

**Self-Conversation in Virtual Reality Embodiment to Enhance Healthier
Lifestyles among People with Obesity**

**NEWSLETTER #4
VHIR Team
September 2022**

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Research activities

In the September 2022 SOCRATESVR Newsletter #4, we start with updates on the research activities from VHIR:

After several improvements to the ConVRself platform carried out by VBW, the VHIR team continues to recruit patients for the RCT (52 patients recruited so far). As regards the platform, relevant considerations the scientists from VHIR report are that participants assigned to the two experimental groups express high satisfaction with the platform, and most of them remark on their physical resemblance to their avatars. Also, it is noticeable that the Intensive preliminary training on Motivational Interviewing (MI) techniques for the participants of the experimental group is being carried out successfully. Finally, as regards the MI training, the ConVRself experience video has been improved, helping patients better prepare for the self-conversation in the forthcoming experiments. In the following photo you can see how the VHIR team performs the MI training session at their facilities:



Other partners have been also working in research activities: Reichman University (IDC) conducted a small pilot study using *Convrself* and AI, focused on developing emotion regulation skills. In addition, we have been creating and coding a Motivational Interviewing dataset to train the AI conversational agent. The process includes identifying motivational interviewing example videos and transcripts, proofing the speech to text output and training coders in MITI and CLEAR coding systems. We have used the dataset to train a motivational interviewing conversational AI agent and are now planning a user-study to test it. In the last six months IDC have also developed a method for adjusting a very large pre-trained language model (LLM) to psychotherapy sessions. Here is an example of a small conversation fragment between the model and the patient:

Therapist: *Hello, welcome to the first therapist session today. Can you tell me little bit about yourself and why you are here?*

Patient: *Hi, I am here today to discuss my problems with you.*

Therapist: *How long have you been having a problem?*

Patient: I think since high school, so about 10 years

Therapist: Oh wow, that's a big problem to have 10 years of stress from high school.

*The bold text generated by the model.

Finally, IDC have upgraded the virtual agent (VA) ability. This upgrade enables the use of LLMs such as GPT3 or a custom model on a well-known local or remote machine configured in the Socrates VA project. It can be used in other related works and easily integrated into different VR projects. Another part of this upgrade is the speech-to-text performance, using streaming to reduce the response time and updating to the best available model (in GCP).

Scientific Publications

The study protocol article by VHIR has been recently published online in BMJ Open, a public access journal. Below you may find the link with the full text for further dissemination.

Anastasiadou, D., Slater, M., Spanlang, B., Cano Porras, D., Comas, M; Ciudin, A., Parramon Puig, G., Vázquez-De Sebastián, J., Ramos-Quiroga, A., & Lusilla-Palacios, P. (2022). Clinical efficacy of a Virtual Reality tool for the treatment of obesity: Study Protocol of a Randomized Controlled Trial. *BMJ Open*, 2022

Article: [Clinical efficacy of a virtual reality tool for the treatment of obesity: study protocol of a randomised controlled trial](#)

Also, a new publication, currently under review, has been submitted by VHIR to Frontiers in Psychiatry, in the Digital Mental Health section. The objective of this paper is to demonstrate the usability of ConVRself with people living with obesity (PLWO).

Anastasiadou, D., Herrero, P., Vázquez-De Sebastián, J., Spanlang, B., Alvarez De la Campa, E., Slater, M., Ramos-Quiroga, A., & Lusilla-Palacios, P. (2022). Virtual Self-Conversation Using Motivational Interviewing Techniques to Promote Healthy Eating And Physical Activity: A Usability Study. *Frontiers in Psychiatry*, under review.

Frontiers Research Topic

As regards the Frontiers research topic, 6 manuscripts have been submitted to the Research topic in Frontiers in Psychology “Can Virtual Reality Be a Solution for Assessing and Treating Psychological Symptoms Caused by Eating and Weight Disorders?”, which is handled by 4 editors of the Socrates team: Dimitra Anastasiadou (VHIR), Pilar Lusilla (VHIR), Doron Friedman (IDC) and Desiderio Cano Porras.

Deliverables

One of the main tasks concerning Work-package 6, Dissemination, Communication, and Exploitation, is the elaboration of the Deliverable 6.3 *Overview of dissemination and communication activities*. The objective is to gather all the dissemination, communication, and exploitation activities carried out by all partners from M1 to M25. This task, initially elaborated by VHIR and assisted by the other partners, is expected to be submitted at the end of August.

White paper on regulatory framework and reimbursement for embodiment therapies

The preparation of the white paper about the use of Virtual Reality in the treatment of patients with obesity is already underway. As it was initially stated in the proposal, this task was planned to be

done by a subcontracted company by VHIR. Hence, in the last three months, VHIR has contacted four different companies that would be interested in writing the White paper. After evaluating two different budgets and proposals of specialized companies with high levels of expertise in the field, the VHIR team agreed to contract the company, PredictBy (Research and Consulting Spanish Unipersonal Limited Company, <https://www.predictby.com>), which better fitted with the qualities required for the task. More precisely, to briefly elaborate on such a decision, VHIR chose this company because (1) they are experienced in broadening the understanding and knowledge of the use of healthcare treatments in the field of obesity and eating disorders, (2) they are experts in doing both qualitative and quantitative research and conducting behavioural studies, and (3) they are also involved in several H2020 projects and Tender Projects for the European Commission. To carry out the white paper, PredictBy plans to complete the following tasks:

- a) State-of-the-art of the current situation regarding virtual reality treatments offered by the different public and private healthcare institutions in Europe for the treatment of obesity, also including R+D+i institutions working in related research projects whose proposed treatments are not yet consolidated in clinical practice.
- b) A case study that includes several individual cases of healthcare and/or R+D+i institutions in Europe, which are currently delivering virtual reality treatments for obesity.
- c) Focus groups with healthcare professionals of several institutions¹ involved in the delivery of virtual reality techniques for the treatment of obesity covering topics such as barriers and facilitators of adoption of this technology.
- d) Conclusions and recommendations for potential adopters in healthcare institutions.

White Paper on “The use of Virtual Reality in the treatment of patients with obesity” within the framework of the SOCRATES project

1. DESCRIPTION OF THE TASKS TO BE CARRIED OUT

The purpose of this contract is to carry out the following actions:

1. Creation of a White Paper whose objective will be to promote the use of Virtual Reality in the treatment of patients with obesity, with a particular focus on embodiment therapies and its regulatory landscape. This White Paper will contain, first, recommendations related to the implementation of this type of technologies in everyday clinical practice with patients with obesity as a treatment tool, and will also reflect on the different current applications of Virtual Reality embodiment techniques (i.e., exposure, distraction and imagery techniques, body swapping, etc.) for behavioural health problems in general (i.e. anxiety disorders, pain management, eating and weight disorders, substance use, among others). The White Paper will be intended for the following actors:

- Technological companies developing healthcare platforms.
- Healthcare providers working with patients with obesity who are interested in integrating this type of technologies in their everyday practice.
- R+D+i institutions that participate in similar research projects and have interest in learning more about the specific topic.

**Screen capture of the Introduction of the White paper proposal
VHIR sent to the companies.
VHIR, 2022**

Industry stakeholder's meetings

VBW has been involved in meetings with several international investors in order to exploit SOCRATES results and look for additional financial support for implementing the business plan. In 2021, seven meetings took place and in 2022, two meetings.

Dissemination activities

Social media posts

Several posts concerning the Socrates project (i.e., blogs, news, events...) were published on different social media platforms: Instagram, Twitter, and LinkedIn. To see these posts visit:

https://www.instagram.com/socrates_vr/.

<https://twitter.com/SocratesVr>

<https://www.linkedin.com/groups/12473464>

Website publication and Blogposts

The Socrates website has also been very active. Different blogposts have been published by different partners. Since March 2022, 6 blog posts have been published of which 2 were written by VHIR, 2 by UM, and 1 by IDC and 1 by VBW. To read these blogposts visit the following link: <https://socratesvr.eu/blog/>



Are You An Emotional Eater?

AUGUST 8, 2022



How to create a future version of a patient?

JULY 4, 2022

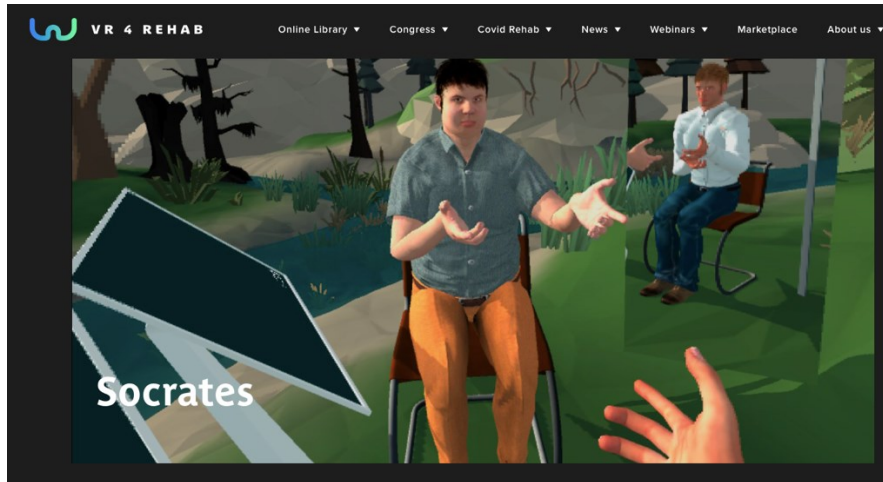


Why is VR useful for People Living With Obesity? Embodiment therapies and embodied cognition.

JUNE 7, 2022

The Consortium has done some advertisement among partners from other EU projects and INTERREG platforms like VR4REHAB platform, which is a partner of the EuroXR Association, see: <https://vr4rehab.org/>.

VR4REHAB is an open innovation network that believes in the power of virtual reality for rehabilitation. Some more actions will be promoted with them in the next months.



Conferences

Partners of the Consortium participated in several conferences and congress publications around Europe in different formats. Scientific conferences presented in the last six months are the following:

UM

In May 2022, UM was invited to present two oral communications, the first one titled *Predictors of Binge Eating* and the second one titled, *Effects of mindset on hormonal responding, neural representations, subjective experience and intake* at the ECO Zoomforward symposium.

In addition, another oral presentation was carried out by a research assistant student (Charlie van Deursen), to discuss the proposal and progress of the behavioural VR study at the Eating disorders and obesity research group of the department of Clinical Psychological, in the Faculty of Psychology and Neuroscience, UM.

VHIR

In June 2022, the results of the usability study led by VHIR, in which we examined the usability of ConVRself with 8 PLWO and 6 healthy participants were presented by Dr. Dimitra Anastasiadou as a poster communication at the European Congress Psychiatry EPA2022, which was held virtually:

Anastasiadou, D., Herrero, P., Vázquez De Sebastián, J., Spanlang, B., Slater, M., Ramos-Quiroga, J.A., Parramón, G., Ciudin, A., Comas, M., Lusilla-Palacios, P. (2022, june). *Can the Integration of Motivational Interviewing Skills in a Virtual Self-Conversation be effective in promoting lifestyle changes among healthy adults and patients with obesity? A Usability Study*. EPA2022, virtual presentation.

Besides, Dr. Pilar Lusilla Palacios introduced the SOCRATES project virtually in June 2022 as an Oral communication at the International Conference on Motivational Interviewing.

IDC

The Symposium *Xr for the people*, organized by IDC, took place on June 13th. The objective of this event was to cover developments in the fields of VR, AR, and the Metaverse with special emphasis on the human factor. In it, the Ph.D. candidate Momi Zisquit presented the Socrates Project at a conference titled “VR and AI for Mental Health: some lessons from the Socrates project”.

Events

Socrates partners have organized and/or participated in 3 formal events

Local events with stakeholders

UM, Faculty of Psychology and Neuroscience

- UM team introduced the SOCRATES platform (April, 2022) to the *Emotion laboratory and Eating disorders and obesity* investigators from the Faculty Psychology and Neuroscience.

VHIR, Psychiatry department of HUVH

Two events were carried out by VHIR with stakeholders of the Psychiatry department of HUVH:

- In April, Health professionals from the HUVH had the opportunity to try the IVR platform, ConVRself, give their feedback about the virtual experience, and ask questions to the research team.



NeuroLab presentation event to connect societal partners in MU
MU, 2021



Local workshop at Brain and Emotion Lab, from MU
MU, 2022



SOCRATES project presentation to the Psychiatry service from HUVH
VHIR, 2022



HUVH Psychiatry department trying the ConVRself platform
VHIR, 2022

Upcoming events

- **VHIR Team:** abstract preparation to participate at the Sociedad Española para el Estudio de Obesidad (**SEEDO**). It is planned to present the preliminary results of the RCT VHIR is conducting.
- **VHIR Team:** Asociación española para el estudio de trastornos de conducta alimentaria (**Aeetca**): Dr. Anastasiadou will participate in a round table to discuss the therapeutic aspects of technology in the study of obesity.
- **VHIR Team:** Caixa Fórum of Lleida “Psychology and Obesity” meeting. Dr. Anastasiadou will participate in a round table to discuss the psychological treatments for obesity using Virtual Reality.