Body Image Assessment Software: A new program for assessing body-image disturbance using adjustable partial image distortion

Marta Ferrer-García; José Gutiérrez-Maldonado and Alex Letosa-Porta
University of Barcelona

ECED Innsbruck 2005

Scientific Board, International Advisory Board & Local Organising Committee

Organised by:
The Austrian Society on Eating Disorders (OEGES/ASED): www.oeges.or.at
Netzwerk Essstörungen (Austrian Network Eating Disorders): www.netzwerk-essstoerungen.at
& Innsbruck Medical University, Dept. of Psychological Medicine & Psychotherapy: www.i-med.ac.at

Venue
Old University, Universitätsstrasse, Innsbruck
Emperor Leopold Hall

Scientific Board

Günther Rathner (Head)	Innsbruck, Austria
Martina de Zwaan	Erlangen, Germany
Andreas Karwautz	Vienna, Austria
Karin Waldherr	Vienna, Austria

International Advisory Board

Gerard Butcher, Ireland	Michel Probst; Belgium
Arthur Crisp, UK	Gerald Russell, UK
Massimo Cuzzolaro, Italy	Ulrike Schmidt, UK
Christopher Fairburn, UK	Pal Szabó, Hungary
Fernando Fernández-Aranda, Spain	Stephen Touyz, Australia
Manfred Fichter, Germany	Janet Treasure, UK
Hubert Lacey, UK	Ferenc Túry, Hungary
Mervat Nasser; UK	Walter Vandereycken, Belgium
Claes Norring, Sweden	Glenn Waller, UK
Robert Palmer, UK	

Local Organising Committee

Susanne B. Leeb	Gabriel Ingrid
Stephanie Oberndorfer	Waldegger Eva
Elisabeth Mores	Assmayr Karin
Julia Aichbauer	Kröll Julia
	Hellmair Christina

Marta Ferrer-García; José Gutiérrez-Maldonado and Alex Letosa-Porta
University of Barcelona

Body Image Assessment Software: A new program for assessing body-image disturbance using adjustable partial image distortion

Marta Ferrer-García; José Gutiérrez-Maldonado and Alex Letosa-Porta
University of Barcelona

jgutierrezm@ub.edu

In this study we present an innovative interactive computer program developed to assess body-image disturbances. This assessment is especially indicated in patients with eating disorders but it may also be of use in other contexts. The BIAS (Body-Image Assessment Software) is a simple, fast and economical method for assessing two of the most important body-image disturbances, body-size distortion and body dissatisfaction, via the modification of a scale image of the subject's figure.

Body-image disturbance has been one of the most widely studied areas in relation to eating disorders. Hilde Bruch (1962) was the first researcher to see the dysfunctional experience of body image as a main feature of eating disorders. Since then, numerous studies have focused on subjective body image. Indeed, body-image disturbances constitute an essential aspect in the differential diagnosis for eating disorders, distinguishing them from other disorders that also present altered eating habits and changes in body weight (Rosen, 1990). Moreover, body-image disturbances play an important role in the development and prognosis of eating disorders (Skrzypek, Wehmeier & Remschmidt, 2001).

Two aspects of body image dysfunction are usually distinguished: *perceptual distortion* and *body dissatisfaction* (Cash & Brown, 1987; Cash & Deagle, 1997; Schlundt & Bell, 1993; Thompson, 1990). Perceptual distortion is the inability to accurately perceive one's body size, and body dissatisfaction represents the degree to which people are content with the size and shape of their bodies. Perceptual distortion is usually measured with visual tasks, while body dissatisfaction tends to be measured by rating scales and questionnaires (Cash, 1991, 1994; Cooper & Fairburn, 1987; Cooper, Taylor, Cooper & Fairburn, 1987; Fairburn & Cooper, 1993; Franzoi & Shields, 1984; Garner, Olmstead & Polivy, 1983; Rosen & Reiter, 1996), though it can also be measured using visual tasks. The difference between real and ideal body size (the size that the subject would like to have) reflects the degree of body dissatisfaction.

Two large groups of visual tasks have traditionally been used, assessing either specific *body parts* or the *whole body*. Body part size procedures include techniques such as the movable callipter technique (Gleghorn, Penner & Schulman, 1987; Reitman & Cleveland, 1964), the visual size estimation procedure (Ruff & Barrios, 1986; Slade &

Marta Ferrer-García; José Gutiérrez-Maldonado and Alex Letosa-Porta
University of Barcelona

Russell, 1973; Thompson & Spana, 1988), the image-marking technique (Askevold, 1975; Molinari, 1995), and the kinaesthetic size estimation apparatus (Gila, Castro, Toro & Salamero, 1998). Whole body assessment procedures include techniques such as the distorting mirror (Traub & Orbach, 1964), projection of photographs with distorting lenses (Garner, Garfinkel & Bonato,1987; Garner, Garfinkel, Stancer & Moldofsky, 1976; Glucksmann & Hirsch;1969), the video-distortion technique (Allebeck, Hallberg & Spamark, 1976; Askevolt, 1975; Fernandez-Aranda, Dahme & Merman, 1999; Freeman, Thomas, Solyom & Hunter, 1984; Meerman & Vandereycken, 1988; Probst, Van-Coppenolle, Vandereycken & Goris, 1992; Smeets, Ingleby, Hoek & Panhuisen, 1999), the life-size screen distortion method (Gardner & Bokenkamp, 1996; Probst, Van-Coppenolle, Vandereycken, Kampman & Goris, 1991; Probst, Vandereycken, Van-Coppenolle, 1997; Probst, Vandereycken, Van-Coppenolle &Vanderlinden, 1995) and the silhouette method (Bell, Kirkpatrick & Rinn, 1986; Furnham & Alibhai, 1983).

Both whole body and body part procedures have their own methodological drawbacks. In whole body assessment, subjects modify the shape or size of the whole body, that is, they introduce the same amount of distortion throughout; therefore the test does not provide information on distortions in specific body parts. In turn, body part size estimation procedures allow the differential distortion of body parts but do not offer a holistic vision of the body image. The fact that most of the techniques included in these procedures offer only a frontal view of the body is an additional problem (Schlundt & Bell, 1993).

In recent decades, the development of new technologies has improved many psychological tools (Harper, Jentsch, Berry, Lau, Bowers & Sala, 2003). Many of the methodological failings of traditional body image assessing procedures have been overcome by the use of computers which can combine estimation procedures for whole body and body parts. In most of the applications developed to assess body image disturbance, a human figure appears on the computer screen and subjects can modify each body part separately. Examples are *Body Build* (Dickson-Parnell, Jones, Braddy & Parnell, 1987); *Body Image Testing System* (BITS) (Schlundt & Crystal Bell, 1993); the application proposed by Phillip Benson (Benson, Emmery, Cohen-Tovée & Tovée, 1999); *BodyImage* (Shibata, 2002). Moreover, virtual reality has allowed the creation of more realistic programs for body image assessment, in which the silhouettes appear in three dimensions. The BIVRS (Body Image Virtual Reality Scale; Riva, 1997, 1998) and *The Virtual Body* (Perpiña, Botella, Baños, Marco, Alcañiz & Quero, 1999; Perpiña, Botella & Ramos, 2000) are examples of this.

Despite the usefulness of these softwares, they have several drawbacks that must have been into account. For example, the body figures that the *Body Build* ant the *Body Image Testing System* (BITS) show are highly unrealistic, and so it is usually quite difficult for the subjects to identify with the image displayed. The main drawback of Benson's program is that it uses the therapist's subjective estimation to define the prototype that best fits the subject's real figure, with the result that the image presented to the subject is only an approximation of his or her real image.The main drawback of

Body Image Assessment Software: A new program for assessing body-image disturbance using adjustable partial image distortion

Marta Ferrer-García; José Gutiérrez-Maldonado and Alex Letosa-Porta
University of Barcelona

the *BodyImage* is that it only shows the whole figure of the subject or a part of it, and does not allow differential distortion of body parts in its holistic feedback on the body.

The applications designed by Riva and by Perpiña and co-workers both present subjects with a realistic female image with whom subjects can identify. However, both have limitations. Riva's instrument does not allow modification of individual parts. In Perpiña's, the subject's real body image is generated by the therapist, who adjusts each of the parts from photographs of the patient from different angles. This means that the size of the image may be biased by the perception and skill of the therapist.

We present an innovative interactive computer program developed to assess body-image disturbances. The BIAS (Body-Image Assessment Software) is a simple, fast and economical method for assessing two of the most important body-image disturbances, body-size distortion and body dissatisfaction, via the modification of a scale image of the subject's figure.

The program we describe here displays side and frontal views of a scale female human figure which is the same size as the subject. The image can be adjusted by independently modifying six body parts (head, arms, breast, waist, hip and legs) in the frontal view, and five body parts in the side view (head, breast, waist, hip and legs), using the computer mouse. The subject's real body image is generated by entering its objective measurements in a data base. The program proposes two visual tasks, which can be administered together or independently. In the first, subjects are asked to modify several frontal and side body parts in order to make a human figure as similar as possible to their real body image. In the second task subjects modify frontal and side body parts to make a human figure representing their ideal body image. The discrepancy between their real and perceived body size provides information about their degree of perceptual distortion. The discrepancy between subjects' perceived body size and their ideal body size (the size that the subject would like to have) provides information about their degree of body image dissatisfaction.

The main advantages of the BIAS (Body-Image Assessment Software) over other soft wares are: firstly, it allows displaying a scale image of a female human figure starting from the real measures of the patient. The therapist measures the real length and breadth of each of the parts of the subject's figure and introduces them into the computer. With these data, the program generates a female figure reproducing the subject's real image. Secondly, it allows the differential distortion of several body parts in the context of the whole body. Moreover, the BIAS can be run on any computer with Windows and Microsoft Access 2000 or Microsoft Access 2000 RunTime, and the data compiled may be analysed directly in widely used applications such as SPSS and Excel. So its strong points are its accessibility and its ability to generate a female figure to scale that represents the real silhouette of the patient. On the other hand, it is possible to obtain longitudinal data of each subject, performing repeated assessments of the perceived or desired body image. This should be useful not only for research purposes but in therapeutical contexts, in order, for example, to evaluate the effectiveness of a treatment program.

Body Image Assessment Software: A new program for assessing body-image disturbance using adjustable partial image distortion

Marta Ferrer-García; José Gutiérrez-Maldonado and Alex Letosa-Porta
University of Barcelona

BIAS demonstration:

Subject registration and data entering

First, the therapist registers the subject by entering her data. ("Add subjects' measurements"). This can be done using centimetres or inches.

These data are used to build a scale figure of the subject. The therapist has the choice to introduce real measures of a subject or use a standard subject. If you select a standard subject, you will be able to obtain only dissatisfaction indexes. If you select to introduce real measures, you will be able to obtain distortion and dissatisfaction indexes.

All the fields should be completed. Clicking on "Help measurements" will show a help figure with indications about points to take the measures.

Body Image Assessment Software: A new program for assessing body-image disturbance using adjustable partial image distortion

Marta Ferrer-García; José Gutiérrez-Maldonado and Alex Letosa-Porta
University of Barcelona
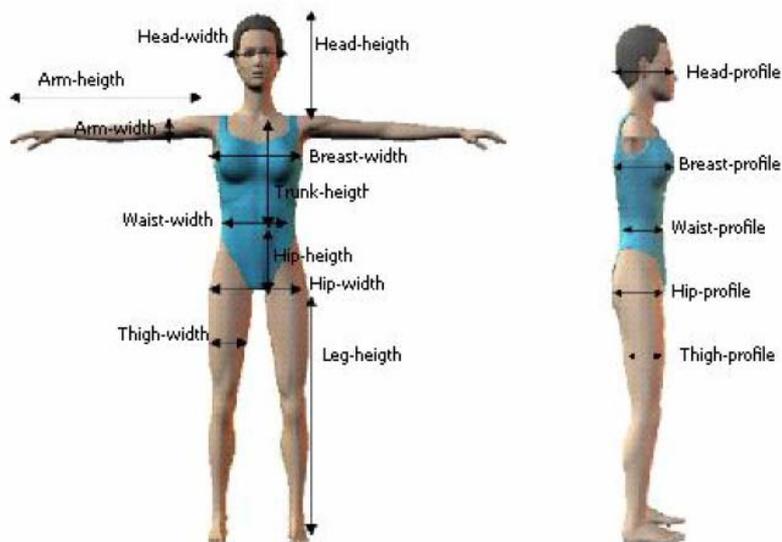
This screen is different if you select to use a standard subject, because real measures are not needed to build the figure:

Clicking on "History assessments" you'll be able to view (and copy) the previous assessments of this subject (there will be no one when you add the subject, but you'll find data when editing a subject with has previous assessments).

To assess the perceived body image or the desired body image:

Body Image Assessment Software: A new program for assessing body-image disturbance using adjustable partial image distortion

Marta Ferrer-García; José Gutiérrez-Maldonado and Alex Letosa-Porta
University of Barcelona

Once the personal data and measurements have been entered (or a standard prototype has been selected), the subject may begin the perceived body image assessment and the desired body assessment.

The scale (or standard) image will appear on the screen. It can be modified by clicking on either "frontal view" or "profile". Below are the segments that the subject can modify. For example, to modify the waist in the profile view, she clicks on "profile view" and "waist". To increase or reduce the size of a particular area the subject clicks on "+ / -".
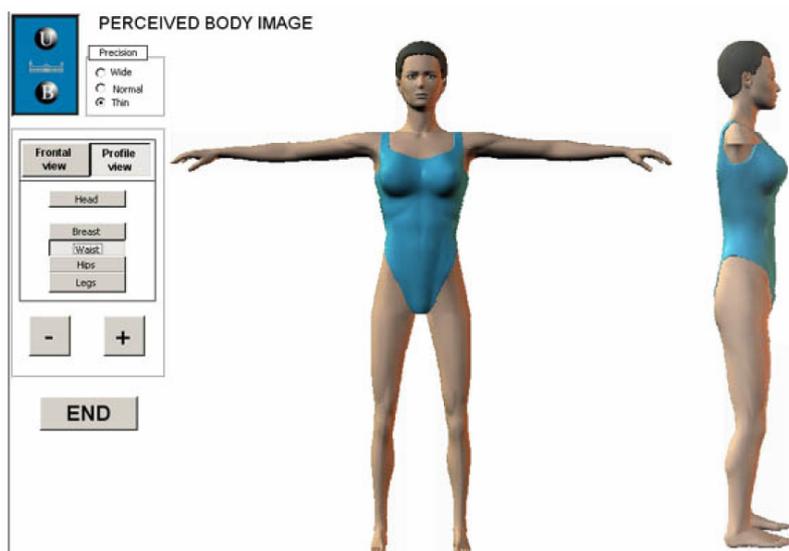
The scale of the changes that the + / - keys make can also be changed. There are three scales: wide, normal and thin. To make large changes, choose "wide". To make very small, detailed changes, choose "thin". In this way the subject can model the image as she likes until achieving her perceived or desired body size.

On finishing the session, the subject clicks on "end". The data will be automatically saved to a table.

Retrieving data for analysis

When the subject has finished the session, her data can be viewed and edited clicking on "Edit/View subjects measurements".

Inside "Edit /View subject's measurements", clicking on "History assessments" you'll be able to view (and copy) the previous assessments of this subject.

Body Image Assessment Software: A new program for assessing body-image disturbance using adjustable partial image distortion
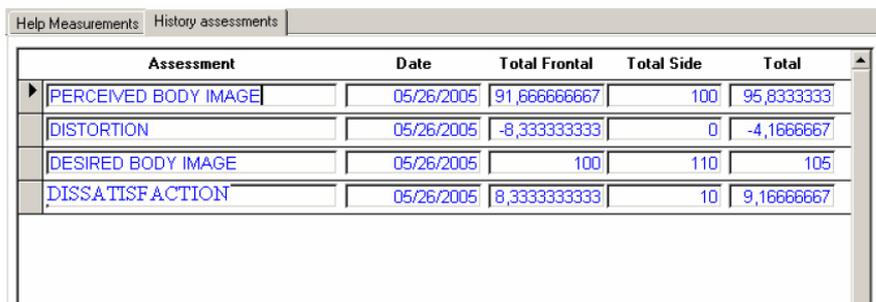
Marta Ferrer-García; José Gutiérrez-Maldonado and Alex Letosa-Porta
University of Barcelona

Assessment	Date	Total Frontal	Total Side	Total
PERCEIVED BODY IMAGE	05/26/2005	91,666666667	100	95,8333333
DISTORTION	05/26/2005	-8,333333333	0	-4,1666667
DESIRED BODY IMAGE	05/26/2005	100	110	105
DISSATISFACTION	05/26/2005	8,3333333333	10	9,16666667

In this case, the total perceived frontal body image of 91.66 means that the perceived frontal image of this subject is 91.66% of her real mean frontal size . It can be expressed as a distortion index of -8.33 (-8.33 = -91.66 - 100). The perceived side (profile) image is 100, meaning that it is 100% of her real mean side size, so the distortion index is 0. The total perceived body image is 95.83% of her real body size, so the total distortion index is -4.16.

The desired body image is 105, meaning that she would like to be 5% bigger than she is actually. So the dissatisfaction index is 9.16, obtained substracting the perceived body image (95.83) from the desired body image (105). In the same way, dissatisfaction indexes are obtained for frontal and side body parts.
Distortion and dissatisfaction indexes are calculated by BIAS when new perceived body image assessments or desired body image assessments are completed by the subject. Each index can be related with its assessment (perceived and desired body estimations) by the date field.

The entire data table (all subjects and assessments) can be opened by clicking on "View results".

It is possible, as well, to export the entire data table to an Excel file by clicking on "Export data". This action will save a file (BIASDATA.xls) in c:

BIASDATA.xls can be opened by SPSS in order to perform statistical analysis.
2005-05-30

The aim of this study is to assess psychometrical properties of the Body Image Assessment Software. Specifically, we wanted to check if BIAS is a good assessment technique of the body image eating disorders: body image distortion and body image dissatisfaction.

METHOD

Subjects

197 students from the faculty of psychology at the University of Barcelona participated in this study. All of them were female. The average age of the sample was 21,68 years (SD = 3,89).

Body Image Assessment Software: A new program for assessing body-image disturbance using adjustable partial image distortion

Marta Ferrer-García; José Gutiérrez-Maldonado and Alex Letosa-Porta
University of Barcelona

The participants were weight and height and their body mass indexes were obtained. 57% of the sample has a healthy weight, the 36% shows low height and 0,5% shows severe underweight. Only ten participants (5%) were overweight and three (1,5%) were obese. The mean body mass index was 21,7 (SD = 2,77), from 15,43 to 37,04.

Procedure

The assessment was carried out in two stages:

In the first stage, the participants filled up:

- The *Symptom Check List-90-Revised* (SCL-90-R; Derogatis, 1977): this is a self-report questionnaire designed to assess different psychopathological symptoms. It's composed by 90 items. Every one describes a psychopathological or psychosomatic disorder. Its main aim is to assess the subjective distress experienced by the patient but can be used too for the detection of cases in the general population (as a screening tool).

- The *Eating Attitudes Test* (EAT-26 reduced version; Garner & Garfinkel, 1979): this is the reduced version of the *Eating Attitudes Test*. The questionnaire assesses the presence of symptoms and behaviours characteristics of eating disorders in non clinical population. It's usually used as a screening tool.

- The *Body Shape Questionnaire* (BSQ; Cooper, Taylor, Cooper & Fairburn, 1987): this scale of 34 items measures body dissatisfaction. It discriminate among subjects who not worry about body image, those who worried but are subclinical and eating disorders classified subjects. It was adapted to Spanish population by Raich and colleagues (1996).

- The Body Dissatisfaction Scale of the *Eating Disorder Inventory* (EDI-2). D.M. Garner. Spanish adaptation by S. Corral, M. Gonzalez, J. Pereña & N. Seisdedos (1998): this is a self-report questionnaire designed to assess the cognitive and behavioural features characteristic of eating disorders patients. The questionnaire offers scores on 11 scales: Drive for Thinness, Bulimia, Body Dissatisfaction, Ineffectiveness, Perfectionism, Interpersonal Distrust, Interoceptive Awareness, Maturity Fears, Asceticism, Impulse Regulation and Social Insecurity.

- The *Body Image Assessment-Revised* (BIA-R; Beebe, Holmbeck & Grzeskiewicz; 1999). It's a visual whole body assessment procedure. The BIA-R shows nine female figures on a sheet. The figures appear in this order: 726419538 (where figure 1 is the slimmer one). The participant has to tell which one are her real figure and her ideal figure.

The second stage was carried out individually. Every participant was height and weight. Moreover, the following measures were taken:

Body Image Assessment Software: A new program for assessing body-image disturbance using adjustable partial image distortion

Marta Ferrer-García; José Gutiérrez-Maldonado and Alex Letosa-Porta
University of Barcelona

- Frontal head-width
- Head-height
- Frontal arm-height
- Frontal arm-width
- Frontal breast-width
- Trunk-height
- Frontal waist-width
- Hip height
- Frontal hip-width
- Frontal thigh-width
- Leg-height
- Profile head-width
- Profile breast-width
- Profile waist-width
- Profile hip-width
- Profile thigh-width

All these measures were introduced in the BIAS software. With these measures, the Body Image Assessment Software generates a scale figure of the participant.

Once introduced the real measures of the participant in the software, she carried out two tasks: her perceived body image assessment and her desired body image assessment.

Results

Here we expose part of the results obtained in this study:

Results obtained show good validity. The correlations among the level of body dissatisfaction measured with the BIAS and all other measures of body dissatisfaction: Body Shape Questionnaire ($r = 0,687$; $p < 0,001$), Body Dissatisfaction Scale of the Eating Disorder Inventory ($r = 0,641$; $p < 0,001$) and the Body Dissatisfaction Scale of the Body Image Assessment-Revised ($r = 0,721$; $p < 0,001$) are positive and significant. In the same way, the correlation between body image distortion measured with the BIAS and the Body Image Distortion Scale of the BIA-R is positive and significant ($r = 0,397$; $p < 0,001$).

Moreover, the BIAS is able to discriminate between people who are in risk of having an ED (score obtained in the EAT-26 over 20) and people that are not in risk of having an ED (score obtained in the EAT-26 below 20). People who are in risk of having an ED show more body image distortion ($t = -2,239$; $p = 0,046$) and body image dissatisfaction ($t = -3,214$; $p = 0,008$).

The BIAS has also shown a very high reliability (Cronbach's Alpha = 0, 8528). When

These results show that BIAS has good psychometric properties and that it's a good instrument for body image distortion and body image dissatisfaction assessment.