



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

NEWSLETTER #2

August 2021

In this issue

- Progress and achievements
- News from the partners
- Upcoming events
- Consortium partners
- Contact us

Progress and achievements

3rd and 4th General Meetings

Socrates had two virtual General meetings, in which all partners shared important updates of their progress in the different work packages and some suggestions for improvements.

Usability Study

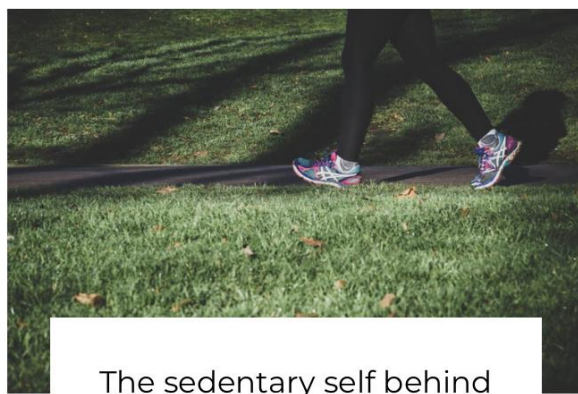
The Usability Study with 6 healthy adult participants was successfully conducted in July 2021. The initial goal to recruit 8 patients with obesity from the Vall d'Hebron University Hospital could not be met due to the Covid-19 pandemic restrictions. In particular, face-to-face visits of patients with obesity in the hospital were restricted and carried out mostly virtually. As a result, we were forced to carry out the study with healthy volunteers who were visited at their homes taking the appropriate precautions. The 6 participants with the desire to make lifestyle changes, in terms of eating healthier and doing more physical activity, were recruited and were randomly assigned to two *ConVRSelf* conditions: the experimental group (EG) or the control group (CG). The 3 participants from the EG engaged in a VR self-conversation aiming at enhancing their self-awareness through embodied perspective taking. Participants from the CG, embodied in their own virtual bodies, participated in a “scripted dialogue” with an avatar counsellor of their choice. Participants’ satisfaction with the 2 virtual experiences and their uncovered needs were assessed, as well as their readiness to change habits, their body ownership during the VR experiences and some aspects of system usability. Some important conclusions were that all participants experienced high satisfaction with the platform finding the VR experience interesting and enjoyable. Although some difficulties in using the VR tool were observed, most of these issues seemed to be easily overcome with further training of the users on Motivational Interviewing and the correct use of the platform.

SOCRATES Blog Posts

Ms. Julio Vázquez, new member of the VHIR research team, dedicated May’s Blog post to explain how neuropsychology can help to understand the course and the maintenance of obesity and the cognitive factors that are underlying it.

Mel Slater, Distinguished Investigator at the University of Barcelona and one of the founders of Virtual Bodyworks, dedicated June's Blog post to explaining in detail the potential of Embodied self-conversation for people with a desire to make lifestyle changes and its effects on their mindsets. The Socrates project leverages VR Embodiment to engage obese individuals in a self-conversation to target three aspects that are inherent with severe obesity: recognition, self-stigmatisation, and self-determination.

Dr Cano Porras, postdoctoral researcher from Maastricht University, wrote June's Blog post and brought a new vision to what we know as physically active self. His post titled "*The sedentary self behind our physically (in-) active self*" discusses the importance of adopting behaviors that promote healthy levels of physical activity and reduce time on sedentary behaviors, based on recent scientific evidence.

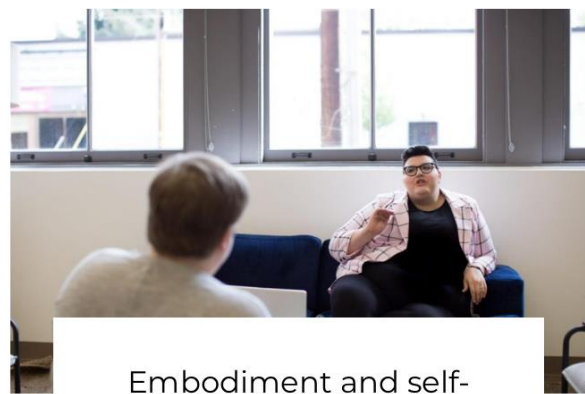


The sedentary self behind our physically (in-) active self

AUGUST 30, 2021

One commonly believes that a person is either (physically) active or sedentary. Are there other options? The World Health Organization...

[Read More](#)



Embodiment and self-conversation in VR to confront obesity

AUGUST 2, 2021

Through decades of research, Virtual Bodyworks leverages virtual reality's unique medium to offer new possibilities that are impossible to recreate...

[Read More](#)

Figure 1. Last Blog posts

Socrates social media

Our presence in social networks continues to rise, with the number of Instagram followers reaching 63. During the last semester, all partners have been encouraged to carry out dissemination activities by sharing the achievements of SOCRATES project through their social networks: Instagram, LinkedIn and Twitter.

- *Socrates website and social media channels:*

Socrates webpage (<https://socratesvr.eu/>)

Socrates channels:

- YouTube specific channel at:

<https://youtube.com/channel/UCmclKHUC52pUt0sqZuaCGaQ>

- Instagram page at: https://www.instagram.com/socrates_vr

- LinkedIn group at: <https://www.linkedin.com/groups/12473464/>

- Twitter feed at: <https://twitter.com/SocratesVr>

News from the partners

VHIR team

VHIR team shared with all partners a draft version of the protocol of the upcoming RCT before submitting it for approval to the Ethical Committee (EC) of the hospital. All partners reviewed the protocol and provided suggestions for improvement. The last reviewed protocol was then submitted to the EC Board and the following changes were implemented in the protocol following their suggestions:

- increase the sample size recruiting 97 participants with obesity

- increase the experimental conditions from 2 to 3:

- *Group 1: VR embodiment with body swapping + standard treatment at the hospital.*
- *Group 2: VR embodiment with no body swapping + standard treatment at the hospital.*
- *Group 3: standard treatment at the hospital.*

- add a final experimental “Summing-up” session, in which participants will summarize what they have learned during the previous virtual sessions and say goodbye.

The final approval was obtained in August 2021. The protocol of the clinical trial will now be registered in ClinicalTrials.gov and be then published in a peer-reviewed scientific journal.

The VHIR team has been actively working on the Data Protection Impact Assessment document, which has been prepared in collaboration with the Legal and IT Departments of Vall d'Hebron University Hospital. Through this document, called PIA, the VHIR team identified and tried to minimise all the data protection risks of the clinical validation study, which is currently being carried out at the Vall d'Hebron University Hospital and consists in 2 phases:

- A usability of the ConVRself tool with 6 healthy volunteers and 8 patients with obesity aimed at identifying and gaining information about the specific needs and characteristics of people who desire to make lifestyle changes and the product details (**Phase I**).
- Second, once modifications to the prototype will be completed based on the usability testing and the final VR tool will be ready to be tested in a clinical setting, a Randomised Controlled Trial (RCT) with 97 patients with obesity will be conducted (**Phase II**).

A new researcher from VHIR joined the SOCRATES Team, Mrs. Julia Vazquez, a neuropsychologist and pre-doctoral research who is going to offer her support to the team during the execution of the RCT at the hospital.

Maastricht team

The Socrates Maastricht Team (Bea de Gelder, Sieske Franssen, Desiderio Cano Porrás & Lotte Lemmens) has now requested ethical approval for an experimental behavioral study in which we will lay important groundwork for a subsequent fMRI project, in which we will provide the VR experience in the scanner to examine neural correlates of VR embodiment.

In the proposed study, we will create and test the usability of a VR-setup and we will examine the behavioural mechanisms involved in embodiment, readiness to change, exercise performance and body satisfaction while interacting with a future fit self-avatar or with other avatars. Female and male participants who are health-concerned, motivated to change their current lifestyle and with a higher body weight ($25 > \text{BMI} < 30$) will be included. We propose to compare participant's motivation to change to a healthier lifestyle through interacting by exercises in VR

with a current self-avatar, future fit self-avatar, future unfit self-avatar, current generic avatar, future fit generic avatar, and generic future unfit avatar.

We expect that interacting with the self-avatars will motivate to change to a healthier lifestyle as compared to the generic avatars, as a result of increased embodiment. The effects will be expected to be strongest for the future fit-self avatar. It is expected that interacting with a future self-fit avatar will increase motivation to live a healthier lifestyle, as expressed by an increased readiness to change, better performance with doing the exercises (physio measures and exercise performance) and higher body satisfaction as compared to the other conditions. Furthermore, we expect that interacting with a future unfit-self or generic unfit avatar would lead to opposite effects.

We expect to hear from the ethical committee by October. In case of approval, preparations will take place in November/December, and data-collection will start from January onwards. To be continued!

For more information and updates please contact:

Sieske Franssen (Sieske.Franssen@Maastrichtuniversity.nl) or Lotte Lemmens (Lotte.Lemmens@Maastrichtuniversity.nl).

Virtual BodyWorks

Virtual BodyWorks continues with the development of virtual avatars with different shapes and sizes, as well as with younger and older look-alikes. Our 3D deep CNN for body morphing paper, which describes this in more detail, was accepted for presentation at the 3D conference <https://3dbody.tech/>. Additional features will be the ability to morph avatar body shape gradually during a self conversation and also to develop proper avatar movements. For instance, the virtual counsellor will be able to give instructions to the patient's avatar (i.e. by pressing buttons on the panel in front, within the VR environment) to make the avatar of the person on the other side automatically stand up, turn around and so on. VBW is working in close collaboration with the VHIR clinical team who determine the validity of avatars' final versions.

Furthermore, VBW adapts ConVRself for various experiments and creates flow adaptation capabilities to make it easier to change things for the various conditions. VBW has prepared a study with IDC, the aim of which is to evaluate the differences between a default gender matched avatar and a look alike avatar in the results of a self conversation. Also, in collaboration with IDC,

VBW has developed and integrated a network communication protocol to control the flow of the spoken AI therapist interventions. Finally, VBW is also preparing a gamified embodiment scenario for the MRI Magnet Resonance Imaging study in collaboration with Maastricht University and other project partners.

IDC Herzliya

IDC Herzliya, in collaboration with VBW, has completed a prototype of the intelligent component integrated inside Converself. Now the participant, if and when stuck in their self conversation, can opt to press the 'AI' button. An intelligent component listens to the (self-) conversation in the background, and when the 'AI' button is pressed the component responds with a spoken utterance, which may hopefully serve to fuel the next stages of the (self-) conversation.

The component includes integration of speech understanding, speech generation, and most important a 'chatbot' dialogue component. To this end, IDC Herzliya is currently working in close collaboration with Maastricht University and Vall d'Hebron Research Institute on the training of the Generative Pre-trained Transformers (GPT). The healthcare professionals from both institutions provide them with suggestions and feedback on how fine tuning the models (originally trained on huge diverse datasets) should be carried out following available clinical evidence about effective psychological treatments for obesity. The challenge is that transformers such as GPT are highly unexpected and difficult to 'domesticate': they can be surprisingly insightful at some times, and in other times they may result in misinformation or offensive remarks.

Quality evaluation is a major challenge; while in some areas, such as machine translation, automatic measurements of accuracy are feasible, this is not the case with dialogue systems – the metrics are not very useful in determining the qualities of responses. Thus, IDC Herzliya is working with VHIR to generate a systematic evaluation framework, with human referees in the loop. This will allow comparing among various language models, trained on various combinations of datasets, with various selection of hyper-parameters.

Here is a conversation fragment, followed by the comment by the 'AI' component:

User: my mom was always dieting, she ate like a bird

Therapist: And what was it like for you,

User: watching that I didn't really think anything of it, until later when - I just suddenly became aware that I was actually bigger than my own mother

Therapist: Do you remember how you felt when you realized that? Or how you feel now thinking back

User: Anger. Disgust.

Socrates: But you said you're growing impatient, feeling like the child you weren't the one who should be teaching you?

But here is another example, illustrating potential problems:

user: um just definitely no better than last week when we talked I mean it's been I had some major binges this week I don't even honestly know why we're othering to talk about it because I've been down this road before I should just I should just like give up and buy some muumuus and you know just resign myself to the fact that I'm gonna get fat and I'm gonna stay fat.

Socrates: I mean. I'm getting hungry.

All SOCRATES team

Researchers from Vall d'Hebron Research Institute, Maastricht University and IDC Herzliya are currently acting as handling editors of a Research Topic of Frontiers in Psychology focused on psychological treatments for the treatment of obesity, using VR. The deadline for abstract submission is now extended by 2 months and is in November 2021. Our Research Topic is cross-listed and currently appears in the following journals: Frontiers in Psychology (sections: Psychology for Clinical Settings, Eating Behavior) and Frontiers in Nutrition (section: Eating Behavior). Apart from full articles, we also accept case reports, protocols and systematic reviews. We have 7 expected manuscripts confirmed so far, and we are continuing with the further dissemination of our Research Topic to other potential contributors of the area.

Upcoming events

- [CyPsy25bis, the 25th Annual International CyberPsychology, CyberTherapy & Social Networking Conference \(ONLINE Event\)](#)

Dra. Dimitra Anastasiadou, member of the VHIR team, is going to participate as a speaker at the CYPsy25 Conference on September 13-15, presenting the results of the usability study carried out at Vall d'Hebron University Hospital. The full paper of the study, titled "*A Virtual Reality tool using embodiment and body swapping techniques for the treatment of obesity: A usability study*" is currently under peer-review and will be published at the Proceedings of the Annual Review of Cybertherapy and Telemedicine (AECTT) by the Interactive Media Institute, San Diego, California, in cooperation with Istituto Auxologico Italiano, Milan, Italy (indexed in PsycINFO and in Scopus).

- [National Meeting on Motivational Interviewing \(GETEM: Grupo en Español de Trabajo en Entrevista Motivacional\)](#)

Dra. Dimitra Anastasiadou, is also presenting the clinical validation study of the SOCRATES project at the National Meeting on Motivational Interviewing (GETEM) that will be celebrated in Zaragoza (Spain) on October 1-2, 2021.

Consortium partners

VIRTUAL
BODYWORKS 



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