Clinical Guide

psious

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1.
What is virtual reality and how to use it in psychotherapy

Virtual reality (VR) and augmented reality (AR) are part of the so-called Information and Communication Technologies (ICTs), and can be defined as a set of three-dimensional environments with which a person interacts in real time, which generate a sense of immersion (sense of presence) similar to that of a real situation. Sense of presence and interaction with the environment are, in fact, the characteristic components of this kind of technology.

In psychotherapy, virtual environments allow us not only to reproduce relevant stimulation configurations for mental health intervention, but also the possibility of manipulating certain variables in order to control and adapt the intervention to our patient's characteristics. Therefore, this technology allows us on certain occasions to work in a way which cannot be reproduced in the real situation; it provides us with the option of evaluating and intervening with the patient "within" a specific situation (for example, in the subway) without the need to leave the consultation; it allows us to repeat certain conditions (for example, a takeoff) as many times as necessary to work on a therapeutic goal (habituation, reciprocal inhibition of an anxious response, relaxation...), and it helps us to plan in a personalized way, manipulating configuration variables and the moments at which certain events are initialized, the intervention's stages, etc.

In short, it is a tool that well used will facilitate the application of psychological evaluation and intervention protocols. However, it is essential to point out that ICTs alone do not produce a therapeutic change. Therefore, the use of Psious environments within psychological evaluation psychological evaluation and intervention protocols that have shown empirical evidence is absolutely essential (for an overview, see, for example, Daset, Lilian R. and Cracco, Cecilia, 2013). Research in psychology already has a broad empirical base that includes virtual reality or augmented reality protocols, which have proven their therapeutic efficiency (see, for example, Botella et al., 2012).

> “It is a tool that well used will facilitate the application of psychological evaluation and intervention protocols”

In Psious, we develop virtual environments for healthcare professionals to have accessible, flexible, customizable and attractive tools to apply treatments that have shown a better therapeutic efficiency. All our environments are based on bibliographic review of validated studies and the clinical experience of mental health professionals.

We currently have environments in which you can work exposure, systematic desensitization, diaphragmatic breathing, muscle relaxation, visualization/imagery and mindfulness techniques. Likewise, although in a less pre-established way, you will be able to use the environments to work on more cognitive strategies, such as cognitive therapy, rational emotive therapy... Below, we will give you details to do this.

Finally, remember that each environment has a Specific Manual (fear of flying, claustrophobia, fear of heights...), and that you can find additional materials in the Knowledge Base, which can be useful to clarify the use of virtual reality and augmented reality in your consultation.

2. Advantages and disadvantages of virtual reality: what your patients should know before they start

2.1
Main advantages of virtual reality

VR is a non-invasive and safe technique based on the projection of interactive 3D graphics through an VR device (goggles and headphones). The placement of the helmet isolates the external stimuli, transporting the user to an environment that is different from the one he/she is in that moment. It is in this "virtual" environment, designed by and for healthcare professionals, where the most adequate therapeutic procedure in accordance with the characteristics of the patient is applied.

As in many other areas, new technologies give us the possibility to facilitate certain processes. In the case of psychotherapy, they allow us to control the therapeutic process, that is, they allow us to personalize the psychological interventions in accordance with the patient's characteristics and needs. For example, in the case of fear of flying, they allow you to land before taking off, and you can also do it as many times as necessary.

As Gutierrez (2002) points out, there are a series of advantages, which we could call Virtual Reality's Decalogue of advantages, from which we and our patients can benefit:

1. It offers a greater degree of privacy in comparison with live exposure.
2. The cost is also lower, as it is not necessary, for example, for therapists to change locations or to hire co-therapists.
3. It allows carrying out treatments in difficult-to-access stimulation configurations (take-offs, storms...), and to solve more easily problems associated with the patient's imagination difficulties.
4. It provides greater control on stimuli and stimulatory conditions. The therapist can decide whether it is day or night, rainy or sunny... In this way, you can better adjust the therapeutic process to the patient's needs.
5. It allows creating situations that go beyond what can be found in reality itself. For example, to recreate 10 consecutive take-offs or going up on a lift without stopping at any floor for 5 minutes.
6. It facilitates self-training and over-learning, as the patient does not have to wait for the events to take place in real life, but can produce and reproduce them whenever he wishes.
7. It allows the therapist to control and observe what the patient is seeing, which allows him/her to detect more easily the stimuli of greater clinical relevance.
8. It makes it possible to design exhibition hierarchies in a personalized way, graduating each one of the steps to follow in a very detailed way.
9. It is very safe: therapist and patient control what is happening at all times.
10. It is an activity in which the patient adopts an active and participative role (Bruner, Vygotsky, Piaget). In this way, the patient can promote re-learning and behavior modification.

2.2.
Disadvantages: Warnings for the use

(It is recommended to inform and include them in the informed consent)

Does it have any side effects?

The most common possible side effects associated with the use of Virtual Reality or 3D videos are slight dizziness, blurred vision, eye strain, headaches, or other visual effects. This is what you may have already experienced if you have watched a 3D movie in a cinema. If your patient experiences any of these symptoms, stop the use of the equipment, and rest and schedule shorter VR or AR exercises.

3D motion sickness is a problem that can occur depending on the person's characteristics: there are people who get dizzier than others when they watch a 3D movie at the movies. You can anticipate whether your patient will get dizzy, more or less, by evaluating whether he/she usually suffers from motion sickness in cars, a boat, an airplane, in the cinema... If you detect he/she is a person with these characteristics, we recommend some strategies:

a. Initially, shorter VR exercises, 10-15 min, with rest periods between them. You can use this to evaluate the sense of presence, cognitions, talk about the process of habituation...

b. Do not let the patient make sudden head movements. In most environments, we have eliminated or controlled this with the introduction of visual effects, turns... and using "interaction targets," so that the patient only moves when facing the front.

c. Tell the patient to accompany what he/she is seeing in the VR with movements of his/her body. For example, if the VR is moving and the patient is sitting, let hi/her stand, always touching a chair or a table with the back of the legs, and tell him/her to accompany the movement of walking by moving his/her legs (without advancing), arms and shoulders.

Is there any risk in the use?

A low percentage of people (approximately 0.025%) may experience seizures, nausea, or disorientation when using VR. It should be noted that seizures caused by flashing lights are more common in epileptic patients, so they should not use this tool or, if they do, they should be aware of the risk involved. To minimize these risks, Psious has controlled the use of scintillating lights in virtual experiences. Again, if you experience any of these symptoms, notify your therapist.

The goggles do not fit well.

It is important to adjust all the fastening strips, unfastening the Velcro, tightening the strap around the head, and refastening it. Try not to tighten the strips too much, as it may become uncomfortable during long sessions. It is also important to center the goggles at the average height of the eyes for a correct visualization.

The patient usually wears glasses. Can he/she wear them under the helmet?

If he/she has **few diopters**, it will be better for him/her to take off the glasses before using the helmet, as they may not fit properly in the cavity and may cause discomfort. To adjust the image to the needs of each person, the little wheel on the top of the helmet must be rotated until the image can be clearly seen.

If he/she has **many diopters**, he/she can keep the glasses on, as many virtual reality devices already allow it, adapting to the size of the glasses.

Can the patient stand or walk while wearing the helmet?

Psious environments are designed to be experienced while sitting or, if indicated by the therapist or if the patient prefers it, standing, without moving and always touching a physical reference with part of the body (for example, calves or calf muscles). It is important that he/she does not move while wearing the helmet to avoid accidents.

3. General recommendations for the therapeutic process

3.1.
Key moments of the use of the VR in consultation:

There are three key moments in the treatment with VR:

1. Before the start of the treatment:

a. INFORM: explain what virtual reality is and what is not to the patient. We must explain that:

- **i.** Realism is not a necessary condition for effectiveness. You will find more information in the section "what to say when the patient says..." of this guide.
- **ii.** He/she will not wear the goggles and immediately believe he/she is on a plane
- **iii.** It has been scientifically validated that it is an effective treatment (more than 15 years ago, imagine what virtual environments looked like back then!)

Remember that, in the Knowledge Base, you will find the document Information for patients that you can provide the patient.

b. MOTIVATE: Let the patient test a virtual environment that impresses him/her. For example, the glass elevator (do not use this environment if he/she is afraid of heights) or under the sea. The purpose of this step is that the patient becomes interested in VR and be predisposed.

c. EVALUATE: it is very important to perform a good evaluation. In the case of phobias, you can build the hierarchy taking into account everything that can be done with Psious environments.

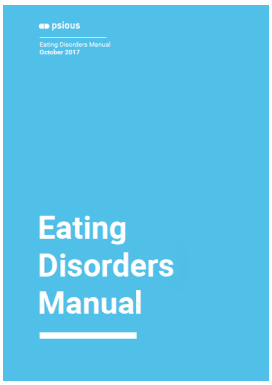
2. First treatment session:

The first experience with VR at treatment level must be successful from the therapeutic point of view. In this way, we will benefit motivation. For example, you can perform a relaxation session in a pleasant virtual environment and record anxiety/relaxation levels with the electrodermal activity sensor. If the patient goes home having experienced a relaxing environment and feeling he/she has really relaxed (*toolsuite* graph for electrodermal response), he/she will be more motivated to start the treatment.

Another way to encourage motivation, if you are using exposure as an intervention technique, is to start with an item that generates a discomfort between 20-40 Subjective Units of Distress SUDs (scale from 0 to 100) and to register the habituation curve using the *toolsuite* tool (0-10 scale of the Psious web platform). Remember that you can also complement the anxiety descent with the physiological record. It allows for the patient to activate and resolve this activation (habituation), and to show the patient his/her habituation curve at the end of the session.

3. Treatment sessions:

For the treatment sessions to be effective, the following elements must be taken into account:



a. **Know well the functioning of the virtual environment you are going to use:** Read the **manual** before applying the treatment to know what each button is for, whether there are buttons that cannot be pressed at certain times, etc... Also, practice with the environment. In this way, you will acquire skill for its use and you will come up with ideas about how to use it.

b. **Care for details to ensure the sense of presence and immersion is as high as possible:** the more sensory channels we stimulate, the greatest the sense of presence. The information obtained during the evaluation will be essential to promote emotional activation; the development of a good hierarchy and the advice you can find in the section *"What to say when the patient says...,"* at the end of this document, will help you to establish the sense of presence.

c. **Showing reports at the end of the session** allows you to see the patient's progress. You can print it and give it to the patient, or show him/her the changes session by session.

d. **Psious' virtual environments have multiple uses:** we should not get hold back by the titles of the virtual environments. Be creative! For example, the plane can be used for patients with claustrophobia, the subway for people who have suffered aggressions in the street and fear going out alone due to post-traumatic stress... In the Knowledge Base, you can access the **Multiple uses of Psious** document, which offers you more uses similar to those of the previous example.

e. **Prevent technical incidents:** for example, check the device's battery before the patient arrives, whether the internet connection works properly, or that there are no pending updates.

3.2.
A good evaluation is the key to an effective intervention

A good evaluation is the basis to conceptualize and plan a good psychological intervention. Remember that you have **specific guidelines for virtual reality environments (for example, Manual on Claustrophobia)** in which you will find strategies, self-reports and bibliography.

Remember also that you can use the environments to help you in the evaluation, for example:

a. Evaluate the **patient's sense of presence:**

   i. Remember that not all patients have the same ability to use the imagination; some may require certain previous training.

   ii. Activate an environment and observe the patient's degree of interaction with it; whether he/she shows an exploratory behavior, stays very still, is silent or talks to you...

   iii. At the end of the virtual reality scene, you can ask your patient to what extent (1 to 9) he/she felt involved in it, in what aspects of the environment he/she focused more, what he/she thought while experiencing the environment...

b. Establish the **baseline of the electrodermal response:**

- **i.** Use a neutral environment, for example that of the island, to obtain five to ten minutes of electrodermal response.
- **ii.** With the information obtained, you will be able to analyze the particular characteristics of your patient's response. Remember that the electrodermal response can vary both intra-subject and from one patient to another.
- **iii.** Remember that you have more information about biofeedback in the Knowledge Base.

c. Perform a **behavioral approximation/avoidance test:**

- **i.** The information you obtain can be useful to create a hierarchy (in case of using gradual exposure, systematic desensitization, emotional staging...).
- **ii.** Start an environment in a certain configuration. In general, the default is usually a configuration of a low discomfort level.
- **iii.** Evaluate the subjective discomfort units and obtain the electrodermal response record.
- **iv.** You can register variables such as:
  1. The distance at which the person stays away from the phobic stimulus. For example, how far from the basement room (claustrophobia environment) is he/she able to get.
  2. The maximum time h/she is able to remain in the presence of the phobic stimulus. For example, how long can he/she be looking down on the fear of heights environment.
  3. The intensity of the stimulus that the patient is able to tolerate. For example, the degree of rain's intensity he/she can tolerate in the fear of darkness environment.
  4. How many of the environment's activities the patient considers himself/herself able to perform. For example, in the fear of flying environment, whether he/she can leave the house, take a taxi to the airport, remain in the departure lounge... How far can he/she go?

d. Evaluate the presence of cognitive distortions in a specific situation. For example, activate the generalized anxiety environment, having previously indicated the patient to verbalize aloud what he/she is thinking while he/she experiences the environment.

e. Evaluate social skills. They can be useful to evaluate how the patient interacts with avatars, whether he/she keeps up with the conversations (in the meeting room), whether he/she can make requests (for example, call the waitress to request he/she lowers the air conditioning), whether he/she is assertive when presented with a negative opinion (for example, during a conversation at the bar), how he/she acts in front of an audience (in a meeting where he/she speaks in a classroom or auditorium...).

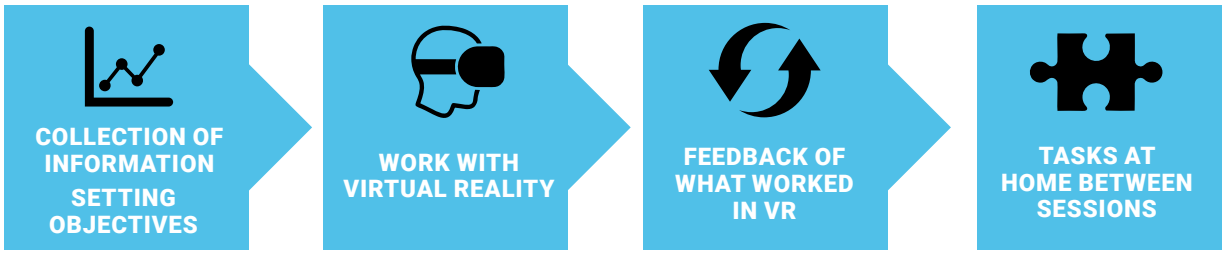
f. Evaluate psychological processes, such as attention or memory. For example, whether he/she can focus his/her attention on a particular activity (notice how the leaves fall from the tree in the mindfulness environment...) or count and remember how many pictures are in the living room of fear of darkness environment.

In summary, use the environments to complement traditional evaluation (interview and self-reports...), and observe in a direct way the patient's behavior while in a clinically relevant situation simulated by VR.

3.3.
Dynamics of intervention during the consultation: What will the sessions be like?

Your patient will be curious and uncertainty about what the intervention sessions will be like. The therapeutic process will depend on the type of problem and the paradigm used by the therapist. However, in general we can say that:

- There will be a first stage for **information collection and establishment of objectives**.
- **Working time with the virtual reality device** in which the patient will interact with the therapist to a greater or lesser extent, depending on the type of technique used.
- A **feedback** process of the things worked upon during virtual or augmented reality.
- In general, the establishment of homework between sessions with the intention of strengthening and generalizing what has been worked upon during the consultation in the patient's usual environment.



3.4.
The importance of the sense of presence

Keep in mind the following aspects to benefit the sense of presence:

1. **Psious develops virtual environments that include stimulation, configuration variables, and events adjusted to therapeutic needs.** For this purpose, it carries out bibliographic reviews prior to the development stage and adapts them to the moment's technical possibilities. Use them and enjoy! This is on Psious
2. **Select the environments that best suit your patient's characteristics.** For example, if he/she prefers the mountain to the beach and you have to teach him/her to relax, select the "Diaphragmatic breathing in the meadow" environment rather than the "Island" or "Under the sea" environments. If you are performing an exposure treatment, begin with low anxiety environments (20-40 SUDs) and increase them based on the patient's evolution. Elaborate a hierarchy that reflects your patient's particular characteristics. Remember that, while treating the same phobia, different people may fear different stimuli: a patient may fear boarding and another landing, although both feel fear of flying.
3. **Establish clear intervention objectives.** For example, to perform abdominal breathing increasing the inspiration's duration. In this way, you will make it easier for the patient to focus his/her attention on the important aspects of the environment. If you use hierarchy, keep in mind that during the construction of the same, you already work with the patient establishing what he/she will be exposed at and in what order it will be done, so he/she will generate expectations about what is going to happen.

4. **Before starting to work with virtual reality, briefly describe to your patient what the objectives are and what he/she will see and hear during the simulation.** You can also provide information that induces the focus of your patient's attention. For example, when you are working on the takeoff, ask him/her (before the simulation starts) where he/she are going, how long will the flight last, etc. You will find more information like this in the Environments' Specific Manuals (for example, in the Manual for Fear of Flying) available in the Knowledge Base.

5. **In general, do not interact with the patient during the simulation.** Talking with you, establishing a dialogue, can remind him/her that he/she is in consultation and not in the environment and, therefore, interferes with the sense of presence. Therefore, instruct him/her to voice his/her questions or doubts after completing the simulation and, if you are going to ask about relaxation or discomfort levels, always try to do it with short and pre-established questions (e.g., I will ask you every 5 minutes "What is your level of discomfort from 0 to 10?," try to answer considering what you feel at that moment.)

6. **Observe your patient during the VR.** His/her behavior can be very useful for evaluation processes and to obtain data on therapeutic changes. For example, if you are carrying out an exposure therapy, observing exploratory behavior at the beginning of the simulation may indicate lack of activation and/or lack of a sense of presence (if there is activation, the patient is usually tense and therefore, more rigid, he/she does not explore). On the other hand, if that same behavior takes place together with a decrease in self-reported discomfort, it will reflect habituation.

7. **At the end of the simulation, you can ask** questions about what he/she has done, what he/she has seen, what he/she remembers about the environment as a way of evaluating the extent to which his/her attention has been focused on the simulation. In this way, you will obtain information regarding the sense of presence and, additionally, regarding the most clinically relevant stimulation for your patient.

8. **Promote live and/or imaginative expositions between sessions.** In some cases, especially in anxiety and avoidance behavior cases, the patient has been avoiding what he fears for a long time, and has no recent memories of what it implies. The live exposition will help him/her to generalize what he/she has learned in the consultation, and will also allow him/her to have more recent memories during the simulations.

[1]In case you are evaluating or intervening through cognitive restructuration, the interference caused by the dialogue can be minor or insignificant for the therapeutic objectives (it will not interfere with the exposition). See section 4.4 Cognitive Restructuring.

4.
Specific recommendations for the therapeutic process based on the technique

4.1.
Exposure therapy

Very briefly, exposure therapy is a psychological intervention technique that benefits, through the gradual (though not always) and systematic confrontation of the feared stimuli (external or internal), the habituation and the elimination of the conditioned emotional response, the substitution of avoidance responses, and the emotional reprocessing and change of expectations.

4.1. GRADUAL EXPOSURE THROUGH VIRTUAL REALITY AND AUGMENTED REALITY	
General steps of the procedure	Remember...
Evaluation	...Use the environments to perform a **behavioral approximation/avoidance (BAT) test and build the hierarchy**. ...Use Virtual Reality and the electrodermal response sensor to establish a baseline ...Observe the patient to notice his/her motor behavior within the environment he/she fears, and record it in the comments of the Psious platform ...Ask him/her questions, at the end of the VR simulation, to detect distorted cognitions and dysfunctional beliefs ...Evaluate the patient's imagination ability (it may require some training sometimes). To do so, you can use the instructions in section 3.4.
Elaboration of exposure hierarchy	...The behavioral approach/avoidance tests carried out in consultation using VR, can be used to establish the exposure hierarchy starting point. ...Virtual reality environments will allow you to create hierarchies of between 10 and 40 items (from 0 to 100 SUDs). Use the configuration variables and environment events to define the items in the hierarchy.

	...In the specific "Environment" Manuals you will find self-reports with examples of items configurable by means of the variables and events of the Psious platform.
Set session objectives	...In the **initial session look for items of low activation, between 20-40 SUDs** to generate a low-moderate anxiety and, in that way, reach habituation to discomfort more easily. The patient will be able to experience that change is possible and this will benefit motivation. ...In the **following sessions, use the exposure hierarchy to establish the objectives of the session**. The configuration variables of the environments will allow you to adjust the exposure gradient to your patient's characteristics and needs.
Gradual exposure therapy	..It will be better if you schedule sessions of between **30 and 45 minutes** of exposure. In them, you can work on a variable number of items in the exposure hierarchy depending on the patient's characteristics and the intervention's moment (more or less aversive items). ...Make an **introduction:** • define the intervention objectives (e.g., landing) • make a brief description of the content of the environment on which he/she is going to work (flying, information about the next arrival, approaching the airport and characteristic sounds, wheels contacting with the track and intense sounds...). In this way, you will benefit induction of the sense of presence. ...**Use Virtual Reality so that the patient is exposed** to the stimulating configuration that generates the phobic emotional response. The use of hierarchies obtained in the evaluation will make the process more gradual and less aversive for the patient. ... You can use the Psious platform **to register, by means of SUDs, the discomfort experienced**. ... It is recommended in general not to ask questions while the patient is being exposed himself (wearing the goggles and being within the VR's environment), as these could interfere with the patient's sense of presence. Wait for the stimulation to end before you ask questions. You can also request the patient, before the start of the intervention through VR, to indicate relevant changes in his/her discomfort levels (increases or decreases), and you can register them. Sometimes patients seek therapeutic interaction as a disguised avoidance response (talking to the therapist reminds them that they are not inside the virtual environment but in the consultation and thus, thy avoid discomfort). ...It is recommended, as a general guideline, **that there is a significant reduction in self-inflicted discomfort in order to end the exposure exercise or advance from one item to the next: a decrease to more than half the**

	maximum level of discomfort registered. For example, if the maximum indicated was 10 (on a scale from 0 to 10), do not finish the exposure until you reach a 4. If you have time during the session, it is better to reduce it to 0-2. ...In case **the patient does not tolerate the discomfort level, the exposure can be stopped:** positively reinforce the coping behavior, provide explanations regarding the emotional response, allow emotional expression, identify trigger stimuli...) Once the anxiety diminishes: • **re-evaluate** the exposure hierarchy to, if applicable, decrease the stimulation level (you can do this using the hierarchy obtained during the evaluation, the configuration variables, the general volume of the platform...) • **re-expose** the patient until you reach a significant reduction of anxiety. ...In case the patient gets tired, even if the scheduled time has not been reached, it is advisable to stop the exposure, pause (reinforce the coping behavior, talk about how the process is going, show the changes achieved...) and , if possible, re-expose the patient. ...**End the session always after having significantly reduced the discomfort associated with one of the phobic conditions.** In this way, you will maintain your patient's motivation. ...Use the possibility of writing comments on the Psious platform to record the verbalizations, the thoughts of the patient during the exhibition, etc. Also, make notes regarding their behavior (for example, whether they remain quiet, with arms tensed, whether he/she carries out more or less exploratory behaviors...) ...You can use the electrodermal response sensor to record anxiety changes using the physiological channel. Remember that you can find more information on how to use the sensor in the **Knowledge Base** and the specific Biofeedback Guide. ...In case you detect the **presence of cognitive beliefs and/or distortions,** use pauses between the exposure exercises (for example, scene repetition, changes on items...) to work on cognitive restructuring. ...If feasible, **establish live exposure exercises between sessions** that include the items worked in consultation. ... In the "Specific Environment Manuals," you can find examples of specific intervention protocols.
Interoceptive exposure therapy	• To work exposure to body sensations generating fear, you can use the button located below the webplayer SETTINGS EVENTS RELAX INTEROCEPTIVE • In general, you can use interoceptive exposure in patients with panic disorder with or without agoraphobia, some cases of claustrophobia (especially those with marked fear of suffocation), health anxiety, etc.

- In **case the patient is afraid of the physical sensations a certain situation** can generate, you can opt for different intervention forms:

  a. Launch a certain environment in a configuration you have identified as one generating anxiety for the patient. If the physical sensations that generate fear appear, allow habituation to occur. In case they do not appear, you can activate the INTEROCEPTIVES button to induce the physical sensation of discomfort and then work on the habituation.

  b. You can launch a neutral environment for the subject (if he/she is afraid of closed spaces, activate the park environment) and then activate the INTEROCEPTIVE button and expose him/her specifically to sensation that causes fear. In this case, the objective will be to solve the fear of sensations before an exposure to a virtual or real environment (being on the subway, for example).
- Choosing one or another option will depend on the evaluation process:

  Option a will be appropriate for subjects with less fear of physical sensations (more time with them, for example) and more associated with specific situations (especially the agoraphobic ones).

  Option b will be appropriate for patients with high sensitivity to physical sensations (recent panic attacks, for example).
- We recommend that, in general, you complement the interoceptive exposure with psychoeducation and cognitive restructuring and/or re-labeling of physical sensations.
- Interoceptive exposure should not be used or should be applied with medical supervision in people suffering from cardiovascular disorders (hypertension, arrhythmias), respiratory diseases (asthma, emphysema), metabolic or hormonal disorders, pregnancy, epilepsy, seizures, or any serious physical disorder. In all these cases, it is convenient to contact the patient's doctor, explain the procedure and the exercises involved, and ask which ones can be carried out. On the other hand, it is advisable to request a medical examination for patients who have not undergone check-up in the last 12 months.

4.2. Systematic desensitization (and variants)

Systematic desensitization is a psychological intervention technique based on the counter-conditioning of emotional responses. In it, we will use a relaxation strategy –in the form of technique (Jacobson's relaxation, for example) or activity (game, eating, for example in emotional staging)– to inhibit a conditioned emotional response. In general, the emotional response to resolve is usually an anxiety related one. Through the principle of reciprocal inhibition, the fearful emotional response will be associated and counter-conditioned with relaxation.

4.2. GRADUAL EXPOSURE THROUGH VIRTUAL REALITY AND AUGMENTED REALITY	
General steps of the procedure	Remember...
Evaluation	..Use the environments to perform a behavioral approximation/avoidance test and build the hierarchy. ...Use Virtual Reality and the biofeedback sensor to establish a baseline ...Observe the patient to notice his/her motor behavior within the environment he/she fears, and record it. ...Ask him/her to detect distorted cognitions and dysfunctional beliefs ...Evaluate the patient's imagination ability (it may require some training sometimes)
Elaboration of exposure hierarchy	...The behavioral approach/avoidance tests carried out in consultation using VR, can be used to establish the exposure hierarchy starting point. ...Virtual reality environments will allow you to create hierarchies of between 10 and 40 items (from 0 to 100 SUDs). Use the configuration variables and environment events to define the items in the hierarchy. ...In the specific "Environment" Manuals you will find self-reports with examples of items configurable by means of the variables and events of the Psious platform.
The relaxation response	Use Psious' relaxation environments (Diaphragmatic breathing under the sea or meadow and/or Jacobson's) to train the inhibitory response. Once the answer is taught, you can start with the counter-conditioning. Remember that, in children, you can use games as a relaxation response and that you have specific environments, such as fear of darkness, that include the "gamification" for coping.
Set session goals	...In the initial session, look for low activation items, between 10-20 SUDs, to benefit the appearance of low anxiety. ... In the following sessions, use the exposure hierarchy to establish the objectives of the session. The configuration variables of the environments will allow you to adjust the exposure gradient to your patient's characteristics and needs.
Systematic desensitization	Once started the environment in a certain configuration and when the patient indicates the appearance of anxiety, you can:

a. Tell the patient to close their eyes and launch the relaxation with which you have trained in audio format, from the RELAX buttons located below the webplayer: progressive muscle relaxation (Figure 1, button 1) or diaphragmatic breathing (Figure 1, button 2). Once relaxed, the patient will be able to open his/her eyes and face the objective counter-conditioning item once more.

b. Stop the environment, go to the relaxation environments and apply the one used during the training. Once relaxation has been achieved, you can restart the environment that includes the item you are working with.

Remember that this dynamic will be repeated until the patient does not shows anxiety in that stimulating configuration, at which time you can go to the next item in the hierarchy; that is, restart the environment, and/or change the configuration variables, and/or launch some environmental event.

It is advisable to start the sessions with the environment's last configuration (item) solved by the patient in the previous session.

4.3 Activation control techniques

As its name indicates, the activation control techniques aim to provide the patient with skills to better regulate his/her activation level in general, and physiologically in particular. Historically, Jacobson (1938) provided a muscle relaxation structure, Wolpe (1937, 1982) disseminated them at a general level, and Borkovec (1973) protocolized them for clinical use and research. The role of Schultz and Luthe (1969) and the autogenic training of Upper and Cautela (1979) in relation to covert conditioning, and, finally, Meichenbaum (1985) and his training in stress inoculation, should also be noted. For this purpose, you have four types of virtual reality environments in Psious:

a. Diaphragmatic breathing:
in the meadow and under the sea

b. Muscle relaxation:
Jacobson relaxation

c. Imagery:
Island and Under the sea.

d. Mindfulness:
conscious walk, spring summer, and body scan

4.3. ACTIVATION CONTROL TECHNIQUES	
General steps of the procedure	Remember...
Evaluation	Use them to present VR to the patient before working on more specific objectives. In general, they are very pleasant environments that can help the patient to get an idea of what VR and AR are, and how they work. These environments can be used to assess your patient's sense of presence. Use the environment and the tips and guidelines in section *3.4. The importance of the sense of presence* They can also be useful to assess **more general aspects** such as: • **Perceptive** ability: at the end of the simulation, you can ask him/her whether you he/she has noticed the breeze and/or the smell of salt water. Assess to what extent the person has imagined/perceived, other than seeing and hearing, other perceptive characteristics of the environment. • **Attention** capacity: to what extent is the patient able to focus his/her attention on what is happening visually and auditory in the environment. At the end of the VR, ask about the environment's details, for example, what kind of trees has he/she seen, what fish or marine animals has he/she recognized. • Aspects related to **memory**: establish an objective before the simulation (for example, remembering the amount of palm trees seen at the beginning), and at the end of the simulation, ask whether he/she remembers it. In this way, you can contrast hits/errors.

[2]Since mindfulness goes way beyond the control of activation, it will be analyzed in a specific section.

	And also, to assess **specific aspects**: • You can observe whether or not he/she knows how to move the abdomen while breathing, whether his/her breathing is more thoracic or clavicular. • You can see whether he/she is capable of adjusting his/her breathing to the rhythm you have initially established, whether inspiration or expiration is more difficult, if he/she needs "recovery breaths" from time to time... Establish a baseline for his/her habitual respiratory rate, registering the inspiration and expiration frequency at which the person feels comfortable. Remember that you can use the web comments tool to carry out an evaluation register. • Assess the person's ability to perform a body scan and to detect tension areas in his/her body. Ask him/her to carry out the process and to tell you whether he/she detects tension in any area. • Evaluates the ability to follow instructions: in relaxation environments, the patient must pay attention to indications and then, for example, adjust his/her breathing according to the external guide. Observe him/her and make notes in the comments section to give feedback.
Imaginary	The Island and Under the sea environments will be useful to work relaxation objectives through sensory focus. Through them, you will be able to: • Teach the patient to carry out a covert conditioning (you can use a word repetition, for example, relax) • Redirect attention towards a pleasant stimulation • Use imagination as a distraction element in low intensity anxiety situations; for example, upon the appearance of unpleasant thoughts. It helps the patient to generate his own mental environment and to practice its application in diverse common situations. On occasions when the patient undergoes thought intrusions while practicing muscle relaxation or diaphragmatic breathing, it may be useful to combine various activation control techniques. Once started the environment, remember that you have the RELAX buttons (below the VR viewer on the web) to activate diaphragmatic breathing (Figure 1, button 2) and progressive muscle relaxation (Figure 1, button 1) if you want to work on relaxation through breathing or muscle relaxation.

Diaphragmatic breathing	The meadow and under the sea diaphragmatic breathing environments will allow you to train breathing. The objective will be to regulate its frequency (low rate) and its location (abdominal) to promote the deactivation of the organism through parasympathetic nervous system mediation and the regulation of the amount of carbon dioxide in the blood (hypercapnia). Remember to make a theoretical introduction, **psychoeducation**, of the general objectives of diaphragmatic breathing aimed at relaxation. Likewise, establish specific objectives for the session, such as, for example, breathing using the lower abdomen area. Present a **visual (abdominal movement) and auditory model (intensity of breathing)** of how to perform abdominal breathing: abdomen movement, low frequency, equal duration for inspiration and expiration, or a longer expiration, etc. **Before starting the environment**, select the **virtual guide**. Be sure to select it to the liking of the patient, and that it does not generate intrusive thoughts ("will the jellyfish come near me, will it sting me?") Neutral guides that benefit a stimuli monotony usually work best. Likewise, this will be the moment to connect the electrodermal physiological register. With the registry that you obtain in the toolsuite, you will be able to monitor changes and provide feedback to your patient. For example, you can verbally reinforce the activation descents you see in the graph. **Start the environment and observe** the breathing frequency of your patient breathes at rest. You can write of the baseline parameters in the toolsuite's comments section. Adjust the parameters to their usual frequency. In this way, you will be able to obtain a behavioral baseline and, if you use registration electrodes, also a physiological one. Once the abdomen is **moves and the patient shows a constant inspiratory/expiratory rhythm**, decrease the frequency of the parameters progressively through environmental events. In this way, and by establishing specific objectives during the sessions, you can benefit the learning process. You can evaluate with yes-no questions during relaxation, to avoid distracting the patient, such as "indicate your degree of relaxation from 0 to 10." You can use the SUDs to record the patient's response and add comments in case you notice relevant aspects, for example, whether the patient follows or not the VR's indications.

	Remember to promote generalization of established behaviors in the patient's natural environment. To do this, ask your patient to perform the activities practiced in consultation at home, in the subway, while driving, etc. To facilitate this process, you can **train in the consultation with the virtual environments that are relevant for the patient, and activate diaphragmatic (audio) breathing exercises you can access from the RELAX buttons below the webplayer.**
Muscle relaxation	The Jacobson's muscle relaxation environment consists of the procedure abbreviated by muscle groups. With it, you can teach your patient to identify muscle tension group by group and relax them. This will reduce muscle tension and, with it, proprioceptive information, thus reducing general activation. Remember that psychoeducation always helps the patient to understand the therapeutic process, establish objectives and make an effort in the practice. Before starting, we recommend that you show the general procedure through a visual example. For example, with tensing and relaxing the dominant hand. Remember that the use of a psychophysiological record can be very useful to monitor therapeutic changes and relaxation degree, as well as to provide feedback to the patient during and after the session (reports). Based on the evaluation (self-reported, for example, through Caution's (1977) "Inventory of tension," a body scan exercise included in mindfulness environments, etc) and therapeutic objectives, establish which muscle groups you will work both during the general procedure and during the session. For example, if you have detected that your patient focuses tension on the cervical area, it will be more important to practice head, neck, limbs and trunk exercises. Assess the need to perform the exercises with other muscle groups.

During relaxation, you can evaluate progress in a better way with yes-no questions, such as “indicate your degree of relaxation from 0 to 10.” You can use SUDs to record the patient’s responses and adding comments in case you observe relevant aspects, for example, whether the patient follows or not the VR’s indications.

Remember to promote generalization of established behaviors in the patient’s natural environment. To do this, ask your patient to perform the activities practiced in consultation at home, in the subway, while driving, etc. To facilitate this process, you can **train in the consultation with the virtual environments that are relevant for the patient, and activate diaphragmatic (audio) breathing exercises you can access from the RELAX buttons below the webplayer.**

Body scan

The body scanner included in the mindfulness category can be a very good exercise to **evaluate and teach** the patient to detect muscular tension areas. In this way, attentional focus and discriminative learning of tension muscles will be trained. Likewise, it will be a very good tool as an exercise at the end of the session, once a diaphragmatic breathing and/or Jacobson’s relaxation has been carried out.

	Establish therapeutic goals with your patient, for example, focusing his/her attention on his/her organism, detecting tension levels in different areas of his/her body: face, neck, trunk, etc. Once the scan is finished, ask questions to your patient regarding his/her attention, the detection of areas with more or less tension, etc. Remember that you can make annotations in the comments section before changing the environment or ending the session, and have a register of therapeutic changes.

4.4. Cognitive restructuring

Cognitive restructuring is a cognitive-behavioral therapies general strategy used to modify maladaptive thoughts and beliefs through different strategies: re-labeling, identification and change of distorted thoughts, Socratic dialogue, reality tests, etc. The two main models, and those with the greatest cognitive intervention empirical support, are Rational Emotive Therapy (Ellis, 1958) and Cognitive Therapy (Beck, 1967 1976). The Psious environments provide you with tools for you to evaluate and intervene through the intervention model you consider most appropriate.

4.3. ACTIVATION CONTROL TECHNIQUES	
General steps of the procedure	Remember...
Evaluation	All virtual reality environments can be useful to evaluate and intervene using different cognitive restructuring techniques. If you have detected, in the initial evaluation, that your patient needs intervention at a cognitive level (presence of automatic, distorted thoughts, and dysfunctional beliefs), you can use the environments to identify their content. For example: • Activate an emotionally activating environment and instruct your patient to verbalize aloud what he/she is thinking while they experiencing the environment (taking off, driving, going down a subway corridor, listening to television news, etc.) • Tell him/her that in order to avoid interferences in the process (i.e., not to have an effect on the sense of presence), you will not interact with him and you will only take notes. You can use the platform's comments section

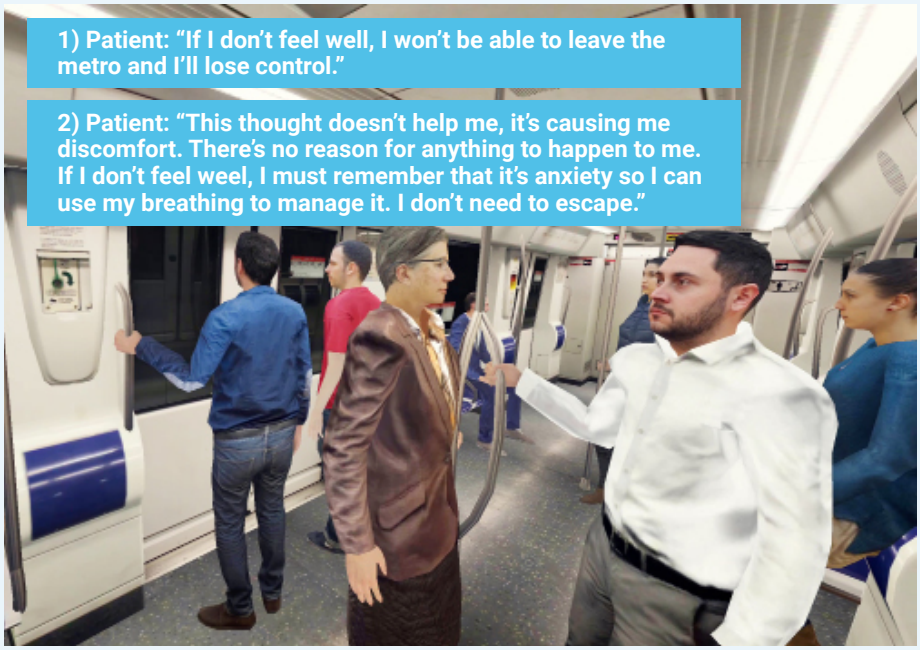
- In this way, you can register distorted thoughts associated with a specific situation, and from there, start the cognitive restructuring therapeutic process of either the thoughts or beliefs

You can perform intervention in cognitive restructuring in two different ways, a complementary way or a specific way; that is, as the main strategy. In both cases, we recommend that, before you start, you teach your patient the basic steps of the restructuring (identification of distorted ideas, labeling –catastrophizing, excessive generalization, etc.– of alternative thought.)

a. Complementary:

If you are working with a technique as the main intervention strategy, for example, exposure, DS, etc., you can apply cognitive restructuring in a way that complements the main objective. Both in exposure and DS, once the patient is habituated to anxiety or has counter-conditioned it, we can begin the restructuring process while the VR environment is active. For example, you can follow this intervention dynamic:

- Encourage the patient to identify the presence of distorted thoughts while in the situation. You can tell him/her to verbalize them out loud. In case they do not appear (you will have already explained what the dynamics of the session will be like), remind him/her the ones you obtained during the evaluation. Express them out loud for the patient to activate and manage them.
- If you have already taught your patient how to identify the type of distortion, encourage him/her to label the thought and generate more functional alternatives.
- As always, we recommend your intervention to take place later on if you want the sense of presence to prevail. Take notes, using the toolsuite's comments section, to later provide feedback once the VR exercise is finished.



b. Main strategy:

In those disorders in which you use cognitive restructuring as the main intervention strategy (generalized anxiety, adaptive disorders, mood disorders, etc.) and, therefore, you do not use other techniques as central strategy, you can follow a procedure similar to that outlined below:

- Direct the patient to identify the presence of distorted thoughts while in the situation (thinking out loud, for example). Choose virtual reality environments in which you have detected, during the evaluation, it is easier for distortions to appear. For example, in the case of anxiety related to health issues, you can use the "concern for diseases" generalized anxiety environment
- In this case, given that the sense of presence will not be as relevant as in the exposition, you can interact with the patient and teach him/her how to identify thought distortions, categorize them, and even offer the patient alternative thoughts for him/her to learn how to generate them through modeling.
- If the distortions do not appear spontaneously, remind the patient of the ones you obtained during the evaluation. Express them out loud and work with them while the VR is active.
- Enhance the patient's autonomy in the process little by little and promote, by working with the VR, records and activities between sessions, which will allow the patient to automate and generalize the use of cognitive restructuring.

4.5.
Mindfulness

Mindfulness is defined as consciousness that emerges through paying attention with purpose, in the present moment, and without being critical, to the development of the moment to moment experience (Kabatt-Zinn, 2003, cited in Boettcher et al., 2014).

The concept of **mindfulness** is essentially **transdiagnostic** (Boettcher et al., 2014), therefore, its use in the field of psychological therapy is justified from a broad theoretical framework, in which **individuals with mental disorders are considered to share behavioral processes and specific cognitive factors contributing to the development and maintenance of said disorders** (Barlow et al., 2004 and Mansell et al., 2009; cited in Boettcher et al., 2014). This are **processes such as selective internal and external attention, attentional avoidance, interpretation biases, distorted and/or recurrent thoughts, and avoidance and safety behaviors** (Harvey, Watkins, Mansell, & Shafran, 2004; cited in Boettcher et al., 2014). Therefore, through the practice of mindfulness, is not intended to treat specific aspects of a specific disorder, but **to treat certain aspects common to different disorders**. The Psious environments provide you with tools for you to be able to evaluate and intervene transversally. For this, you have different environments and events:

Conscious walk:

Walk through a meadow with mindfulness exercises aimed at different perceptual modalities. Duration: 15 minutes.
Level: beginner

Spring-summer:

A walk with full attention, thought management, and gratification exercises in two environments corresponding to two seasons: spring and summer. Duration: 22 minutes. Level: beginner

Body scan:

Tour through the parts of the body, paying full attention to them and to body sensations. It can be used as training for Jacobson's relaxation exercise, as the patient must focus on body parts where he/she feels tension, and then relax them. Duration: 5 minutes Level: beginner-intermediate

[3] Remember that you have a Mindfulness Manual in the Knowledge Base

4.5. MINDFULNESS	
General steps of the procedure	Remember...
Conscious Walk	
Evaluation	The conscious walk environment can be very useful to evaluate aspects associated with the patient's perceptual abilities. Is he/she able to focus his/her attention on each of the different sensory modalities? Is there one in which he/she is more skilled than others? Is it easy for him/her to focus his/her attention on one modality? Does he/she know how to change his/her attention focus from one perceptual modality to another? Can he/she focus on his/her breathing, on his/her own perception? Establish specific objectives and evaluate the patient's performance while carrying out the VR activity. For example, use the lemon tree exercise to assess his/her ability to focus on taste and smell; evaluate the level of salivation response (you can use the SUDs scale as a tool) by asking (once the VR is finished) and observing your patient's non-verbal behavior (he/she moves his/her mouth during exercise, swallows, etc.)
Intervention	Use chaining as a way to progress gradually while learning mindfulness. Train each of the perceptual modalities through the VR exercises and in an order determined by the evaluation's results. Once they are individually learned, the patient will be able to carry out the activity completely. You can complement the mindfulness environments by working with of activation control, both diaphragmatic breathing and muscle relaxation. Remember that you can stop the mindfulness exercise, using the Play event, and that you have the RELAX buttons (below the web player) to activate the activation control audios. Once the full attention training is completed, you can facilitate its application by practicing in a virtual reality environment, such as the acrophobia environment, to promote the generalization of the skill learned in a specific environment. Promote activities similar to those carried out during the VR in the person's natural environment in order to favor generalization.
Spring - Summer	
Evaluation	The spring-summer environment consists of different activities that will allow you to evaluate mindfulness (Spring: nature meditation), management of thoughts (Spring: Cascade of thoughts), conscious attention (Summer: Conscious observation and proprioception) and capacity to use pleasant emotions (Summer: gratitude exercise).

	Use each one of the environments to evaluate the different aspects included in the VR environment following the guidelines indicated up to now. • Establish evaluation objectives. For example, thought management in the basement environment. • Detect the presence of unpleasant thoughts and write them down in the patient's file using the toolsuite's comments section. • Evaluate the user's ability in relation to the therapeutic objective (remember that you can use the SUDs scale as a guide: 1 - few skills and 10 - many skills). Is his/her attention focused on the thoughts? Do these generate a high intensity emotion? Does such a fact generate a cascade of unpleasant thoughts the patient cannot stop, manage, etc.?
Intervention	From the evaluation: • Define the intervention objectives. You can use conscious attention to manage unpleasant emotions during, for example, a job interview. • Carry out activities using the VR that allow you to work on the therapeutic objective. For example, you can use the conscious attention exercise of the Summer environment to practice voluntary and directed observation of the VR details, of oneself and of the process, and not of the result. Let the patient complete the activity, and once completed, jointly evaluate his/her level of attention, what he/she has seen, etc. • Remember that you can use observation to assess the behavior of your patient during the VR activity (whether he/she is immobile, shows exploratory behavior, focuses on a specific object, uses diaphragmatic breathing correctly, etc.) • Once practiced, during one or several sessions, you can encourage your patient to use it during a job interview conducted in the Office VR environment. • As always, we recommend you establish exercises between sessions to benefit the generalization of what has been learned. In the exemplified case, you can promote covert practice through imagination; encourage the patient to imagine himself/herself in a job interview and, during the same, to practice, for example, attentional focus on the task.
Body scan	
Evaluation	The body scan environment consists of a single activity that will allow you to evaluate the patient's ability to focus attention on parts of his/her body and physical sensations. Is he/she capable of focusing on every part of his/her body for a while? Can he/she notice which points are in tension and relax them later? Does he/she have the ability to perceive the physical sensations that appear?

	You should evaluate whether the patient is able to develop attention, in this case, towards his/her body and the sensations that he/she notices and detects during the session. As in the previous environments, establish specific objectives and evaluate the patient's performance while carrying out the VR activity.
Intervention	After the evaluation, establish the objectives to be followed in the intervention (for example, a specific objective may be not to tighten the muscles of the back before a lecture or conference). You can use this environment as a training to perform the final exercise of Jacobson's relaxation. Once the patient has learned to focus on different parts of his/her body one by one to see which ones are in tension and to be able to relax them, this environment will allow him/her to perform the activity completely and thus, acquire greater control. If you have used the environment for mindfulness training, you can facilitate its application by practicing in a virtual reality environment, such as fear of speaking in public, driving, etc., to promote the generalization of the skills learned in a specific environment. Once again, promote activities similar to those carried out during the VR in the person's natural environment to benefit generalization.
Other non-mindfulness Psious environments that allow you to work transversally	Through Psious environments, you can evaluate aspects associated with: **a.** Your patient's **perceptive abilities**: to what extent between virtual reality and imagination does the patient feel present and immersed in the activities? Have he/she noticed visual details and can he/she provide their details? Has he/she heard the environment's different sounds? Has he/she felt the breeze, the smell or perceived the taste of something related to the environment? Ask your patient questions regarding these aspects after completing the VR activity. It may be interesting to set goals before it. For example, ask your patient to pay attention to what he/she perceives (what he/she sees, hears, smells, etc.) while walking on the subway platform. **b. Attention avoidance**: observe and record your patient's behavior while in an environment. For example, when he/she is in the elevator, what he/she is looking at, does he/she show an exploratory behavior and his/her gaze is fixed in a specific place; is he/she avoiding looking at some area of the environment? You can use the toolsuite comments section to make the annotations and notice changes between sessions.

c. Presence of **distorted thoughts:** As already indicated in previous sections, especially in the one dedicated to cognitive restructuring (section 4.4), you can use the environments to evaluate the presence of dysfunctional thoughts and beliefs. Use the indicated guidelines to obtain a better result.

d. **Avoidance behaviors**: propose different activities to your patient to evaluate his/her level of avoidance. How in a behavioral avoidance test you can activate an environment and graduate its presentation. For example, activate the environment of fear of storms with rain, and ask the patient about his/her level of discomfort. If it is low, ask him/her whether he/she is ready for a low intensity thunder and lightning storm.

   i. In case he/she indicates a high intensity, write down his/her answer to elaborate the exposure hierarchy.

   ii. In case he/she indicates an intensity below 30 SUDs, restart the environment with the storm variable and, ask once more.

You can also observe, as we mentioned in section "a," to what things the patient pays attention or not. For example, does he/she constantly look out the window while on the plane? At the end of the VR, ask him/her whether he/she has noticed it and to explain the reasons for his/her behavior.

e. **Safety behaviors:** as in the previous section, observation will be your great ally. Is the user capable of carrying out an activity but does it in a very rigid way or only in certain conditions? For example, he/she sits at the front of the plane. Does he/she carry them out with some object or thought that generates safety in a dysfunctional way? For example, carrying a bottle of water in your bag, the cell phone battery at full charge, always accompanied by someone, etc.

Remember that Virtual Reality is a tool to use together with an evaluation psychological intervention technique or protocol. Well used, it will allow you to adapt the modality of presentation and/or use of the intervention strategy, facilitating the therapeutic process.

5.
What to say when the patient says...

In this section you will find **information on how to manage the patient's doubts** regarding their interaction with virtual reality, the psychological intervention processes, and the intervention dynamics.

I do not feel immersed in the situation being simulated

It is very important that you imagine yourself in the situation the computer presents (with the exception of the accidents scene). Do not look at it as if you were watching a movie. Strive to imagine that you are there. Make sure there are no distractions in the room. Think about what you are doing. If you cannot stop thinking about other things, stop the activity and resume it at a more appropriate time.

I still cannot imagine myself in the situation

Some of the following guidelines can help you live the situation more realistically. Always imagining that you are there, think about how you are dressed, where are you going (for example "To my city, coming back from a meeting"), who is sitting next to you, what smells can you smell. Think about what tactile sensations you notice. Close your eyes momentarily, paying attention to the sounds coming through the headphones. In short, look for the best way to make the scene you are watching a realistic and vivid one.

This is not the same as reality...

It certainly is not. But it is what resembles it the most. If it was a real situation, do you think you could do it? Remember, what we do is to gradually break the associations between the discomfort we feel and concrete aspects of the situation we fear. When the day comes to do it in reality, the discomfort will be much less because these associations will no longer exist or will have been greatly weakened. Focus on what you are doing at present, and do not anticipate what may come later.

It is also important to note that psychological research in new technologies (Information and Communication Technologies, ICT) points out that an excess of realism can be, in initial intervention situations, harmful to the process of therapeutic change. Quoting Dr. Gutierrez Maldonado, of the Universitat de Barcelona, expert in the subject of virtual reality psychological interventions:

"We can initially think, as Thorndike proposed in 1931, that the more similar to reality the learning environment is, the greater the probability that what is acquired in the virtual environment will be transferred to the real situation. However, this assumption may require qualifications. It is possible that a very realistic virtual environment is even detrimental to learning and that, on the other hand, more schematic reproductions, such as those now available because of technical limitations, are capable of focusing the subject's attention more on the relevant aspects of the task, promoting better learning."

"Psychological research in new technologies (Information and Communication Technologies, ICT) points out that an excess of realism can be, in initial intervention situations, harmful to the process of therapeutic change"

The Psious platform allows the therapist to reduce or extend the administered stimulation (configuration variables and events), depending on the stage of the therapeutic process and the patient's characteristics and needs.

Only certain stimuli cause me a lot of discomfort

If you experience significant discomfort when you watch certain images or hear certain sounds, this means the treatment is working. The natural reaction would be to think about something different, get distracted, take off your goggles, get up or leave. DO NOT DO IT! The only way to make the stimuli neutral is to let the discomfort go down in their presence, and this will happen after repeatedly working on the different scenes. What you can do, exceptionally just because a particular scene is much more difficult for you, is to graduate the exposition. Watch the scene once more, but this time without the headphones, just looking at the images. When the discomfort has somewhat decreased, put on the headphones, but lower the sound a little. Finally, watch the scene again in normal conditions (with headphones and normal sound).

Only part of the scene causes me discomfort

The scenes are formed by many different stimuli, and it is usually easier to get used to some while others are more difficult to get used to. Whenever you identify a specific moment in the scene that causes you the most discomfort, watch it again, focusing especially on that moment, as many times as you need to lower the anxiety. Your therapist will tell you when you can move to the next environment. If it is a particular stimulus that causes you discomfort, pay special attention to it and introduce details, that is, facilitate the sense of presence. If you find it difficult to get used to a particular sound, try to isolate it by exposing yourself to it in a more direct way. For example, close your eyes to concentrate better. You will see that the sound will gradually stop generating discomfort and that you will have become accustomed to it.

[4]**Edward Lee Thorndike** (pr. [θ'oRn daik]) (Williamsburg, August 31 de 1874-Montrose, August 9 1949), American psychologist and pedagogue, considered an precursor of American behavioral psychology. His main contributions were learning by trial/error and the law of effect. His studies on animal behavior allowed him to develop the theory of connectionism (source: Wikipedia)

> "If the anxiety rose when you watched a scene this means you are attentively involved in the situation. We always advise you not to abandon the exposure before it has ceased to cause discomfort"

I cannot lower a certain level of discomfort

Do not anticipate anything that is not present in the scene you are watching. Focus on the present goal (for example, remaining in the terminal before boarding). The higher the anxiety score, the easier it is to notice when it is reduced. That is why it may be harder for you to notice you are calmer and to give a lower score to a situation after average discomfort scores. In any case, do not worry if it is difficult for you to lower the score. The treatment is individual and you must carry it out at your own pace, without speeding the process up. Even if you have to repeat a scene many times, there will come a time when you will hardly experience any anxiety.

I have difficulties rating my level of discomfort

The best index to assess the discomfort level is your body's response. As you see the images and hear the sounds, you will notice that the tension, heart beats, sweat on the hands, dryness in your mouth, etc, change. Evaluate and rate the level of discomfort according to those changes. Train yourself in the use of the scale from 1 to 9 with simple exercises: rate the cold you have when going out. If you give it a 7, this means it is quite cold and it would be convenient to go back for a coat. These questions can also help you: If this is the first time you watch a scene, at what time have you noticed the most discomfort? What score would you give that discomfort? If you have already watched the scene, is the discomfort you feel this time less or greater than before? If the level of discomfort is low, is this discomfort tolerable, can it be managed; do you consider yourself capable of doing what you fear with that level of discomfort?

When I saw the scene again, the discomfort increased

What has probably happened is that now you focused, consciously or unconsciously, in some detail, part of the sound, which you had not previously paid attention to. VERY GOOD! This means you are attentively involved in the situation. If the anxiety rose when you watched a scene that still created discomfort for you, you should know that it is a normal effect and that it is precisely for this reason that we always advise you not to abandon the exposure to a scene before it has ceased to cause discomfort. What you should do is to watch the scene again and notice what the moment that causes you the most discomfort is. Do it as many times as necessary. You will see that the discomfort will be reduced/habituated little by little.

I'm tired...

If you are very tired and are not capable of becoming involved in the situation, it is better to interrupt the exposure. In this case, first pause it for five or ten minutes. If you still cannot get involved in the situation, finish the session for the time being. However, do not delay the following session, carry it out when you had planned to do it. Remember, it is important that before starting any session you have ensured that you have the ideal conditions to do it (planning time, eliminating distractions, etc.)

I will never complete this scene

DO NOT BE DISCOURAGED! It is usual for it to be more difficult for you to overcome each stage as you progress in the hierarchy or relaxation exercises. Thus, as you overcome the scenes, it may be more difficult to move forward. Watch the scene again as many times as necessary. Anxiety, in the end, will be reduced.

Can I take tranquilizers?

In general, we know that anxiolytics do not improve exposure treatment. On the contrary, they can interfere in the process of re-learning. If you are already taking them, inform your therapist and check with your doctor. Exposure is a strategy that allows you to get used to the unpleasant sensations that cause fear, reducing or eliminating it completely. Exposure gives autonomy and has no side effects.

Some drugs can be enhanced by the use of activation control techniques. Check with your doctor.

(note: the use of pharmacotherapy is recommended only under medical supervision)

Some of the stimuli that cause me greater discomfort are missing

The objective of the images and sounds in the scenes is not only to expose yourself to them. They aim to help you imagine and think of other stimuli, probably similar ones, to which you are particularly more afraid of. Imagine those stimuli from what you see and hear in the virtual environment, and try to make the situation as realistic and vivid for you as possible. It is not possible to include all the stimuli that cause anxiety to all people; however, the scenes can help you imagine them.

Can I close my eyes when I watch a scene?

Sometimes, closing your eyes can help you to better imagine the situation. You should never close your eyes to avoid watching a certain part of the scene, however unpleasant it may seem. Remember, the way to get used to it is to watch them repeatedly.

Can I take breaks during the exposure session?

We recommend that the sessions last between 30 and 45 WITHOUT pauses of any kind (telephone, bathroom, drinking, etc.) Try to end the session having completely finished a scene, and do not leave it if the anxiety has not disappeared or significantly decreased a little more than half the maximum you have felt. For example, if the maximum is 8, do not stop until you get a 2 or a 3. If you have finished an item in the hierarchy and believe you will not have time to complete the next, it is best not to start it; leave it for the following day.

What happens if I cannot complete any sessions during the week?

The effectiveness of the treatment depends on perseverance, and we recommend completing two or three sessions each week. If you have not been able to complete any sessions during the week, do not worry, but plan the sessions for the following week carefully. If you know you will not be able to complete some future sessions, you have two alternatives. You can intensify the treatment now and complete more sessions (for example, one each day), or wait until you have time availability for three or four weeks (application conditions).

6. Clinical Cases

6.1

Clinical Case: Acrophobia

Date: 05/27/2016

Patient: I.R.

Reason for consultation: Irrational fear of heights.

Escenario: Outdoor lift.

I find this a case worth sharing. A 52 years old patient who came to my practice to overcome an overall limitation to practice her favorite sport: mountaineering. It was a hobby that she used to share withher friends and with her husband, who was feeling frustrated as she was not able to join on the group trips.

She presented symptoms of acrophobia or irrational fear of heights. The affectation had gradually, although very quickly grown, in the space of the few months that followed seeing her two years old grandson in danger, when the toddler was peeking through a window.

This situation had deeply affected her, and thus she began to develop a more irrational fear of heights.Every time, it became harder for her to bear with heights, she was not even able to climb a ladder or being out on the balcony of her house.

She began to experiment episodes of anticipatory anxiety that worsen as the day of departure approached. The patient also presented an acute feeling of despair. The woman believed that she would never be able to overcome her fear without experiencing a panic attack that would leave her stuck as it had been going on with increasing intensity and frequency.

6.2

Clinical Case: ADHD

Fecha: 06/ 21/2016

Paciente: J.E.

Motivo de consulta: ADHD, trouble concentrating and staying focused.

Escenario: The meadow

J is an 8-year-old boy that according to his parents and school tutors, was experiencing serious problems at the moments where he had to pay attention and stay focused, and also had difficulties when he had to concentrate on any given task. Those closest to him, described him as a restless and nervous child who did not like doing a thing for more than a short amount of time. He had been referred to several professionals before without significant progress, mainly because he lost interest in the treatment easily and was not thoroughly involved.

We decided that a case like J's could benefit from a session with the virtual environment the meadow, originally designed for Mindfulness. When we first introduced the environment to him, he showed an enormous fascination, capturing his interest almost immediately. From there, we got his full involvement during the whole process, which significantly eased the process and helped him to pay attention to the stimulus.

Despite the notorious hyperactivity presented before, when he had the glasses on, he could calm down enough to follow the instructions of the exercises, which would also favor his listening skills and concentration throughout the task.

At the end of the session and after taking the glasses off, J remained in a state of calm without going back to the activation levels that presented at the beginning of the session. He also told us about how glad he was with this experience and that he would be more than happy to do it again in the future.

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