

# EXPERIENTIAL COGNITIVE THERAPY FOR THE TREATMENT OF PANIC DISORDERS WITH AGORAPHOBIA: DEFINITION OF A CLINICAL PROTOCOL

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# **EXPERIENTIAL COGNITIVE THERAPY FOR THE TREATMENT OF PANIC DISORDERS WITH AGORAPHOBIA: DEFINITION OF A CLINICAL PROTOCOL**

## **1. Introduction**

Through the development of epidemiologic studies we are able to say that 3.5% of the general population suffer from panic disorder<sup>1</sup>, with serious personal and social repercussions, such as depression, substance abuse and suicidal tendencies<sup>2</sup>.

According to DSM-IV<sup>3</sup>, the essential feature of panic disorder (PD) is the occurrence of panic attacks. A panic attack is a sudden onset period of intense fear or discomfort associated with at least four symptoms that include: palpitations, breathlessness, dizziness, trembling, a feeling of choking, nausea, de-realization, chest pain, and paraesthesias. The panic is characterized by a cluster of physical and cognitive symptoms, which occurs unexpectedly and recurrently, such as pervasive apprehension about panic attacks, persistent worry about future attacks, worry about the perceived physical, social or mental consequences of attacks, or major changes in behavior in response to attacks.

Panic disorder is often associated with circumscribed phobic disorders such as specific phobias, social phobias, and especially with agoraphobia<sup>4-5</sup>. Agoraphobia is described separately from panic disorder in the DSM-IV to highlight the occurrence of agoraphobic avoidance in individuals with or without a history of panic disorder<sup>3</sup>.

Agoraphobia consists of a group of fears of public places such as going outside, using public transportation and being in public places, i.e. supermarkets, theaters, churches, football stadia, etc, which cause serious interference in daily life. Other fears may spring from this core phobia, such as going through tunnels, using lifts, crossing bridges, etc., as well as other internal fears, such as excessive worry about physical sensations (palpitations, vertigo, dizziness, etc.) or an intense fear of panic attacks, including fear of social interaction. The results of these psychopathological symptoms are that the patient tends to avoid the feared situation and, from then on, this avoidance carries over into other situations. Indeed, avoidance of public places in order to reduce fear or panic becomes the main cause of incapacity in patients, who, in more serious cases, are confined to their homes<sup>6-7</sup>.

The recognition of panic disorder as specific syndrome was introduced by Klein<sup>8-9</sup>. He disclosed that patients with recurrent panic attacks responded to imipramine but not benzodiazapines, and vice versa for anxious patients without recurrent panic attacks. His studies were

particularly influential in establishing panic disorder as a separate diagnostic entity.

In the aetiopathology of PD, Barlow<sup>10</sup> describes the initial panic attack as a misfiring of the "fear system," under stressful life circumstances, in physiologically vulnerable individuals. But an isolated panic attack does not necessarily lead to the development of panic disorder, as evidenced by the scientific literature<sup>1,11</sup>. The individuals who developed a panic disorder had a physiological vulnerability, a sort of anxious apprehension conceptualized by Barlow as a set of danger-laden beliefs about the symptoms of panic and about the meaning of panic attacks. After the initial panic attack the unrealistic interpretations persist because patients engage in cognitive and behavioural strategies that are intended to prevent the feared events from occurring. As the fears are unrealistic, the main effect of these strategies is to prevent patients from disconfirming their negative beliefs. Then, such as in many anxiety disorders, the symptoms of anxiety are additional sources of perceived danger, and produce a series of vicious circles which further contribute to the maintenance of the disorders<sup>10,12</sup>.

The words of Clark<sup>13</sup> clarify the aetiopathogenetic model of PD:

"Individuals who experience recurrent panic attacks do so because they have a relatively enduring tendency to interpret certain bodily sensations in a catastrophic fashion. The sensations that are misinterpreted are mainly those involved in normal anxiety responses (e.g., palpitations, breathlessness, dizziness, paresthesias) but also include some other sensations. The catastrophic misinterpretation involves perceiving these sensations as much more dangerous than they really are and, in particular, interpreting the sensations as indicative of *immediately* impending physical or mental disaster—for example, perceiving a slight feeling of breathlessness as evidence of impending cessation of breathing and consequent death, perceiving palpitations as evidence of an impending heart attack, perceiving a pulsing sensation in the forehead as evidence of a brain haemorrhage, or perceiving a shaky feeling as evidence of impending loss of control and insanity". (Clark 1988, p. 149).

## **2. The treatment of Panic Disorder and Agoraphobia**

Many studies demonstrated the effectiveness of a multicomponent cognitive-behavioral treatment strategy for panic

disorder with agoraphobia<sup>14-17</sup>.

Clark, Salkovskis, Barlow, and other colleagues<sup>6,7,10,13-15</sup> have outlined the treatment for PD with agoraphobia. The traditional protocol involves a mixture of cognitive and behavioral techniques which are intended to help patients identify and modify their dysfunctional anxiety-related thoughts, beliefs and behavior. Emphasis is placed on reversing the maintaining factors identified in the cognitive and behavioral patterns. The treatment protocol includes exposure to the feared situation, interoceptive exposure, cognitive restructuring, breathing retraining, and applied relaxation. On an average the duration of the protocol is twelve-fifteen sessions. Readers interested in a more detailed description of CBT for panic disorder and agoraphobia can consult Salkovskis and Clark<sup>18</sup>, Mathews, Gelder and Johnston<sup>19</sup> and Barlow<sup>10</sup>.

### 3. Virtual reality in Psychotherapy

In Psychotherapy, the virtual cyberspace offers a series of powerful and valid applications for diagnosis and treatment.

The qualities that make VR software reliable and particularly useful in the practice of assessment and rehabilitation of certain psychopathological dysfunctions emerge with extreme clarity from the specialist literature<sup>20,21</sup>.

VR consists of a three-dimensional interface that puts the interacting subject in a condition of active exchange with a world re-created via the computer. The possibility of not limiting the paradigm of interaction in a unidirectional sense represents the strong point of the new technology: man is not simply an external observer of pictures or one who passively experiences the reality created by the computer, but on the contrary may actively modify the three-dimensional world in which he is acting, in a condition of complete sensorial immersion<sup>21</sup>. The nature of this exchange means that the subject feels actually present in this new context. The feeling of "actual presence" is perhaps the peculiar characteristic of this tool<sup>22, 23</sup> and is made possible both by the realistic reproduction of the cybernetic environments and by the involvement of all the sensorimotor channels during interaction.

To describe in what way the development of science and technology may favour the buttressing of the therapeutic effects associated with traditional strategies of care, we introduce two elements: the cost-benefits in psychotherapy and the exposure technique<sup>23</sup>.

One of the fundamental parameters in assessing the effectiveness of therapies is the ratio existing between the "cost" of administration of the therapeutic procedure and the resulting "benefits". By cost it is meant

the expenditure not only in terms of money and time, but also in terms of emotional involvement by the person to whom the therapy is directed. The benefits regard the effectiveness of the treatment, i.e., the achievement of the target set, in the shortest time possible.

Exposure therapy traditionally is carried out “in imagination” or “*in vivo*”. In the first case, the subject is trained to produce the anxiety-provoking stimuli through mental images; in the second case, the subject actually experiences these stimuli in semi-structured situations. Both of these methods present advantages and limitations as regards the cost-benefit ratio. In the first case, the prevalent difficulty is represented by teaching the subject to produce the images that regard experiences associated with anxiety: the majority of failures linked to this therapy are those subjects who present particular difficulties in visualizing scenes of real life. The cost of the application, however, is minimal, because the therapy is administered in the physician’s office, thus avoiding situations that might be embarrassing for the patient and safeguarding his privacy. In the second case, the difficulty lies in structuring, in reality, experiences regarding the hierarchically ordered anxiety-provoking stimuli, with the result that the cost in terms of time, money and emotions is high. At the same time, the advantage of contending with real contexts increases the likelihood of effectiveness of the “*in vivo*” procedure<sup>24</sup>.

In this context, emerges the need to favour the possibilities of intervention on psychological dysfunctions by overcoming the limits that render the cost-benefit ratio disadvantageous, and in this framework, virtual reality technology takes its place as an experience that is able to reduce the gap existing between imagination and reality<sup>24, 25</sup>.

The prevalent elements in cognitive-behavioural therapies are that of exposing the subject to the stimuli that produce the dysfunction and of generating responses that are antagonistic to the maladaptive ones<sup>26</sup>. VR facilitates both of these processes of treatment. Using VR software, it is possible to re-create, together with the subject undergoing treatment, a hierarchy of situations corresponding to reality, which he may experience in an authentic way thanks to the involvement of all his sensorimotor channels<sup>27</sup>. The realistic reproduction of virtual environments enables the interacting individual to immerse himself in a dimension of real presence. This makes it possible to limit the costs as compared to traditional procedures of treatment, as pointed out above, and to consolidate the effectiveness of the treatment thanks to the possibility of re-creating a “three-dimensional world” within the walls of the clinical office<sup>23, 24</sup>.

## **4. Experiential-Cognitive Therapy Protocol: A multicomponent approach**

The preliminary treatment protocol for Panic Disorder and Agoraphobia, named Experiential-Cognitive Therapy (ECT), was developed at the Applied Technology for Neuro-Psychology Lab of Istituto Auxologico Italiano, Verbania, Italy, in cooperation with the Psychology Department of the Catholic University of Milan, Italy<sup>28</sup>. The actual version included the efforts of researchers from the Center for Advanced Multimedia Psychotherapy, California School of Professional Psychology, San Diego (CA), USA, and from the Seoul Paik Hospital, Inje University, Seoul, Korea.

The goal of ECT is to decondition fear reactions, to modify misinterpretational cognition related to panic symptoms and to reduce anxiety symptoms. This is possible in an average of seven sessions of treatment plus an assessment phase and booster sessions, through the integration of Virtual Experience and traditional techniques of CBT. We decided to employ the techniques included in the cognitive-behavioral approach because they showed high levels of efficacy. Through virtual environments we can gradually expose the patient to feared situation: virtual reality consent to re-create in our clinical office a real experiential world. The patient faces the feared stimuli in a context that is nearer to reality than imagination<sup>28</sup>.

### *4.1 VR design and implementation*

For ECT we developed the Virtual Environments for Panic Disorders - VEPD - virtual reality system.

VEPD was developed using a Thunder 600/C virtual reality system by Virtual Engineering of Milano-Italy. The Thunder 600/C is a Pentium III based immersive VR system (600mhz, 64 mega RAM, graphic engine: Matrox G400 Dual Head, 32Mb WRam) including an HMD subsystem and a two-button joystick-type motion input device.

#### *4.11 The display system*

The Sony Glasstron PLM-A55 head mounted provided the visual display. The HMD displays 800 lines of 255 pixels to each eye and uses LCD technology (two active matrix 7" color LCDs). An InterSense InterTrax 30 tracker provided head tracking. The tracker can sense azimuth, elevation and roll with a sensitivity of 360 degrees per second. The response latency is 38ms+/-2ms.

In this research we did not use a stereoscopic display. Previous researches regard stereoscopy as important because it provides the

user with good cues of depth<sup>29</sup>. However, the refresh rate of graphics decrease by 50% for the need of two different images for each eye. Consequently, we decided against implementing a stereoscopic display. To compensate for the lack of binocular cues, we included perspective cues (light and shade, relative size, textural gradient, interposition and motion parallax) in the virtual environment<sup>30</sup>.

#### *4.12 Motion input system*

The data glove-type motion input device is very common in virtual environments for its capability of sensing many degrees of freedom simultaneously. However the operator is also frequently confused by the difficulty in correctly using it, especially when there is a time delay contained in the feed-back loop).

To provide a easy way of moving in VEPD we used an infrared two-button joystick-type input device: pressing the upper button the operator moves forward, pressing the lower button the operator moves backwards. The direction of the movement is given by the rotation of operator's head.

#### *4.13 The virtual environment*

VEPD is a 4-zone (see Figure 1) virtual environment developed using the Superscape VRT 5.6 toolkit. The four zones reproduce different potentially fearful situations - an elevator, a supermarket, a subway ride, and large square. In each zone the characteristics of the anxiety-related experience are defined by the therapist through a setup menu. In particular the therapist can define the length of the virtual experience, its end and the number of virtual subjects (from none to a crowd) to be included in the zone.

**Zone 1:** In this zone, an elevator in which the subject has to enter, the subject becomes acquainted with the appropriate control device, the head mounted display and the recognition of collisions.

**Zone 2:** this zone show a supermarket in which the patient can go for shopping. The subject can pick up objects and pay for them at the cash-register.

**Zone 3:** this zone reproduces a subway ride. The subject is located in the train which moves between different stations.

**Zone 4:** the last zone is a large square in which are located a medieval church, different buildings, and a pub.

## 4.2 The Clinical Protocol

### *Subjects*

Subjects will be consecutive patients seeking treatment in one of the institutions involved in the study who met will DSM IV criteria for panic disorders and agoraphobia for a minimum of 6 months as determined by an independent clinician on clinical interview.

Individuals will be excluded if they were acutely suicidal, medically ill or pregnant, had abused alcohol or drugs within the last year or had evidence of cardiac conduction disease. Before starting the trial, the nature of the treatment will be explained to the patients and their written informed consent will be obtained.

The selected subjects will be randomly divided in three groups: ECT group, that will experience the ECT treatment; CBT group, that will experience the traditional Cognitive Behavioral approach and a no-med group. A wait-list control group matched to the other three will be also used.

### *Assessment*

Subjects will be assessed by independent assessment clinicians who will not be involved in the direct clinical care of any subject. They will be MA-level chartered psychologists or PhD-level chartered psychotherapist. For the clinical interview they will use a semistructured interview with the aim of identifying relevant DSM IV diagnostic criteria in the subjects. All the subject will be assessed at pre treatment, upon completion of the clinical trial and after a 1-month, 3-month, 6-month, 12-month and 24-month follow-up period.

The following psychometric tests will be administered at each assessment point:

1. **BDI** - Beck Depression Inventory (Beck, Ward, Mendelson, Mock & Erbaugh, 1961)<sup>31</sup>; contains 21 items which address behavioral, physical, cognitive, and affective components of depression. Each item has four choices that are scored from 0 to 3 in terms of severity.
2. **STAI** - State-Trait Anxiety Inventory (Spielberger, Gorsuch, Lushene, Vagg & Jacobs, 1983)<sup>32</sup>; measures a person's situational (or state) anxiety, as well as the amount of anxiety a person generally feels most of the time (trait). The two scales contain 20 items each, which

may be scored 1 (not at all) to 4 (very much so). Trait anxiety has a reliability of .81 and state of .40, with internal consistency of between .83 and .92.

3. **ACQ** - Agoraphobic Cognitions Questionnaire (Chambless, Caputo, Bright & Gallagher, 1984)<sup>33</sup>; the questionnaire consist of 15 items and evaluate cognitive changes such as the so-called *fear of fear*. The patients have to indicate with what frequency they have negative thoughts when they are anxious, such as "I'm going to die," "I'm going to go crazy etc.
4. **FQ** - Fear Questionnaire (Marks & Mathews, 1979)<sup>34</sup>; the questionnaire consists of a subscale of agoraphobia, which has five items and is limited to the evaluation of motor behavior.

During the assessment will be also used:

- Subjective measurements (self reports, diaries)
- Subjective Units of Distress (SUDs) during exposure to virtual environments. In particular SUDs will be taken at baseline, after 10 minutes and after 20 minutes. (scale is from 0 = no anxiety to 100 = maximum anxiety)

### Session 1

- Description of the etiologic model according cognitive-behavioral approach
- Programmation of Cognitive-Experiential Treatment
- Introduction to Virtual Environments.
- Graded exposure to virtual environments

The first goal of session 1 is to discuss with our patient the etiologic model of Panic Disorder and Agoraphobia and to describe the programme of Experiential-Cognitive Therapy. The description is necessary to obtain an active role of the patient in the therapy.

Then we introduce our patient to Virtual Reality through the use of head mounted display and joystick.

The innovative principle of ECT is to integrate cognitive and behavioral techniques with the experiential possibilities offered by Virtual Reality. Then the next step of the first session is to structure the Graded Exposure procedure to virtual environments.

In imagination and in vivo exposure to the feared stimuli are the most effective psychological treatments available to confront avoidance

behaviours in phobic disorders<sup>35</sup>. The objectives of the therapy are things which the patient fears or avoids and which create difficulty in their daily life. The tasks are the concrete steps needed to reach each one of these objectives. We have developed a virtual reality software with virtual environments, reproducing a square, a supermarket, an underground subway station and an elevator, which allow the patient to face feared stimuli, allowing graded exposure therapy.

The second step is to show the patient the role of avoidance as the main source of agoraphobic and panic behaviors. The therapist underlines the importance of regular exposure to feared situation and structures with his patient a self-exposure schedule. In vivo graded self-exposure as homeworks, initially with the co-therapist (when it is possible), is very important to empower the efficacy of the therapy<sup>36</sup>. This step can be more easily approached by graded exposure to virtual reality and produce important advantages for the patient: reducing the number of sessions, reducing dependency on the therapist and helping to maintain therapeutic achievements.

According Barlow<sup>37</sup> and Clark<sup>13</sup> exposure mainly affects avoidance, but also have a significant effect on panic symptoms and cognitive distortions. In Panic Disorder the graded exposure treatment has much wider effects and leads to improvements in: fear during exposure, avoidance, physiological arousal and catastrophic thoughts.

The long term follow-up studies show that the improvements tend to increase with the introduction of self-exposure<sup>36</sup>. This technique stimulates the patients adopting a main role and attributing the success to their own efforts.

## *Session 2*

- Breathing retraining and Relaxation
- Graded exposure to virtual environments
- Introduction and scheduling of in vivo Self-Exposure
- Homework: in vivo Self-Exposure with co-therapist

Before to pursue graded exposure work we teach Breathing Retraining and Relaxation. A consistent percentage of panickers describe hyperventilatory symptoms as being very similar to their panic attack symptoms<sup>38</sup>. This observation had stimulated the idea that hyperventilation may play an important causal role in panic attacks. In this conception panic attacks are viewed as stress-induced respiratory changes that provoke fear because they are perceived as frightful and augment fear elicited by other panic stimuli. Many researchers have

examined the efficacy of breathing retraining that consist of training in slow and diaphragmatic breathing<sup>39</sup>.

Clark and Salkovskis<sup>14</sup> reported a larger scale study in which the panickers received two weekly sessions of breathing retraining and cognitive restructuring training. After the treatment panic attacks were reduced markedly in that brief period of time and especially in subjects who were not significantly agoraphobic.

The goal of this step is to teach the patient a technique to control panic symptoms during exposure therapy in Virtual Reality and during self-exposure. The breathing exercises can be administered through the following schedule<sup>40</sup>:

1. *Stop what you are doing and sit down, or, at least, concentrate on the following instructions*
2. *Hold your breath without taking any deep breaths and count to 10*
3. *When you get to 10, exhale and keep saying the word "calm down" in a soothing way*
4. *Breathe in and out in cycles of 6 s (3 for inhalation and 3 for exhalation), saying the word "calm down" each time you exhale. As such, there will be 10 breathing cycles a minute*
5. *At the end of each minute (after 10 breathing cycles), hold your breath again for 10 s. As you continue, resume the six-second breathing cycles*
6. *Continue breathing in this way until all symptoms of involuntary hyperventilation have disappeared*

### Session 3

- Homework's Review
- Graded exposure to virtual environments
- Cognitive Restructuring
- Homework: in vivo Self-Exposure with co-therapist

Each session starts with the review of the homeworks, to verify the difficulties that have emerged during self-exposure and to reinforce the patient for the tasks that have been carried out.

After the graded exposure procedure, session three is based on Cognitive Restructuring<sup>41</sup>. In panic disorder cognitive treatment focuses upon correcting misappraisals of bodily sensations as threatening. The cognitive strategies reduce attentional vigilance for symptoms of arousal, level of chronic arousal, and anticipation of the recurrence of

panic.

Cognitive treatment starts by reviewing with the patient a recent panic attack and identifying the main negative thoughts associated with the panic sensations. Once patient and therapist agree that the panic attacks involve an interaction between bodily sensations and negative thoughts about the sensations, a variety of procedures are used to help patients challenge their misinterpretations of the symptoms.

A lot of patients interpret the unexpected nature of their panic attacks as an indication that they are suffering from some physical abnormality. In these cases information and psycho-education about the nature of anxiety can be helpful, especially if it is tailored to patients' idiosyncratic concerns.

Among cognitive procedures one of the most useful involves helping patients to understand the significance of past events which are inconsistent with their negative beliefs.

The techniques are introduced by explaining that errors in thinking occur naturally during heightened anxiety, thus preparing the client to gain an objective self awareness and expectation that their thinking is distorted.

One of prevalent types of errors in cognitions is *overestimation*. The panickers are inclined to jumping to negative conclusions and treating negative events as probable when in fact they are unlikely to occur.

The procedure for countering overestimation errors is to question the evidence for probability judgements. The general format is to treat thoughts as hypotheses or guesses rather than facts and examine the evidence for predictions, while considering alternative, more realistic predictions.

Another type of cognitive error is misinterpreting events as *catastrophic*. Decatastrophizing means to realize that the occurrences are not as "catastrophic" as stated, which is achieved by considering how negative events are managed versus how "bad" they are.

This is best done in a Socratic style so that clients examine the content of their statements and reach alternatives.

The cognitive strategies are conducted in conjunction with behavioral technique of graded exposure in virtual reality.

The steps of Cognitive Restructuring are<sup>41</sup>:

1. Introducing cognitive model of Panic Disorder and Agoraphobia
2. Individuation of NATs - negative automatic thoughts, by means of interview and DTR - dysfunctional thought record
3. Classification and role attribution of dysfunctional thought individuated
4. Verbal Reattribution Procedures (according Clark or Wells's

model)  
5. Behavioral Reattribution Procedures

*Session 4*

- Homework's Review
- Graded exposure to virtual environments using relaxation
- Cognitive Restructuring
- Homework: in vivo Self-Exposure with co-therapist

The schedule of session four is the same of session three. The first part is dedicated to graded exposure. The second part is dedicated to the careful inquiry of cognitive distortions and their modification.

*Session 5*

- Homework's Review
- Interoceptive Exposure
- Graded exposure to virtual environments using relaxation
- Homework: in vivo Self-Exposure

The key feature of session five is Interoceptive Exposure<sup>10,37</sup>. The theoretical basis for interoceptive exposure is one of fear extinction, given the conceptualization of panic attacks as "conditioned" alarm reactions to particular bodily cues. Since according to the cognitive model panic disorder is considered as a "*phobia of internal bodily cues*", the purpose is to modify associations between specific bodily sensations and panic reactions.

According cognitive-behavioral model of Clark<sup>42</sup> and Barlow<sup>37</sup> the most important therapeutic focus consists, in the first place, of inducing panic-like sensations by means of voluntary hyperventilation, cardiovascular exercise or spinning in a chair; in the second place, in demonstrating mistaken beliefs about the catastrophic results of such symptoms by Socratic methods and other techniques used in cognitive therapy; and in the third place, in encouraging the patient to follow through with planned behaviours to test their previous beliefs along with reinforcing more realistic thought systems related to the symptoms.

This technique can be used also during the exposure to the virtual

environments. After the induction of panic-like sensations the patient uses Breathing retraining and Relaxation to control symptoms.

The controlled study and the follow-up of cognitive-behavioral treatments for Panic Disorder demonstrates the effectiveness of interoceptive exposure procedures in the short-term and long-term.

The essential steps of Interoceptive Exposure are:

- Ask to our patient to hyperventilate for 1 minute to induce panic-like sensations
- Demonstrating mistaken beliefs about the catastrophic results of panic sensation
- Repetition of the exercise after few minutes to obtain a desensitization of our patient respect internal bodily cues

### *Session 6*

- Homework's Review
- Cognitive Restructuring
- Graded exposure to virtual environments using relaxation

The session consists of cognitive restructuring and graded exposure with breathing exercises, to strengthen the results.

### *Session 7*

- Homework's Review
- Cognitive Restructuring
- Prevention Relapse
- Booster sessions schedule

After cognitive restructuring prevention relapse is an important step of the last session. In this session we have to schedule the homeworks of self-exposure, the Booster sessions and to reinforce the patient for the tasks that have been carried out and for the future tasks.

### *Booster sessions*

- Follow-up after 1 month, 3 months and 6 months
- Review and Reinforcement of patient's tasks

## □ Management and Prevention of future relapse

The number of booster sessions can be scheduled according to the results of our patients. In our experience three sessions after 1, 3 and 6 months is an appropriate number to complete efficacious therapy. The objective of booster sessions is to verify the difficulties that have emerged and to reinforce the patient for the tasks that have been carried out. During this phase it is possible to repeat some steps of the therapeutic techniques to improve or to stabilize the results of treatment.

## 5. Conclusion

The possibilities offered in this framework by virtual technology are numerous and all extremely advantageous. The administration, guided by the therapist, in VR of scenes that favour the induction of relaxation response have shown extremely positive results. This is primarily due to the intrinsic effects of the VR tool. The feeling of actual presence offered by the realistic reproduction of cybernetic environments and by the involvement of all the sensorimotor channels enables the subject undergoing treatment to live the virtual experience in a more vivid and realistic manner than he could through his own imagination<sup>23</sup>.

VR constitutes a highly flexible tool which makes it possible to programme an enormous variety of procedures of intervention on psychological distress. The possibility of structuring a large amount of controlled stimuli and, at the same time, of monitoring the possible responses generated by the user of the programme offers a considerable increase in the likelihood of therapeutic effectiveness, as compared to traditional procedures.

This innovative tool produces a change with respect to the traditional relationship between client and therapist. The new configuration of this relationship is based on the awareness of being more skilled in the difficult operations of recovery of past experiences, through the memory, and of foreseeing of future experiences, through the imagination. The therapist who knows this valid tool and knows that he can use it as an advantage in his own therapeutic practice feels more powerful and capable of intervening in a more incisive manner on the course of the distress of his client. At the same time, the subject undergoing treatment perceives the advantage of being able to re-create and use a real experiential world within the walls of the clinical office of his own therapist<sup>24,28</sup>.

VR-assisted therapy therefore offers a strong impulse to the

development of new possibilities of prevention and care of psychological health. Through VR it is possible to reduce the serious and careful experimentation will it be possible to enjoy the numerous advantages offered by immersive VR and by technological development.

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Figure 1: The different zones included in VEPD

