Spanish version of the Gardner body image validation scale in patients with eating behavior disorders

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INTRODUCTION

It is considered that the body image is made up by both perceptual components (how one sees him/herself) as well as attitudinal components (how one feels)1-2. An alarming number of adolescents are unsatisfied with their body; this tendency has been growing, thus, while in 1972 it was estimated3 that 6% of adolescents were not satisfied with their body image, in 1986, this value increased to 78%3. Consequently, Wadden et al.4 report that almost 70% of a sample of adolescents suffering from overweight had been on a diet during the previous year.

Studies on estimation of body weight and its relationship with eating behavior disorders (EBD) have been traditionally focused on the study of body image distortions present in patients with anorexia and bulimia, understanding distortion of the body image as perceptual incapacity to reliably assess body size and shape5-7. In general, these studies have shown that those who suffer eating behavior disorders tend to significantly overestimate their body mass, suffering alterations of self-estimate of the body image, a process modulated by many affective, cognitive, behavioral factors, potentially capable of explaining the proprioceptive distortions8.

The perception distortion of anorexic and bulimic subjects with their body image is a traditionally accepted fact7, and thus, it is gathered within the diagnostic criteria of eating behavior disorders9. This distortion is focused on body size and shape10, in fact, decrease of body image distortion is an accepted index of EBD treatment evolution, so that several treatments aimed at modifying this distortion have been developed11-15.
In a review, Thompson gathered more than 100 instruments developed for this end, all them classified as «shape stimuli.» These typically assess size, silhouette, weight and satisfaction with body image estimated by the subject. Most of the scales have a certain number of silhouettes (generally between 7 and 9) on a card on which there are silhouettes in ascending size from left to right. Based on these, the subject should mark the estimation of his/her present weight. Furthermore, the body image considered ideal for the patient is assessed. The difference between both estimations would represent a magnitude index of the discrepancy between present and ideal state, it also being interpreted as a measure of satisfaction with the body image.

The scales having a Likert type response format in which a reduced number of silhouettes are presented have been repeatedly criticized, since these would hardly be capable of representing a continuous type variable, such as that which is being attempted to evaluated. The restriction in the range of possible stimuli affects the reliability of the instrument; however, the presentation of a very high number of silhouettes also produces distortions in the reliability of the scale, because it is known that the range of silhouettes that is selected is generally about eight most of the times and this fact may artificially increase the test-retest reliability indexes of these scales.

Another factor that biases the results of these scales is the proportional magnitude of the chest and waist in the stimuli that are close to the scale extremes, in relationship to the central figure that supposedly represents normality, as is demonstrated by Gardner, Friedman and Jackson when they analyzed the silhouettes of Stunkard, Sorenson and Schlusinger. Thus, they advise that caution should be taken regarding the results obtained with the application of these scales.

In the present study, we proposed to adapt the Gardner, Stark, Jackson and Friedman body image assessment scale to thirteen silhouettes of 8 cm in height, that represent schematic outlines of the human figure that lack any attribute such as hair, face, etc. (fig. 1). The silhouettes were elaborated following the National Health Center statistics of the USA for a mean age of 19 years and weight of 63.99 kg (SD = 14.53). The middle figure represents the median of the weight distribution for the reference population and the changes were based on this, increasing or decreasing its volume ± 30% until six more silhouettes, which represented weight increase in growing order (5%, 10%, 15%, 20%, 25% and 30%) as well as six others that proportionally represented the progressive weight decrease (–5%, –10%, –15%, –20%, –25% and –30%) were constructed. All this provided a continuum of silhouettes, whose details represent an extremely thin figure and another obese one.

The scale makes it possible to obtain three indexes: the first represents the present perception of their body image; the second, the image that the patients estimate as «ideal» for them. Finally, the evaluator marks the real image that each one of the patients shows. In this way, it is possible to assess the degree of adjustment between the image perceived and desired, as well as an estimation of the objective body image performed by the evaluator.

In the original study, Gardner, Stark, Jackson and Freedman used 100 students (32 men and 68 women) whose mean weight was 62.01 kg, their BMI being 22.2. It should be mentioned that in the original study, the authors also presented two more assessment procedures, in which variations of this scale were implemented, using both an analogue scale with two silhouettes that represent the extreme points as well as by the use of video projection of the silhouettes. In this study, we omit the analysis of both procedures as we consider that both make the clinical evaluation difficult, given the need to perform complex image projection systems, that require a use of time that the clinician generally does not have.

**METHOD**

**Subjects**

A total of 282 women whose ages ranged from 13 to 35 years participated in this study. Of them, 168 made up the control group, all being students from the University of Murcia. The rest, 114, was formed by patients diagnosed with DSM-IV criteria and under treatment for EBD (table 1), either because they had anorexia (n = 57) or bulimia (n = 57). They came from the EBD Treatment Unit of the Hospitals of Niño Jesús (Madrid) and Virgen del Carmen (Ciudad Real), as well as from ADANER (Albacete). When the mean age of the three groups was compared, no significant differences were found ($F_{(2, 279)} = 1.2; p > 0.10$). On the other hand, the existence of significant differences among the three groups was observed in the body mass index (BMI) ($F_{(2, 279)} = 33.78; p < 0.000$), as well as in weight ($F_{(2, 279)} = 57.09; p < 0.000$).

**Instruments**

The Gardner, Stark, Jackson and Freedman body image assessment scale was used. This scale is formed by thirteen silhouettes of 8 cm in height, that represent schematic outlines of the human figure that lack any attribute such as hair, face, etc. (fig. 1). The silhouettes were elaborated following the National Health Center statistics of the USA for a mean age of 19 years and weight of 63.99 kg (SD = 14.53). The middle figure represents the median of the weight distribution for the reference population and the changes were based on this, increasing or decreasing its volume ± 30% until six more silhouettes, which represented weight increase in growing order (5%, 10%, 15%, 20%, 25% and 30%) as well as six others that proportionally represented the progressive weight decrease (–5%, –10%, –15%, –20%, –25% and –30%) were constructed. All this provided a continuum of silhouettes, whose details represent an extremely thin figure and another obese one.

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**Procedure**

All the participants were invited to collaborate voluntarily in this study. After obtaining their anthropometric...
data of height and weight, they were instructed to put a cross (X) on the silhouette that would represent the perception that they presently have of their body image; after, they were requested to estimate the silhouette that best represented the figure that they would like to have by marking it with a circle (O). Finally, the evaluator indicated his estimation of the body image of the participant with an asterisk (*). In order to avoid biases in the estimation of the evaluator of the body image of the participants’ in this study, all the evaluations were performed by the same evaluator with wide experience in this field.

RESULTS

Validity

The validity of the scale lies in the correct estimation of weight and body mass index of the subjects evaluated. Concurrent validity was estimated, assessing the relationship between the subjects’ weight and their estimations of the present weight and BMI for all the groups.

As can be seen in table 2, the estimations of the present image show greater correlations with weight and BMI in the control group, while the anorexia and bulimia groups make noticeably more biased estimations of their present image (table 2).

In relationship to the estimation of the present and desired image, table 3 gathers the degree of deviation on the three indexes obtained from the scale: perceived, desired and real image (estimated by the evaluator). On its part, table 4 gathers the percentages of deviation, in absolute values, in the three indexes. As can be seen in table 4, the difference between the perceived and desired image is considered an index of dissatisfaction with body image, while the difference between perceived and real image is considered an index of distortion of the body image (figs. 2 and 3). We differentiate between dissatisfaction and body image distortion indexes, since although both indexes are often similar, they should be differentiated, because dissatisfaction with one’s own body should be considered a manifestation of the body image disorder, which is a wider concept that includes many components.

After, we analyzed independently the relevant dependent variables obtained after the application of the scale: perceived image and desired image, following the models proposed by Williamson, Davis, Goreczny and Blouin and Williamson, Cubic and Gleaves. To do so, we performed a covariance analysis (ANCOVAs) for both variables, considering the body mass index (BMI) as covariant. The results showed that the BMI is a significant covariant, both of the perceived image (F(2,279) = 88.82; p <0.000; r = 0.323) as well as the desired one (F(2,279) = 50.04; p < 0.000; r = 0.230).

After adjusting the data obtained with the significant covariant variable (BMI), we compared the differences

| TABLE 2. Correlations between estimation of the present perceived image, weight and BMI for each group |
|---------------------------------|------|------|
| Group             | Weight | BMI  |
| Anorexia          | 0.352* | 0.322* |
| Bulimia           | 0.401** | 0.380* |
| Control           | 0.627*** | 0.673*** |

*p <0.01; **p <0.001; ***p <0.000.

### Table 3.

<table>
<thead>
<tr>
<th>Group</th>
<th>Perceived</th>
<th>Desired</th>
<th>Real</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anorexia</td>
<td>-0.36</td>
<td>-3.28</td>
<td>-3.67</td>
</tr>
<tr>
<td>Bulimia</td>
<td>1.80</td>
<td>-2.00</td>
<td>-0.71</td>
</tr>
<tr>
<td>Control</td>
<td>-0.52</td>
<td>-1.88</td>
<td>-1.05</td>
</tr>
</tbody>
</table>

The central figure was weighted with the value 0, while we assigned negative values (from -1 to -6) for the figures placed to the left of the central figure that represent the decrease in body mass; in the same way that positive values (from 1 to 6) were assigned for the figures located to the right of the central silhouette, that represents the slow increase of body mass.
between the perceived, desired and real image in the three groups; the results showed the existence of significant intergroup differences in the difference between the perceived and desired image ($F_{(2,29)} = 24.66; p < 0.000$), as well as between the perceived and real one ($F_{(2,29)} = 53.40; p < 0.000$). The post hoc analyses of the adjusted means verified the same pattern of results, that is, while the clinical groups of patients with anorexia and bulimia did not differ between themselves, both groups showed perceived, desired and real image indexes that were significantly different from those obtained by the control group.

### Reliability

Different reliability indexes of the scale were calculated. To do so, we used two samples composed of 61 subjects from the control group and 50 from the clinical group (25 anorexic and 25 bulimic). The scale was administered for the second time in a three week period to both groups. Different reliability indexes were performed: the correlation obtained between both applications (test-retest method), the correlations between the perceived image, weight and BMI, as well as the correlations between the dissatisfaction and distortion indexes between the first and second application. The results appear in Table 5 (Table 5).

### DISCUSSION AND CONCLUSIONS

These results substantially agree with various meta-analytic reviews regarding the alteration of the body image in eating behavior disorders. Thus, the meta-analyses performed by Smeets, Smit, Panhuysen and Ingleby and Cash and Deagle conclude that the lesser the body size of the anorexic subjects, the greater the overestimation they make of it. Our results show how the clinical groups perform more biased estimations of their body image than the control group, because the patients with

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**Table 4. Percentages of deviation, in absolute values, of the differences between the perceived, desired and real image**

<table>
<thead>
<tr>
<th>Group</th>
<th>Perceived/desired</th>
<th>Perceived/real</th>
<th>Desired/real</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anorexia</td>
<td>14.56</td>
<td>16.55</td>
<td>1.98</td>
</tr>
<tr>
<td>Bulimia</td>
<td>19.01</td>
<td>12.58</td>
<td>6.42</td>
</tr>
<tr>
<td>Control</td>
<td>6.84</td>
<td>3.09</td>
<td>3.75</td>
</tr>
</tbody>
</table>

The difference between the perceived and desired image is considered an index of dissatisfaction with the body image, while the difference between the perceived and real image is considered an index of distortion of the body image.

**Figure 2.** Graph of the mean scores obtained by the three groups of the subjects on the scale. X: perceived image; O: desired image; □ real image.

**Figure 3.** Graph of the percentages of deviation between the differences of perceived, desired and real image. X: perceived image - real image; O: perceived image - desired image and □ real image - desired image.

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**Table 5. Reliability (r) indexes obtained**

<table>
<thead>
<tr>
<th>Method</th>
<th>Control</th>
<th>Clinic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test-retests</td>
<td>0.84*</td>
<td>0.80*</td>
</tr>
<tr>
<td>Correlation scale and weight</td>
<td>0.59*</td>
<td>0.57*</td>
</tr>
<tr>
<td>Correlation scale and BMI</td>
<td>0.67*</td>
<td>0.64*</td>
</tr>
<tr>
<td>dissatisfaction index</td>
<td>0.79*</td>
<td>0.75*</td>
</tr>
<tr>
<td>Distortion index</td>
<td>0.88*</td>
<td>0.83*</td>
</tr>
</tbody>
</table>

*p < 0.001.
anorexia nervosa present a greater degree of body image distortion than the bulimics and controls, while the bulimics present greater levels of dissatisfaction with their body image than the remaining groups.

In the same way, these results manifest the need that has already been previously mentioned by other authors9,30 to control the present weight of the patients when performing analyses on their body image assessment, since, as has been manifested in our results, the BMI exerts a significant covariant role, biasing the results of the estimation of the body image.

Psychometrically, the results show the satisfactory properties of the instrument, thus, the reliability index widely exceeds the criterion established by Nunnally26, it being comparable to the original scale reported by its authors (r = 0.87; p < 0.0005). In the same way, the concurrent validity indexes of this adaptation are comparable to those of the original scale; thus, for example, Gardner et al. obtain high correlations between the scores obtained in the scale with weight (r = 0.62; p < 0.0005) and BMI (r = 0.62; p < 0.0005), very similar to those obtained in this study: r = 0.58; p < 0.001, y r = 0.65; p < 0.001, respectively.

For this reason, we consider that this scale represents a valid and reliable procedure of assessment of body image, because: a) it makes it possible to obtain dissatisfaction and distortion indexes of the body image; b) the format of the interval in which the figures are made makes it possible to analyze them using parametric statistics, solving the problems present in other scales, made using ordinal scales, which requires the use of non-parametric statistics, less potent statistically; c) it makes it easier to obtain indexes on over- or underestimation of the body mass to relate them with the body mass index, and d) the scale is psychometrically comparable and superior, in many cases, to other scales.

Finally, as mentioned by Gardner, Stark, Jackson and Freedman12, this scale presents some of the typical problems of this type of instruments: thus, for example, it is not possible to define the perception of overweight in different parts of the body.

REFERENCES


