Assessment of emotional reactivity produced by exposure to virtual environments in patients with eating disorder

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Introduction

- Body image disturbances are considered one of the main features of eating disorders
- Nevertheless, the published literature has not stablished a clear association between Eating Disorders and body image disturbances
- Some authors have explained these results stressing the fact that body image may be considered more a state than a trait and may change according to situational or emotional variables
- Several studies have analysed the possible impact of exposure to specific objects or situations on the stability of the body image
- These studies suggest that body image, or some of its components, can indeed be understood as a state

Objective

To assess the validity of virtual environments representing situations that are emotionally significant to patients with eating disorders to produce changes in mood and anxiety levels

This study is the previous step of a wider research project analysing the influence of the situation to which patients are exposed on their performance on body image estimation tasks

Virtual environments

Previous studies have noted that patients with ED show anxiety on seeing high-calorie **food** and in situations in which their body is displayed or in which they come into contact with other **people**.

Variables and conditions:

- Variable "Food"
  - . No food
  - . High-calorie food: hamburger, pizza and cola
  - . Low-calorie food: salad, apple and water
- Variable "People"
  - . No other people present
  - . Other people present

Reapeated measures design (2x3)

	No food	**Low- calorie food**	**High-calorie food**
No other people present	Living-room	Kitchen with low-calorie food	Kitchen with high-calorie food
Other people present	Swimming-pool	Restaurant with low-calorie food	Restaurant with high-calorie food

New environments

Hypothesis

- If food constitutes an aversive, anxiety-provoking stimulus for people with ED, exposure to virtual situations in which subjects must eat different types of food (high or low calorie) will increase their level of anxiety and depression compared with the neutral situation (living-room)

- If subjects with ED experience higher levels of stress in social situations and situations that involve scrutiny by others, exposure to these types of situation will increase their level of anxiety and depression compared with the neutral situation (living-room)

Procedure

The study was carried out in two stages:

First stage

- Administration of the self-report questionnaires: EDI-2 (Eating Disorders Inventory) and STAI-T (Trait Anxiety Inventory)
- Each subject was then measured and weighed individually and their body mass index (BMI) calculated

Second stage

- The neutral environment (base-line) is administered and the subject filled up the STAI-S (State Anxiety Inventory) and the CDB (a depression scale)
- Then, the five virtual environments (experimental conditions) are randomly administered. In the interval between the presentations of each environment, the subject filled up the STAI-S (State Anxiety Inventory) and the CDB (a depression scale)

Subjects

- 30 women with a prior diagnosis of eating disorder (17 with anorexia nervosa, 11 with bulimia nervosa and 2 with non-specific eating disorder)
- Ages ranging from 16 to 32 (mean= 20.57; s.d.= 4.15)
- The patients were from hospital centres and private clinics in Barcelona

Instruments

- EDI-2 (Eating Disorders Inventory-2). D.M. Garner. Spanish adaptation by S. Corral, M. Gonzalez, J. Pereña & N. Seisdedos (1998): self-report questionnaire for the evaluation of symptoms that normally accompany anorexia nervosa and bulimia nervosa
- STAI (Stait-Trait Anxiety Inventory). C.D. Spielberger, R.L. Gorsuch and R.E. Lushene. Spanish adaptation by N. Seisdedos (1988): anxiety questionnaire
- CDB (The Barcelona Depression Questionnaire). B. Pérez, J. Gutiérrez-Maldonado and M. Ferrer-García (2004): Self-report instrument for measuring variations in depressed mood

Results I

STAI-S

Repeated measures analysis:

STAI-S	F	Signification
Low calorie kitchen – Living room	1,599	,216
High calorie kitchen – Living room	13,120	**,001**
Low calorie restaurant – Living room	3,357	,077
High calorie restaurant – Living room	14,954	**,001**
Swimming pool – Living room	4,230	**,049**

Results II

CDB

Repeated measures analysis:

STAI-S	F	Signification
Low calorie kitchen – Living room	,523	,475
High calorie kitchen – Living room	7,187	**,012**
Low calorie restaurant – Living room	,512	,480
High calorie restaurant – Living room	5,933	**,021**
Swimming pool – Living room	2,585	,119

Discussion

- According to the first hypothesis, virtual environments in which subjects have to eat high-calorie food (the kitchen and restaurant with high-calorie food) caused significant increases in the levels of anxiety and more depressed mood compared with the neutral situation (the living-room)

- With reference to the second hypothesis, either the restaurant with high-calorie food and the swimming-pool situation significantly increases the level of anxiety compared with the neutral environment. Among the situations with people only the restaurant with high-calorie food significantly produces a more depressed mood compared with the neutral environment

- The fact that the restaurant with low-calorie food did not increase anxiety and depression levels compared with neutral environment and that there are not great differences between the results obtained after visiting the high-calorie restaurant and the high-calorie kitchen suggest that the presence of people produces important mood changes only when it implies the exposition of the body both by the patient and by the others (body image dissatisfaction and social comparison)

Conclusion

- Virtual reality is a valid technology particularly useful for simulating everyday situations that may provoke emotional reactions, such as anxiety and depression, in patients with Eating Disorders
- Virtual environments in which subjects are obliged to ingest high-calorie food provoke the highest levels of state anxiety and depression
- Virtual environments with people only produce significant mood changes when it involves the scrutiny of own body by others and where body image dissatisfaction and negative social comparison easily appear
- Certain changes may be introduced in the environments in order to increase the impact that the presence of people has on the patients

BIAS (Body Image Assessment Software)

See video

BIAS: Psychometrical properties

Results:

- The BIAS is a good measure of perceived body image and ideal body image
- High Convergent Validity:

BIAS:	BSQ	EDI-2 (BD)	BIA-R
Body dissatisfaction	r = 0,687; p < 0,001	r = 0,641; p < ,001	r = 0,721; p < 0,001
Perceptual distortion			r = 0,397; p < 0,001

- Good Discriminant Validity (high probability of ED vs no ED)
  - Body dissatisfaction(t = -3,214; p = 0,008)
  - Perceptual distortion (t = -2,239; p = 0,046)

- High Reliability: Cronbach's Alpha = 0,8528

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