

## A study of the validity and reliability of the Brazilian version of the Body Shape Questionnaire (BSQ) among adolescents

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### Estudo de validade e confiabilidade da versão brasileira do Body Shape Questionnaire (BSQ) para adolescentes

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#### Abstract

*Objectives: to produce evidence of the validity and reliability of the Body Shape Questionnaire (BSQ) – a tool for measuring an individual's attitude towards his or her body image.*

*Methods: the study covered 386 young people of both sexes aged between 10 and 18 from a private school and used self-applied questionnaires and anthropometric evaluation. It evaluated the internal consistency, the discriminant validity for differences from the means, according to nutritional status (underweight, eutrophic, overweight and obese), the concurrent validity by way of Spearman's correlation coefficient between the scale and the Body Mass Index (BMI), the waist-hip circumference ratio (WHR) and the waist circumference (WC). Reliability was tested using Wilcoxon's Test, the intraclass correlation coefficient and the Bland-Altman figures.*

*Results: the BSQ displayed good internal consistency ( $\alpha=0.96$ ) and was capable of discriminating among the total population, boys and girls, according to nutritional status ( $p<0.001$ ). It correlated with the BMI ( $r=0.41$ ;  $p<0.001$ ), WHR ( $r=-0.10$ ;  $p=0.043$ ) and WC ( $r=0.24$ ;  $p<0.001$ ) and its reliability was confirmed by intraclass correlation ( $r=0.91$ ;  $p<0.001$ ) for the total population. The questionnaire was easy to understand and could be completed quickly.*

*Conclusions: the BSQ presented good results, thereby providing evidence of its validity and reliability. It is therefore recommended for evaluation of body image attitudes among adolescents.*

**Key words** Validation studies, Reliability, Body Image, Adolescent, Scales, Psychometrics

#### Resumo

*Objetivos: verificar evidência de validade e confiabilidade do Body Shape Questionnaire (BSQ) – instrumento que mensura o aspecto atitudinal da imagem corporal.*

*Métodos: participaram 386 jovens, de ambos os sexos, na faixa etária de 10-18 anos de uma escola particular de ensino, por meio de questionários auto-aplicáveis e avaliação antropométrica. Avaliou-se a consistência interna, a validade discriminante pelas diferenças das médias, segundo estado nutricional (baixo peso, eutrófico, sobrepeso e obesidade), a validade concorrente por meio do coeficiente de correlação de Spearman entre a escala e o Índice de Massa Corporal (IMC), a razão circunferência quadril (RCQ) e a circunferência da cintura (CC). Para confiabilidade, utilizou-se o teste de Wilcoxon, o coeficiente de correlação intraclass e as Figuras de Bland-Altman.*

*Resultados: o BSQ apresentou boa consistência interna ( $\alpha=0,96$ ) e foi capaz de discriminar população total, meninos e meninas, segundo estado nutricional ( $p<0,001$ ). Correlacionou-se com o IMC ( $r=0,41$ ;  $p<0,001$ ), RCQ ( $r=-0,10$ ;  $p=0,043$ ) e CC ( $r=0,24$ ;  $p<0,001$ ) e confirmou sua confiabilidade por meio da correlação intra-classe ( $r=0,91$ ;  $p<0,001$ ) para população total. Registrou-se boa compreensão e tempo de finalização.*

*Conclusões: o BSQ apresentou bons resultados confirmando as evidências de validade e confiabilidade, sendo recomendado para avaliação do aspecto atitudinal da imagem corporal para adolescentes.*

**Palavras-chave** Estudos de validação, Confiabilidade, Imagem corporal, Adolescente, Escalas, Psicometria

## Introduction

Body image refers to a kind of picture that a person has in mind concerning his or her body size, shape and structure, involving feelings regarding both these characteristics and the body's component areas.<sup>1</sup> This mental image extends beyond the body itself, since clothes, objects associated with the body and everything which originates or arises from the body becomes part of this created image.<sup>2</sup>

According to Cash and Brown,<sup>3</sup> the concept of "body image" refers to a multidimensional construct which comprises at least two independent modalities: attitude, which relates to affection and cognition, and perception, which is related to self-appraisal of body size.

As this is a comprehensive construct, several measurement techniques are applied. According to Thompson,<sup>4</sup> there are now at least 50 measures available for evaluating body image. The most commonly used techniques are silhouette scales and questionnaires.<sup>5</sup> From a methodological point of view, both techniques have both advantages and disadvantages.

The technique involving silhouettes consists of drawings (silhouettes) of human beings, from which the subject must choose the one that is most similar to the way he or she perceives him- or herself and another image that is closer to the way the person would like to be.<sup>6</sup> This technique is widely used, as it is easy to apply and correct. However, its quantity of information provided on the subject is limited as it evaluates only the degree of satisfaction regarding the body image, this being understood as the difference (a numerical value) between the perceived real body and the desired ideal.

The questionnaire is another technique commonly used, because it is easy to use and allows for the inclusion of large samples. This technique usually evaluates body satisfaction, appearance and anxiety in relation to the body.<sup>7</sup> The application of questionnaires is a highly valuable resource, as it is easy to manage and, when necessary, the researcher can include more than one instrument in the application. Another advantage is that the results can be treated psychometrically and modified if necessary.<sup>7</sup>

Of the questionnaires available for evaluating the body image, the Body Shape Questionnaire (BSQ)<sup>8</sup> is one of the most widely used among researchers working in the fields of clinical medicine,<sup>9,10</sup> population studies,<sup>11,12</sup> intervention<sup>13</sup> and prevention.<sup>14</sup> It consists of 34 items to be filled in by the subject, presented in the score form of the Likert scale, and

aims to measure the subjects concern regarding his or her body shape and weight over the preceding four weeks, in particular the frequency with which individuals with or without eating disorders experience the sensation of "feeling fat". It is a tool that provides continuous and descriptive evaluation of dissatisfaction with body image in clinical and research settings.

The BSQ, in the original study, designed for the North American population, showed a high level of discriminant validity, internal consistency and reliability in the test-retest scenario.<sup>8</sup> Ghaderi and Scott,<sup>15</sup> found evidence, when applying it to a Swedish population, of good psychometric properties, finding an interclass correlation value in the test-retest of 0.90. The internal consistency, calculated in terms of Cronbach's alpha, varied from 0.94 to 0.97 for the populations investigated. For validation, there was a correlation of 0.72 between body image sub-scales and the EDI (Eating Disorders Inventory).

There is a Portuguese version of the questionnaire, although this has not yet been validated for adolescents.<sup>16</sup> Di Pietro<sup>17</sup> has validated the BSQ for the college population, but did not report on its reliability. In Brazil, this instrument is currently used in studies eating behavior and body image among women.<sup>18</sup> Other published studies have applied the instrument to specific populations.<sup>18-20</sup>

It is important to note that body dissatisfaction is one of the risk factors for the development of eating disorders and depression<sup>21</sup> among young people. In female adolescents, dissatisfaction with regard to weight, shape and individual body parts strongly correlates with and is a predictor of the perceived need to be thinner and the actions of dieting and purging.<sup>22,23</sup> As around 40% of girls and 25% of boys in North America begin dieting in adolescence,<sup>24</sup> early detection of dissatisfaction may be useful for the establishment of prevention and promotion measures, as well as for the management of eating disorders, eating behavior and depression among adolescents.

These measures will require valid and reliable that ensure trustworthy information for clinical examinations and research, and this has been thoroughly addressed by Thompson.<sup>4</sup> Given the importance of the BSQ<sup>8</sup> in research related to body image and the fact that there are no studies on the validity and reliability among adolescents as a specific group, this study analyzes the validity and reliability of this instrument for male and female adolescents.

## Methods

This study was conducted at a Primary and Secondary Private School located in the city of São Bernardo do Campo in the State of São Paulo, Brazil, in 2006.

All regularly enrolled adolescents between 10 and 18 years of age at this school were included. Of the 466 young people, eight did not wish to participate, five were not allowed by their parents and 65 did not bring the Free Informed Consent Form. Two young people were excluded: one for being pregnant and the other for being on psychiatric medication which could affect understanding of the questions. The final size of the sample, therefore, was 386.

The first contact with the school was made in March 2005, to present the research project and data was collected in March 2006. A pre-test was carried out in August and the two-stage questionnaires were applied and the anthropometric measurements taken between September and December 2006.

The questionnaire applied covered demographic data, anthropometric measurements and a self-rated scale. After the questionnaire had been completed by the group in the classroom, each adolescent was taken to the gymnasium to take their anthropometric measurements. At the end of this phase a second interview was scheduled within the following two to three weeks.<sup>6,11</sup>

The BSQ<sup>8</sup> consists of 34 self-scored questions using the Likert scale, with answers varying from 1 – never; 2 – rarely; 3 – sometimes; 4 – frequently; 5 – very often; to 6 – always.

The total score obtained on this questionnaire is used to measure body image dissatisfaction and is calculated by adding up the scores given for each of the 34 questions. The total can therefore vary from 34 to 204 points and the higher the score the greater the degree of dissatisfaction with regard to body image. A score of less than 80 is taken as evidence of no dissatisfaction, 80 to 110 represents slight dissatisfaction, 111 to 140 moderate dissatisfaction and a score higher than 140 indicates serious dissatisfaction, according to the cut-off points proposed by Cordás and Castilho.<sup>16</sup>

The anthropometric measurements were taken by the first author of this study by checking the students' weight, body stature, and hip and waist circumferences. An electronic platform-type scale, with a capacity of 150 kg divided into 100 gr units was used to measure body weight, with the adolescents wearing light clothes and bare foot, in accordance with the methodology proposed by Gordon *et*

*al.*<sup>25</sup> Stature was measured using a stadiometer (SECA) fixed to the wall with a scale in millimeters (mm) and the adolescent was asked to stand with his or her heels, calves, gluteus and shoulders against the wall. Weight and stature were measured twice and the average values were recorded. Waist and hip circumference were measured using a metrical tape-measure placed firmly around the waist at the level of the narrowest part of the trunk and around the gluteus.

The Body Mass Index (BMI) was calculated using the equation:  $BMI = \text{weight (kg)} / \text{stature (m)}^2$ .

Nutritional status was classified according to the WHO<sup>26</sup> recommendations for this age range: underweight <percentile 5; eutrophic between 5<sup>th</sup> percentile and 85<sup>th</sup> percentiles; at risk of overweight  $\geq 85^{\text{th}}$  percentile and <90<sup>th</sup> percentile; obese  $\geq 90^{\text{th}}$  percentile.

To confirm subjects had understood the questionnaire they were asked the following question: "Did you understand what was asked in this scale?"<sup>27</sup> The answers were of the Likert scale type: 0 - I did not understand anything; 1 - I understood a little; 2 - I understood so and so; 3 - I understood almost everything, but I had some doubts; 4 - I understood perfectly and I do not have any doubts. Adolescents were requested to register their degree of understanding after they had completed the questionnaire.

Sample size calculation was based on a  $\alpha=5\%$  and  $\beta=10\%$  to detect correlation coefficients of 0.40 to 0.60,<sup>7,8,11</sup> requiring a minimum participation of 62 adolescents of each sex.

Descriptive statistical analyses were carried out and averages, standard deviations and minimum and maximum values were calculated. The psychometric properties of the test were confirmed using internal consistency, discriminant and concurrent validity, reliability, time taken to complete the questionnaire and verbal comprehension.

Internal consistency was estimated using Cronbach's  $\alpha$  coefficient and the discriminant validity by comparing the four groups (underweight, eutrophic, at risk of overweight and obese<sup>26</sup>) using the Kruskal-Wallis analysis of variance. The obese adolescents are expected to express a greater degree of dissatisfaction when compared to the others. To test for concurrent validity, the distributions of the variables were initially tested and, when they did not respond to a normal condition, Spearman's rank correlation coefficient was used to test the correlation between the scale score and the Body Mass Index, the waist circumference (WC) and the waist-hip ratio (WHR) respectively. It is to be expected

that the higher the BMI, the WC or the WHR, the greater the degree of dissatisfaction.

Reliability was evaluated by comparing the averages of the scale scores at the two research stages (test-retest) using the Wilcoxon test, the interclass correlation coefficient ( $r_{\text{interclass}}$ ) and Bland-Altman figures.<sup>28</sup> For the analysis of the time taken to complete the scale, the average time taken by each adolescent to fill it in was registered and verbal comprehension was analyzed using mean values and standard deviations.

These analyses were performed separately for the overall population, for males and for females.

The Epi-Info software version 6.04 for DOS was used to ensure input consistency and to undertake descriptive analysis of the data. Further analysis was carried out using the SPSS statistics package version 12.0 and, for Bland Altman graphs, MedCalc was employed.

The young people were invited to volunteer and

asked to take the Free Informed Consent Form home to their parents and to bring it signed. The data collection only started once these conditions had been met.

This study was carried out in compliance with Regulation 196 (10/10/1996) of the National Health Council and was approved by the Research Ethics Committee of the University of São Paulo's Faculty of Public Health.

## Results

The sample comprised the 386 young people that took part in the research. 178 (46.1%) were males and 208 (53.9%) females. The means (SD) for BMI were found to be 22.0 (4.1) for the population as a whole and 21.9 (4.6) and 22.0 (3.7) for males and females, respectively (Table 1).

**Table 1**

Descriptive statistics for anthropometric variables among overall population and according to sex. São Bernardo do Campo, São Paulo, 2006.

Variable	Overall population (N=386)		Male (N=178)		Female (N=208)	
	$\bar{X} \pm \text{SD}$	Min-Max	$\bar{X} \pm \text{SD}$	Min-Max	$\bar{X} \pm \text{SD}$	Min-Max
Age (years)	13.8 ± 2.1	10-18	13.8 ± 2.1	10-18	13.9 ± 2.2	10-18
Weight (kg)	57.5 ± 14.0	26-116	59.3 ± 16.4	30.5-115.7	55.8 ± 11.5	26.3-93.1
Height (cm)	161.1 ± 10.0	128-194	163.8 ± 11.8	133.4-194.2	158.7 ± 7.5	127.7-176.8
Waist circumference (cm)	74.2 ± 10.2	57.3-120.2	75.7 ± 11.5	57.3-120.2	72.9 ± 8.8	58.6-103.6
Hip circumference (cm)	90.5 ± 9.6	65.3-127.6	89.0 ± 10.2	68.7-127.6	91.9 ± 8.9	65.3-118.3
Waist-hip ratio	0.8 ± 0.1	0.7-1.2	0.9 ± 0.1	0.8-1.12	0.8 ± 0.1	0.7-1.2
Body Mass Index	22.0 ± 4.1	15-45	21.9 ± 4.6	14.7- 44.7	22.0 ± 3.7	15.7- 38.7

The majority of adolescents showed no signs of body image dissatisfaction (66%) and only 5% demonstrated serious dissatisfaction, although, among girls, this figure rose to almost 10% (Figure 1).

The questions to which the highest percentage of adolescents answered "always", indicating a higher degree image dissatisfaction were: question 4 (Are you afraid of becoming fat (a) (or fatter?)) with 24.4%; question 28 (Are you worried about the fact of having more fat in your body?) with 18.4%, and question 2 (Are you worried about your physical

appearance so that you feel like going on a diet?) with 17.4%.

Scores ranged from 34 to 193 with an average of 73.9 points (sd= 34.6 and median = 62.5).

Analysis of internal consistency revealed a Cronbach's alpha coefficient ( $\alpha$ ) of 0.96 for the overall population, males and females. In terms of discriminant validity, there was a significant statistical difference in the average scores among the four subgroups studied for the total population ( $p < 0.001$ ), males ( $p > 0.001$ ) and females ( $p < 0.001$ ). The concurrent validity registered for the overall population

( $r=0.41$ ;  $p<0.001$ ;  $r=-0.10$ ;  $p=0.043$ ;  $r=0.24$ ;  $p<0.001$ ) showed statistically significant correlations between the BMI, the WHC and the WC. WHC for

females was the only measurement for which there was no statistically significant result (Table 2).

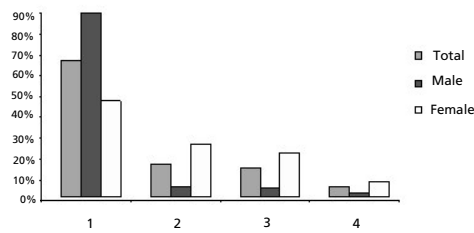
With regard to reliability, there was a statistically significant difference in the average scores for the total population: 73.9 (34.6), 68.2 (34.7),  $p<0.001$ ; males: 57.1 (26.6); 52.5 (25.8),  $p<0.001$  and females: 88.3 (34.3), 81.8 (35.6),  $p<0.001$ , for the first and second phases of the research, respectively. However, comparison of the averages reveals the proximity of the point estimates (Table 2).

The correlation coefficients between the scores for the two phases of research were significant for the total population (0.91,  $p<0.001$ ), males (0.91,  $p<0.001$ ) and females (0.89,  $p<0.001$ ) (Table 2). Figure 2 also shows that the BSQ displayed a good random distribution around zero with outliers, for all the groups under study (the total population, males and females).

The average time taken to complete the questionnaire was greater than 5.5 minutes and the verbal comprehension score was 3.5 (out of a maximum of 4.0).

**Figura 1**

Percentage distribution of Body Shape Questionnaire (BSQ) scores among adolescents. São Bernardo do Campo, São Paulo, 2006.



1=No dissatisfaction; 2=Light dissatisfaction; 3=Moderate dissatisfaction; 4=Severe dissatisfaction

**Table 2**

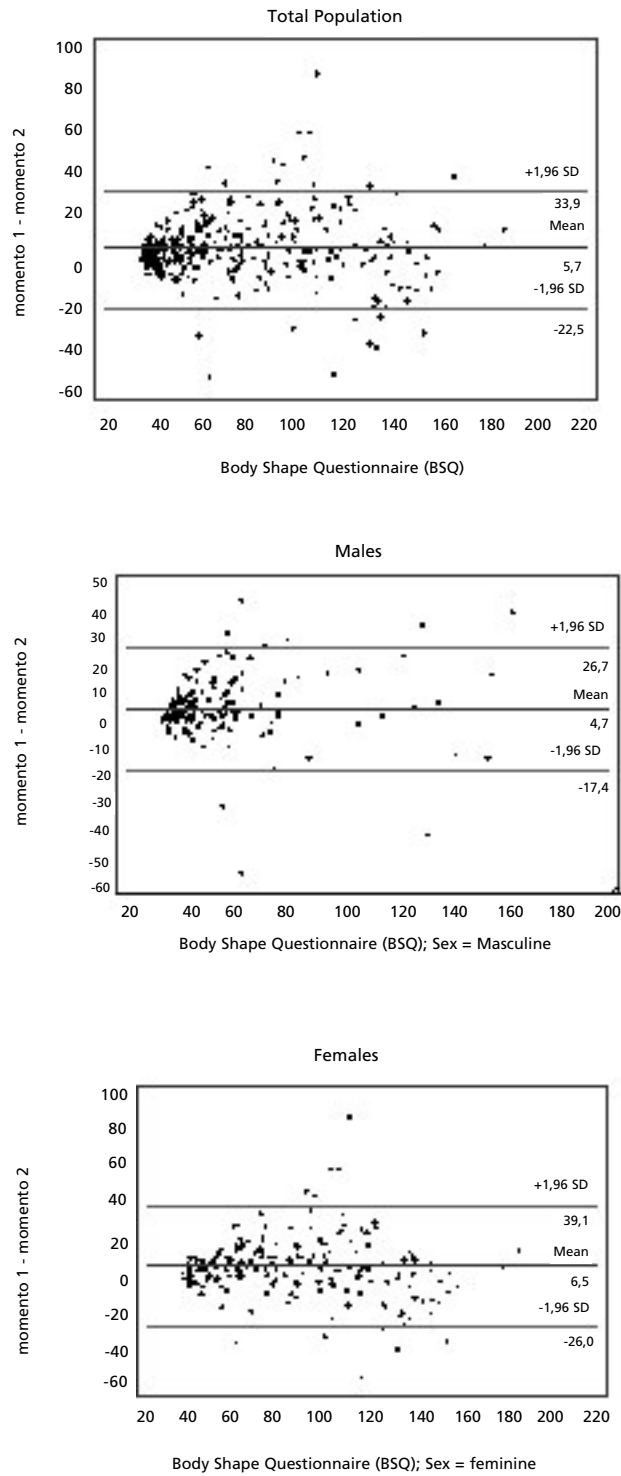
Summary of evidence for validity and reliability of Body Shape Questionnaire (BSQ) for the total population, for males and for females. São Bernardo do Campo, São Paulo, 2006.

Analysis		Total population	p	Male	p	Female	p
Discriminant Validity [ $\bar{X}$ (SD)]	Underweight	48.8 (15.0)	<0.001	47.0 (11.9)	<0.001	50.4 (17.8)	<0.001
	Eutrophic	72.0 (34.0)		53.7 (23.7)		87.5 (33.7)	
	Overweight	92.5 (32.6)		78.9 (34.7)		103.0 (27.2)	
	Obese	91.1 (40.3)		75.8 (34.2)		109.9 (40.9)	
Concurrent Validity [r (p)]	BMI*	0.41	<0.001	0.36	0.026	0.42	<0.001
	WHC**	-0.10	0.043	0.28	<0.001	0.08	0.261
	WC***	0.24	<0.001	0.29	<0.001	0.36	<0.001
Internal Consistency ( $\alpha$ Cronbach)		0.96		0.96		0.96	
Reliability (test-retest) [ $\bar{X}$ (SD)] $r_{icc}$ (p)		73.9 (34.6) <sup>1</sup>	<0.001	57.1(26.6) <sup>1</sup>	<0.001	88.3 (34.3) <sup>1</sup>	<0.001
		68.3 (34.7) <sup>2</sup>		52.5 (25.8) <sup>2</sup>		81.8 (35.6) <sup>2</sup>	
		0.91	<0.001	0.91	<0.001	0.89	<0.001
Time (minutes) [ $\bar{X}$ (SD)]		5.2 (1.7)		4.9 (1.7)		5.5 (1.6)	
Verbal comprehension [ $\bar{X}$ (SD)]		3.5 (0.7)		3.4 (0.8)		3.5 (0.6)	

\*BMI= body mass index; \*\*WHC=waist to hip ratio; \*\*\*WC=waist circumference; 1 = Test; 2 = Retest.

**Figure 2**

The Body Shape Questionnaire (BSQ) for total population, males and females. São Bernardo do Campo, São Paulo, 2006.



Source: Bland JM, Altman DG. Statistical methods for assessing agreement between two methods of clinical measurement. Lancet. 1986.<sup>28</sup>

## Discussion

This study provides evidence of the validity and reliability of the BSQ. The results show that the Portuguese version performed well, in terms of validation, reliability and verbal comprehension, when applied to a sample of adolescents. Thompson<sup>4</sup> and Cash and Szymanski<sup>29</sup> have stressed the importance of studies in this area, given the present lack of data.

A number of remarks should be made regarding the methodology used for validation of the BSQ. Smolak<sup>5</sup> states that greater portion of studies and scientific work focusing on the development of children and adolescents have given priority to “body satisfaction”, associating this with questions about age, sex, nutritional status, quality of family relationships, and social stress, among other factors. There is a consensus among the researchers in the area that overweight and obese adolescents, male or female, demonstrate a higher degree of dissatisfaction compared to their peers.<sup>30,31</sup>

Therefore, as there is no gold standard for evaluation of body image, we assumed, for the purposes of BSQ validation, that the obese and overweight adolescents would show a higher degree of dissatisfaction. This criterion was adopted when evaluating both discriminant and concurrent validity.

The BSQ is a self-reported measure of concern regarding body shape, especially the phenomenon of “feeling fat”.<sup>8,15</sup> In the original study,<sup>8</sup> items were derived from semi-structured interviews with various groups of women, including patients with anorexia and bulimia nervosa.

The BSQ was devised to measure dissatisfaction with regard to body size. Ghaderi and Scott<sup>15</sup> proposed and proved the existence of a single-affective-factor and showed that this can explain 52% of the total variance of the scale in the Swedish population.

In our study the internal consistency of the BSQ was shown to be significant, with the same value (0.96) found by Ghaderi and Scott.<sup>15</sup> As for discriminant validity, the BSQ was capable of discriminating the four subgroups studied and the BSQ scores were shown to be significantly correlated with adolescents' BMI, WHC and WC, but not with WHR among female adolescents, confirming the concurrent validity analysis. It was observed that overweight and obese male and female adolescents were more dissatisfied with their nutritional status.

Cooper *et al.*<sup>8</sup>, using concurrent validity, correlated the BSQ with an EAT overall score among the patients of  $r=0.35$ , and of  $r=0.61$  among students. Correlating the BSQ with the Body Dissatisfaction

Scale of the EDI exclusively for patients, a value of  $r=0.66$  was found, confirming the satisfactory results for validity.

Using yet another measure, Ghaderi and Scott<sup>15</sup> found, in their study of the BSQ, correlation values of 0.79 and 0.82. In our study the figures were different, probably because of the measurements employed, but the results can nevertheless be shown to be significantly correlated. The BSQ can thus be confirmed as valid both in terms of discriminant and concurrent validity.

With regard to reliability, the two phases of the BSQ were not exactly equivalent, when comparing the average for the groups under study, although the point estimates of the average are very close. Ghaderi and Scott,<sup>15</sup> in their study of the BSQ, obtained correlation coefficients of between 0.90 and 0.93 for test-retest. These correlations were a little stronger than those of 0.91, 0.91 and 0.89 found in our study for the total population and for males and females respectively, demonstrating a good fit between the phases of the study.

It can therefore be concluded that the BSQ varied for the groups under study in terms of the averages scores for the two phases of the research. However, the interclass correlation was shown not to vary in this way. The mean time for completion of questionnaire and the BSQ verbal comprehension score also reflected satisfactorily on the validity of the scale.

In conclusion, this study has provided corroborating evidence of the BSQ's validity and has further shown that the Portuguese version demonstrates a high degree of validity and considerable reliability, when applied to adolescents. It was shown that the questionnaire is easy to understand, although subjects took a long time to complete it. The psychometric results obtained using the BSQ were satisfactory, suggesting that it is an effective tool for both clinical practice and research. The BSQ can, therefore, be recommended for the evaluation of attitudes regarding body image among Brazilian adolescents, male and female. It is also recommended that further studies be carried out using different populations and employing different measures for comparison.

## Acknowledgments

This study was supported by CNPq: Process: 140097/2005-8.

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Recebido em 7 de abril de 2008

Versão final apresentada em 20 de julho de 2009

Aprovado em 3 de agosto de 2009