presented in this study, trying to elucidate points that might represent a limitation of this study.

CONCLUSION

Medication use because of studies, perception of academic performance, economic class, and BMI were significant predictors of body image concern.

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