

DISABLING OBESITY: From Determinants to Health Care Models
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New Technologies for Improving the Psychological Treatment of Obesity

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Abstract Most clinicians and patients consider obesity just as a problem of energy balance: more energy input than expenditure. However, the epidemiological data and the clinical practice clearly show that obesity is more complex than described by this simple equation. In particular the chapter underlined the possible role of negative body image in the etiology of this disturbance. Specifically, we suggested that unhealthful weight-control behaviors, that induce significant weight gain over time, may be driven by an allocentric negative body image that is no more updated by contrasting egocentric representations driven by perception (*allocentric lock*). In other words, subjects are locked to an allocentric negative representation of their body that their sensory inputs are no more able to update even after the dramatic body changes following a successful diet or bariatric surgery. In the chapter we also discussed the possible role of virtual reality (VR) in addressing this problem within an integrated treatment approach. Specifically, we suggested that adding a 10-session experiential protocol based on the free NeuroVR (www.neurovr.org) virtual reality software to the classical treatment of obesity may improve its long-term outcome. The characteristics of the protocol and the outcome of two controlled clinical trials used to test it (VEPSY UPDATED - ISRCTN59019572, and AVATOB - NCT01394393) are detailed and discussed.

1 Introduction

Weight-related disorders are becoming a critical problem in both Western and developing countries. During the past 20 years, there has been a dramatic increase in both obesity and eating disorders in most countries and rates remain high. Unfortunately, the treatment of weight-related disorders is not easy: the typical treatment include a combination of diet, exercise, cognitive and/or behavior modification and the final choice depends on the overall health condition, level of disorders, and willingness to address the problem.

The raising prevalence of weight-related disorders, is pushing eating disorder and obesity researchers to start a collaboration between the fields to address them. In particular, their effort is focused on the identification of risk factors that are shared between these weight-related disorders (Haines and Neumark-Sztainer 2006): apparently, unhealthful weight-control behaviors - such as fasting (going without eating for 24 hr for weight control), vomiting or laxative abuse - are the common antecedents of both obesity and eating disorders (Haines and Neumark-Sztainer 2006; Neumark-Sztainer et al. 2006; Neumark-Sztainer 2009; Johnston 2004; Stice et al. 2005; Stice et al. 2008). For example Neumark-Sztainer and colleagues (Neumark-Sztainer et al. 2006), discussed the results of the Project EAT II (Eating Among Teens), a longitudinal study involving 2,516 ethnically and socio-economically diverse adolescents. They report that, 5 years later, the use of unhealthful weight-control behaviors increased six times the risk for binge eating with loss of control, three times the risk for being overweight, and two to five times the risk for extreme weight-control behaviors such as the use of diet pills and self-induced vomiting. A similar result was found by Stice and colleagues (2008): in a different longitudinal study fasting was the best predictor for the future onset, 5 years later, of binge eating and bulimia nervosa.

It is well known from epidemiological studies that childhood obesity has different ethnic, socioeconomic (compared with affluent white children, the poor Hispanic, white, and black children have 2.7, 1.9 and 3.2 times higher odds of obesity), and behavioral risk factors (Singh et al. 2008). Between the behavioral variables higher television viewing, and higher physical inactivity levels were all independently associated with higher obesity prevalence.

However, in a 4-year longitudinal study on 496 adolescent girls, Stice and colleagues (2005) studied the psychological and behavioral risk factors able to predict the onset of obesity in adolescent girls. Their data show that participants who were on a weight-loss diet, or who used maladaptive compensatory behaviors for weight control at T1 of the study showed, 4 years later, an increased risk for obesity onset. A more recent 10-year longitudinal study confirmed this datum (Neumark-Sztainer et al. 2012). As stated by the authors:

“Findings clearly indicate that dieting and unhealthy weight control behaviors, as reported by adolescents, predict significant weight gain over time.” (p. 80)

These data have an important clinical implication: the evidence that youths practicing unhealthful weight-control behaviors are at higher risk for obesity implies that prevention and treatment interventions should also focus on the causes of these behaviors. In other words, why do adolescents decide to start such radical weight-control behaviors? In a recent letter to the *Yahoo Answer* site an adolescent girl wrote:

“I hate my body so much. My top half (arms, stomach) is fine. I have a very flat stomach, my arms are great (my back is even bony looking) I wear a XS, S in shirts. but my lower half (butt, thighs) are huge, seriously I mean how can I loose weight there?”
(online: <http://answers.yahoo.com/question/index?qid=20120504232627AAPkxrl>)

The words of the girl clearly explain her behavior: she wants going on diet because she does not like her body (Riva et al. 2000c). A study by Kostanski and Gullone (1999) with a sample of 431 Australian pre-adolescent children (7 to 10 years) confirms this interpretation: pre-adolescents as young as 7 years of age are unsatisfied with their body appearance and deliberately engage in restrictive eating behaviors. More, a recent study (Friend et al. 2012) showed that in adolescents frequent self-weighing is associated with lower body satisfaction and higher rates of unhealthy and extreme weight control behaviors.

This is even true for morbid obesity, a chronic condition that is hard to treat with diet, exercise and psychological treatment alone. For this reason, in contrast to the nonsurgical treatment of obesity, bariatric surgery is becoming the treatment of choice for morbid obesity (van Hout and van Heck 2009).

Nevertheless, all roses have thorns, and this is true for bariatric surgery, too. In fact, this approach does not lead to equal results in every patient (van Hout et al. 2003): the long-term efficacy is strongly influenced by compliance to adequate dietary rules in which psychosocial factors and behavioral changes can play a major role.

In particular, a critical problem is the expected outcome of the treatment. As underlined by Kali and colleagues (2008) there is a significant difference between the weight loss clinicians consider successful following bariatric surgery and the weight loss potential patients expect to achieve. As a general guideline, bariatric surgery is considered successful when 50% of excess weight is lost and the weight loss is sustained up to five years. However, most obese patients have different expectations: in the previous study patients declared to be “happy” after a 77% +/- 9% excess body weight loss and considered “acceptable” a 67% +/- 10% excess body weight loss. A 49% +/- 14% excess body weight loss, the gold standard for clinicians, was considered “disappointing”.

The situation does not always change after the treatment: a problem affecting some patients is body image dissatisfaction (Pecori et al. 2007; Adami et al. 1999; Morrow et al. 2008): patients with 200 pounds overweight still have body disparagement after losing 100 pounds. For example, in a recent post in a blog, some months after bariatric surgery Stella writes:

“I feel like I have somewhat of a “dysmorphic” view of my body I don’t really see myself as a size 4 or a size 2 (only if they run big since I gained a few lbs) I still see myself as fat and the damn skin on my arms does not help the matters. I have such a hard time finding shirts cause of it and I can almost never find a dress cause I don’t want my arm cheese to show. I want to be normal, is this normal???” (online: <http://www.shrinkingstella.com/>).

The words of the woman clearly explain her situation: the weight loss was unable to modify her negative experience of the body. This expectation was linked to the common belief that the best way to improve one's body image is to lose weight. However, recent studies have questioned this belief: dietary intervention, even if accompanied by significant weight loss, may be ineffective in reducing total body dissatisfaction (Rosen et al. 1995; Rosen 1996a). And unfortunately body disparagement has a negative effect on long term follow-up of obesity, even the one treated using bariatric surgery: uncontrolled eating and grazing after surgery are associated with poorer and elevated psychological distress (Colles et al. 2008).

Given the importance of body image satisfaction for the quality of life of obese persons, these findings argue for the potential benefits of treatment strategies for improving appearance satisfaction for obese individuals, to improve the success of their weight-management efforts (Thompson et al. 1999). Unfortunately, obesity researchers have not yet systematically added body image interventions in their programs. Almost twenty years ago in a review on the behavioral obesity treatment literature Rosen (1996b) didn't find any study including psychological techniques specifically designed to modify body image. But today, the situation is not radically different. In their new cognitive behavioural approach to the treatment of obesity (Cooper et al. 2010) Cooper and Fairburn address the experience of the body only as potential obstacle to the acceptance of weight maintenance (Cooper et al. 2003) and not as a one of the possible causes of the disorder. Unfortunately, the results of the proposed approach are similar to the old one (Cooper et al. 2010):

“Both of the main treatments resulted in an average weight loss of about ten percent of initial weight... The participants were subsequently followed-up for three years post-treatment. The great majority regained almost all the weight that they had lost with the new treatment being no better than the behavioural treatment in preventing weight regain.” (p. 706)

We do not agree with this vision (Riva et al. 2006). Following the emerging “embodied cognition” approach (Bermúdez et al. 1995; Clark 1997; Clancey 1997; Gallagher 2003) we consider body image as an integral part of the subjects’ identity. As noted by Gallagher (1995) the body experience is not neutral but it places constraints on intentional consciousness:

“changes or distortion introduced at the level of body schema result in changes or distortions in intentional consciousness” (p. 239).

In particular in this chapter we will introduce and discuss the “allocentric lock theory” (Riva 2007, 2012; Riva et al. 2012b; Riva and Gaudio 2012). Specifically, we will suggest that an allocentric negative body image that is no more updated by

contrasting egocentric representations driven by perception is the common antecedent of both obesity and eating disorders (Riva 2011). In other words, these patients are locked to an allocentric (*observer view*) negative representation of their body that their sensory inputs are no more able to update even after dramatic body changes, including the one following either a diet or bariatric surgery. More, we will discuss the possible role of virtual reality (VR) in addressing it. Specifically, we suggest that adding a 10-session experiential protocol based on virtual reality to the treatment of obesity may improve its long-term outcome.

2. Unlocking the Allocentric Lock

2.1 *The allocentric lock theory*

Psychology and neuroscience indicates that our spatial experience, including the experience of the body, involves the integration of different sensory inputs within two different reference frames: *egocentric* and *allocentric* (Klatzky 1998; Mou et al. 2004):

- *egocentric frame*: it is referred to the body of the observer and allows him/her to locate objects relative to the body centre. When we adopt an egocentric stance we represent the object relative to ourselves
- *allocentric frame*: it is referred to space external to the perceiver. When we adopt an allocentric stance the object is represented independently of our own current relation with it.

As suggested by Byrne and Becker (2007) the transformation from egocentric to allocentric representations of space is done by neurons in different medial temporal lobe structures. If, for some reasons, this transformation is impaired, the subjects cannot use anymore the sensory inputs to update the contents of the allocentric representation of their body. This is what may be behind the body dissatisfaction experienced by many obese patients even after a significant weight loss: an altered somatrepresentation - that is not updated by contrasting egocentric parietal representations driven by perception - priming the processing of any further body-related experience (Riva 2011). In simpler words, the egocentric perception-driven experience of the real body does not modify the allocentric memory-driven experience of a negative body: these patients are locked to an allocentric negative representation of their body (Riva 2010). However, the impossibility of using sensory inputs for updating the allocentric representation of the body – patients hate their body even after the surgery or significant weight loss -

locks the patients into an unsatisfying body that may explain their depression and low quality of life (Omalu et al. 2007; Masheb et al. 2007).

2.2 Unlocking the virtual body using virtual reality

The evolution of technology is providing new tools and methods for health care (Riva et al. 2004b). Between them, an emerging trend is the use of virtual reality (VR) (Satava and Jones 2002; Riva and Gamberini 2000; Riva and Gaggioli 2008).

VR consists of a three-dimensional (*3D*) graphical environment where a user can interface with the environment through a variety of computer peripheral devices. Using visual, aural or haptic devices, the user can experience the environment as if it were a part of the real world (Riva and Davide 2001).

In surgery, for instance, VR is used in simulation training (Fried et al. 2010). In fact VR allows the surgeon to interact efficiently with 3D computerized databases of medical images in real time using his natural senses and skills (Tanoue et al. 2010). In sum, for physicians, and surgeons, the ultimate goal of VR is the presentation of virtual objects to all of the human senses in a way identical to their natural counterpart (Székely and Satava 1999).

In clinical psychology the ultimate goal is different. VR is used to offer a new human-computer interaction paradigm in which patients are no longer simply external observers of images on a computer screen but are active participants within a computer-generated three-dimensional virtual world (Riva et al. 2002). Moreover, VR can be considered an “embodied technology” for its effects on body perceptions (Spagnolli and Gamberini 2005): it is possible the use of VR for inducing controlled changes to the experience of the body (Riva et al. 2000a; Riva 1997; Slater et al. 2010; Lenggenhager et al. 2007).

On one side, different authors showed that is possible to use VR both to induce illusory perceptions – e.g. a fake limb (Slater et al. 2009) - by altering the normal association between touch and its visual correlate. It is even possible to generate a body transfer illusion (Slater et al. 2010): Slater and colleagues substituted the experience of male subjects' own bodies with a life-sized virtual human female body. On the other side, it is also possible to use VR to improve body image (Riva 1998a, b), even in patients with eating disorders (Riva et al. 2000b; Riva et al. 2003; Riva et al. 1999) or obesity (Riva et al. 2006; Riva et al. 2000a).

As noted by Gallagher (1995), “[different] studies indicate that changes in various aspects of body schemata have an effect on the way subjects perceive their own body.” (p. 237). Following this vision it is possible the use of VR to induce a controlled sensory rearrangement that facilitates an update of the locked allocentric representation of the body.

A possible strategy towards this goal is the adaptation to virtual reality of the imagery rescripting method developed for the treatment of post-traumatic stress dis-

orders (Smucker et al. 1995; Riva 2011). Specifically Riva developed a specific body image rescripting protocol based on VR that is included as part of the Experiential Cognitive Therapy (ECT) described below.

2.21 The proposed approach: The Experiential Cognitive Therapy

Developed by Giuseppe Riva and his group (Riva et al. 1998; Riva et al. 2000a), ECT is a relatively short-term (15-session in 6 weeks), patient-oriented approach that focuses on individual discovery (Riva et al. 2004a; Riva et al. 2006). As in the case of Cognitive Behavioral Therapy (CBT), ECT uses a combination of nutritional, cognitive and behavioral procedures to help the patient identify and change the maintaining mechanisms in obesity and eating disorders. However ECT differs from the typical CBT approach in the use of VR, in its focus on empowerment and in its focus on the negative emotions related to the body:

- *Its focus on the body experience*, a major reason patients want to lose weight (Rosen 1996b). The experience of the body is not addressed only as potential obstacle to the acceptance of weight maintenance (Cooper et al. 2003). As we underlined before, in line with the emerging “embodied cognition” approach (Bermúdez et al. 1995; Clark 1997; Clancey 1997; Gallagher 2003), we consider body image as an integral part of the subjects’ identity.
- *Its focus on the empowerment process*. We consider a critical goal for the long term efficacy of bariatric surgery the ability of the patient in defining a realistic target weight range, in monitoring eating behaviors and in managing the frustration related to weight fluctuations. However, we do not consider these abilities as behavioral skills only. Here we agree with the DiClemente position (1986) that describes them as part of a broader individual dimension, defined “control self-efficacy”: “an individual’s ability to control the addictive behavior in a variety of provocative situations” (p. 303). Bandura (1989, 1997) proposed the concept of self-efficacy as an explanation of behavior and behavior change. People tend to avoid activities they believe exceed their coping abilities and undertake those they consider themselves capable of handling. Following this approach, the main strategy to raise self-efficacy is “empowerment”, the process of helping people feel a sense of control over their lives. Within this process there are three critical dimensions to address: (Menon 1999)
 - *perceived control*: includes beliefs about authority, decision-making skills, availability of resources, autonomy in the scheduling and performance of work, etc;
 - *perceived competence*: reflects role-mastery, which besides requiring the skillful accomplishment of one or more assigned tasks, also requires successful coping with non-routine role-related situations;

- *goal internalization*: this dimension captures the energizing property of a worthy cause or exciting vision.
- *The use of virtual reality (VR)*. VR helps the therapist in providing the two above features of our approach: body experience treatment and empowerment. The use of a VR treatment makes it possible to induce a controlled sensory rearrangement (see Table 1) that facilitates an update of the locked allocentric representation of the body (Riva 1998a, c). Further, VR has the right features to support empowerment, since it is a special, sheltered setting where patients can start to explore and act without feeling threatened (Botella et al. 1998).

Experiential Cognitive Therapy has been tested in different case studies and two controlled trials with 211 obese patients (Riva et al. 2006) and 36 binge eating patients (Riva et al. 2003). The two controlled trials show that ECT provides better results in the follow-up than competing approaches, including both nutritional and cognitive behavioral therapy.

2.22 The protocol

The protocol (Riva 2011) includes 5 weekly group sessions aimed at improving motivation to change and assertiveness, and 10 biweekly virtual reality sessions. The first VR session is used to assess any stimuli that could elicit abnormal eating behavior. Specifically, the attention is focused on the patient's concerns about food, eating, shape and weight. This assessment is normally part of the Temptation Exposure with Response Prevention protocol (Schludt and Johnson 1990). At the end of the first VR session the therapist uses the *miracle question*, a typical approach used by the solution-focused brief therapy (deShazer 1985; McFarland 1995). According to this approach the therapist asks the patient to imagine what life would be like without her/his complaint. Answering this question in writing the patient constructs her/his own solution, which then guides the therapeutic process (deShazer 1988). According to deShazer (1988) this approach is useful for helping patients establish goals, that can be used to verify the results of the therapy. Using VR to experience the effects of the miracle, the patient is more likely not only to gain an awareness of her need to do something to create change but also to experience a greater sense of personal efficacy.

The next 9 VR sessions are used to assess and modify:

- *The expectations and emotions related to food and weight*: This is done both by integrating different cognitive-behavioral methods: Countering, Alternative Interpretation, Label Shifting, Deactivating the Illness Belief (see Table 1).
- *The strategies used to cope with difficult interpersonal and potential maintenance situations*: This is done both by using the Temptation Exposure with Response Prevention (Schludt and Johnson 1990; Riva 1998c)

– and by working on these three empowering dimensions (Menon 1999): *perceived control, perceived competence and goal internalization.*

- *The body experience of the subject.* To do this the virtual environment integrates the therapeutic methods used by Butter & Cash (1987) and Wooley & Wooley (1985), and the body image rescripting protocol based on the Allocentric Lock hypothesis (see Table 1) (Smucker et al. 1995).

Phase 1: Interview	During a clinical interview the patient is asked to relive the contents of the allocentric negative body image and the situation/s in which it was created and/or reinforced (e.g. being teased by my boyfriend at home) in as much detail as possible. The meaning of the experience for the patient was also elicited.
Phase 2: Development of the VR scene	The clinician reproduces the setting of the identified situation (e.g. the corridor of the classroom where my boyfriend teased me) using one of the different scenes available in the free NeuroVR software (http://www.neurovr.org).
Phase 3: Egocentric Expe- rience of the VR scene	<p>The patient is asked to reexperience the event in VR from a first person perspective (the patient does not see his/her body in the scene) expressing and discussing his/her feelings. The patient is then asked what was needed to happen change the feelings in a positive direction.</p> <p>The main cognitive techniques used in this phase, if needed, are:</p> <p><i>Countering:</i> Once a list of distorted perceptions and cognitions is developed, the process of countering these thoughts and beliefs begins.</p> <p><i>Label Shifting:</i> The patient first tries to identify the kinds of negative words she uses to interpret situations in her life, such as bad, terrible, obese, inferior, and hateful. The situations in which these labels are used are then listed. The patient and therapist replace each emotional label with two or more descriptive words.</p>
Phase 4: Allocentric Expe- rience of the VR scene	<p>The patient is asked to reexperience the event in VR from a third person perspective (the patient sees his/her body in the scene) intervening both to calm and reassuring his/her virtual avatar and to counter any negative evaluation. The therapist follows the Socratic approach, for example “What would need to happen for you to feel better? How does it look through the eyes of a third person? Is there anything you as a third person like to do? How do the other people respond?”</p> <p>The main cognitive techniques used in this phase, if needed, are:</p> <p><i>Alternative Interpretation:</i> The patient learns to stop and consider other interpretations of a situation before proceeding to the decision-making stage.</p> <p><i>Deactivating the Illness Belief:</i> The therapist first helps the client list her beliefs concerning weight and eating.</p>

Table 1: The VR body image rescripting protocol (Adapted from Riva, 2011).

2.23 The Virtual Reality experience

The VR sessions are based on the free NeuroVR software (<http://www.neurovr.org>). NeuroVR is an enhanced version of the original Virtual Reality for Body Image Modification (VEBIM) immersive virtual environment, previously used in different preliminary studies on non-clinical subjects (Riva 1997, 1998a).

NeuroVR is composed of 14 virtual environments, used by the therapist within a 60-minute session with the patient. The environments present critical situations related to the maintaining/relapse mechanisms (e.g., Home, Supermarket, Pub, Restaurant, Swimming Pool, Beach, Gymnasium) and two body image comparison areas.

Using the NeuroVR Editor (see Figure 1), the psychological stimuli/stressors appropriate for any given scenario can be chosen from a rich database of 2D and 3D objects, and easily placed into the pre-designed virtual scenario by using an icon-based interface (no programming skills are required).

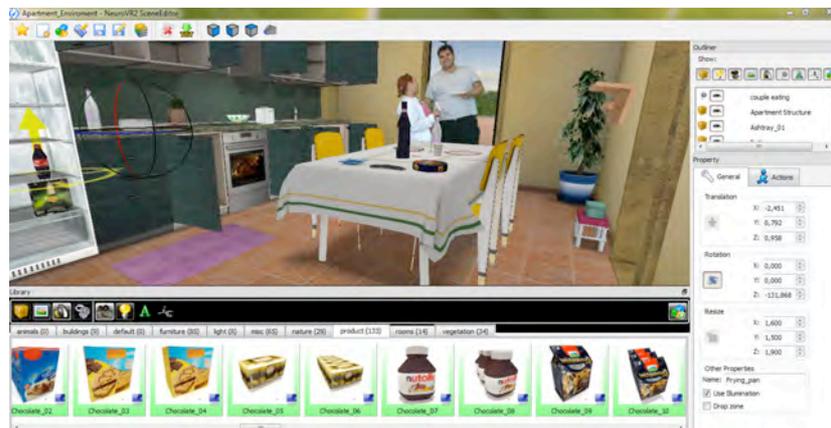


Fig. 1. The NeuroVR Editor

In addition to static objects, the NeuroVR Editor allows both to add audio object and to overlay on the 3D scene video composited with a transparent alpha channel. The editing of the scene is performed in real time, and effects of changes can be checked from different views (frontal, lateral and top).

The edited scene is then visualized and experienced using the NeuroVR Player.

Through the VR experience, the patients practice both eating/emotional/relational management and general decision-making and problem-solving skills. By directly practicing these skills within the VR environment, the patient is helped in developing specific strategies for avoiding and/or coping with these.

Specifically, in the VR sessions the therapist uses the “20/20/20 rule”. During the first 20 minutes, the therapist focuses on getting a clear understanding of the patient's current concerns, level of general functioning, and the experiences related to food. This part of the session tends to be characterized by patients doing most

of the talking, although therapist guides with questions and reflection to get a sense of the patient's current status. The second 20 minutes is devoted to the virtual reality experience. During this part of the session the patient enters the virtual environment and faces a specific critical situation. Here the patient is helped in developing specific strategies for avoiding and/or coping with it. In the final 20 minutes the therapist explores the patient's understanding of what happened in VR and the specific reactions – emotional and behavioral - to the different situations experienced. If needed, some new strategies for coping with the VR situations are presented and discussed. The different techniques used in the VR sessions are detailed in Table 3.

3. Conclusions

Most clinicians and patients consider obesity just as a problem of energy input and expenditure: more energy input than expenditure. However, the clinical practice and epidemiological data clearly show that obesity is more complex than expected by this simple equation. In particular this chapter underlined the possible role of negative body image in the etiology of this disturbance.

Specifically, we suggested that body disparagement may be produced by an allocentric negative body image that is no more updated by contrasting egocentric representations driven by perception. In other words, these subjects are locked to an allocentric (*observer view*) negative representation of their body that their sensory inputs are no more able to update even after dramatic body changes. The impossibility of using sensory inputs for updating the allocentric representation of the body – patients hate their body even after a significant weight loss - locks the patients into an unsatisfying body that may explain their depression, low quality of life and difficulty in maintaining an effective eating behavior (Omalu et al. 2007; Masheb et al. 2007).

How can we unlock this virtual body? The paper suggested as possible answer an exciting new technology: virtual reality (VR). VR is well known by surgeons: it is used in surgical training and allows the surgeon to interact efficiently with 3D computerized databases of medical images in real time using his natural senses and skills. However, VR can be considered an “embodied technology” for its effects on body perceptions: VR can be used for inducing controlled changes to the experience of the body. In sum, it is possible the use of VR to induce a controlled sensory rearrangement that facilitates an update of the locked allocentric representation of the body.

Specifically a specific body image rescripting protocol based on VR is part of the Experiential Cognitive Therapy (ECT) described in the paper. ECT is a relatively short-term (5 weekly group sessions aimed at improving motivation to change and assertiveness, and 10 biweekly virtual reality sessions in 6 weeks), patient-oriented approach that focuses on individual discovery. As Cognitive Behav-

ioral Therapy (CBT), ECT uses a combination of nutritional, cognitive and behavioral procedures to help the patient identify and change the maintaining mechanisms in obesity and eating disorders. However ECT differs from the typical CBT approach in the use of VR, in its focus on empowerment and in its focus on the negative emotions related to the body.

In the VR sessions the therapist uses the “20/20/20 rule”. During the first 20 minutes, the therapist focuses on getting a clear understanding of the patient's current concerns, level of general functioning, and the experiences related to food. The second 20 minutes are devoted to the virtual reality experience. During this part of the session the patient enters the virtual environment and faces a specific critical situation. In the final 20 minutes the therapist explores the patient's understanding of what happened in VR and the specific reactions – emotional and behavioral - to the different situations experienced.

Experiential Cognitive Therapy has been tested in different case studies and two controlled trials with 211 obese patients and 36 binge eating patients (VEPSY UPDATED - ISRCTN59019572). The two controlled trials show that ECT provides better results in the follow-up than competing approaches. This positive experience is being replicated in Mexico. The “Laboratorio de Enseñanza Virtual y Ciberpsicología” at the School of Psychology of the Universidad Nacional Autónoma de México, in cooperation with the Obesity Unit of the Medica Sur Hospital in México City have recently started a controlled clinical trial, recently approved by the US ClinicalTrial.gov database (Virtual Environments For Supporting Obesity Treatment – AVATOB - NCT01394393). The trial, that will include 60 morbid obese patients both treated with bariatric surgery and without it, started its work in June 2011 and is expected to complete in 2013.

Even if the final results are not available yet, recently we reported (Riva et al. 2012a) the clinical case of Patricia, a 44-year old woman, who entered in the bariatric protocol with a weight of 114 kg., 1.55 m. tall and a B.M.I. of 47. Even if at the start of the protocol her weight was 80.2 kg (a 30% body weight loss and a 62% excess body weight loss) the weight loss achieved after the surgery was unable to modify her negative experience of the body: she expressed the need to improve self-esteem, be more attractive, and also be more attractive to others. More, the clinical data underlined a moderate level of depression matched by a high level of body dissatisfaction. The clinical data after the treatment showed a significant improvement in all the psychological variables matched both by an improvement in the subjective physical and emotional well-being, and by relevant behavioral changes in the personal and social daily life.

In conclusion, the available clinical data suggest the added value of ECT as part of an integrated obesity treatment based on the experiential approach allowed by virtual reality. Longer follow-up data and multi-centric trials are required to investigate the possible effects of the behavioral and body image changes on the long-term maintenance of the weight loss.

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