eXperience PROJECT

Newsletter

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eXperience milestone in the clinical work package

Cognition   Behavior

eX

Physiology
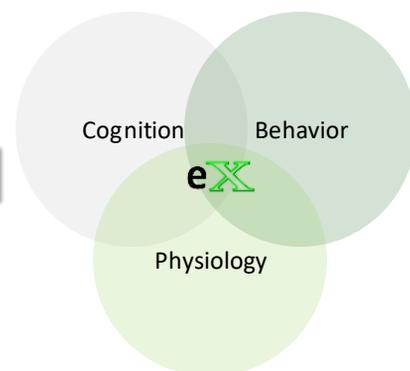
Dear Colleagues,

Welcome to the 7th issue of the eXperience Newsletter.

With the end of 2024, the project has reached an important milestone in its exploration of virtual reality (VR) for clinical applications. A key focus has been assessing depressive symptoms using VR, and we have now completed a pilot study testing this concept.

Analysis of the pilot data shows promising results in terms of categorization performance, alongside high acceptability and usability ratings from the volunteer research participants. These findings support the potential of VR-based assessments in clinical settings.

With these results in hand, we are now in the process of publishing our findings in scientific journals. First submissions have been well received by peer reviewers, and we are looking forward to making our findings public and openly accessible.

Meanwhile, recruitment for the next phase - the treatment study - is underway at the University of Padova in Italy. We look forward to sharing further updates as the project progresses.

Hope you enjoy this issue of the eXperience Newsletter.

Vladimir Carli
Principal Investigator

Name: Vladimir
Surname: Carli
Title: Assoc. Prof.
Affiliation: Karolinska Institutet,
National Centre for Suicide Research and Prevention (NASP)

Karolinska Institutet

1. Favorite areas of interest and research

My main areas of research are mental health promotion, development and evaluation of suicide preventative interventions.

2. What is the most promising research direction in mental health?

Currently the main promising research directions are in the field of precision medicine and precision prevention. Technological advancements will allow us to move away from the "one-size-fits-all" model and enable us to tailor mental health treatments and prevention to individuals based on biological, psychological, and social factors.

Another promising direction is the study of Social determinats of health. Exploring how social factors (e.g., poverty, discrimination, housing) impact mental health will allow the development of interventions to address these determinants leading to more sustainable and equitable solutions.

3. Which innovation had the greatest influence in your field of research over the last 10-20 years?

Digital mental health interventions are particularly noteworthy due to their potential to revolutionize how mental health care is delivered and personalized. Leveraging technology (e.g., apps, wearables, AI, and virtual reality) to deliver scalable, accessible, and cost-effective mental health care make it possible to reach underserved populations, provide real-time monitoring, and offer personalized interventions. Of course, there are also some challenges to take into account such as ensuring efficacy, addressing data security, and avoiding over-reliance on technology without human oversight.

4. What was your motivation to become a psychiatrist and a researcher?

The main motivation was to study the brain. The human brain is the most complex and still mysterious organ in the body. Despite significant advances, much about how it works remains unknown. Unraveling its mysteries can lead to breakthroughs in understanding human behavior and cognition. Understanding the brain has implications for education, mental health, can inform policies and practices that improve societal well-being. Advances in this field can improve the quality of life for millions of people.

5. eXperience is…

eXperience appears as something out of science fiction. In reality, however, it is an interdisciplinary team of researchers who are working on enabling individuals to generate and share experiences recorded in personalized VR worlds.

Dr. Vladimir Carli

Director of the National Centre for Suicide Research and Prevention of Mental Ill-Health (NASP) at Karolinska Institutet (Sweden)
Following his specialisation in Psychiatry, Vladimir also attained a PhD from the Catholic University of Sacred Heart, Rome, Italy. He is Director of the WHO Collaborating Centre for Research, Training and Methods Development in Suicide Prevention.
Participation in eXperience: works in WP4 & WP5

Dr. Gergö Hadlaczky

Head of the Center for health economics, informatics and healthcare research (CHIS) at Stockholm Healthcare Services (SLSO)
Gergö is an associate professor of Psychology and adjunct lecturer at NASP, KI. His primary research interests include suicide, with emphasis on scalable public health interventions.
Participation in eXperience: works in WP4

Dr. Emma Eliasson

Postdoctoral researcher at NASP, KI
Completed her PhD in Psychology from the the University of Edinburgh. Her primary research interests include suicide prevention with focus on brief contact interventions, and the social determinants of health.
Participation in eXperience: works in WP4

Dr. Ivo Todorov

Project coordinator at NASP, KI & Innovation advisor at Stockholm University
Ivo has PhD in Cognitive Psychology from Stockholm University and works as a scientific advisor for eXperience. As an innovation advisor, he supports researchers in the development of innovative ideas meeting societal needs.
Participation in eXperience: works in WP4

Sara Sutori

Research assistant at NASP, KI
Attained a Psychology MSc at Stockholm University, Sweden. Her primary interests include cognition and digital solutions in mental health research.
Participation in eXperience: works in WP4 & WP5

Karolinska Institutet

Virtual Reality in Mental Health Assessment

The clinical work package of the project focuses on testing the eXperience system for the purposes of both mental health assessment and treatment.

The first study aimed to **evaluate the acceptability, usability, and levels of cybersickness** experienced by users when exposed to the pilot VR environment designed for the assessment of depression symptoms severity. Additionally, machine learning algorithms developed within the project were tested **for categorizing the participants into two groups** (with or without depressive symptoms) – based solely on behavioral, cognitive and physiological data collected within the eXperience system.

The study involved 100 participants – 50 healthy individuals and 50 participants with mild to moderate depressive symptoms. Participants engaged with the VR environment for about 30 minutes and then completed questionnaires to assess their experience.

The results showed that **most participants found VR to be an acceptable and usable** tool for mental health assessment. However, there was a **clear preference for VR to be used as a supplementary tool** by mental health professionals rather than as a standalone diagnostic method.

Interestingly, the study also highlighted that **individuals with depressive symptoms reported higher levels of cybersickness** compared to healthy controls. This could imply a risk for those with depressive symptoms to experience higher levels or cybersickness,. However, alternative explanations are also viable which are being further investigated by the Consortium.

The **categorization performance** of the explainable artificial intelligence models reached **satisfactory levels** for a pilot and the results will be taken forward to further refine the virtual environment.

Overall, the study supports the potential of VR as a valuable tool in mental health assessment, offering a new, potentially less subjective way to evaluate depressive symptoms. However, further research is needed to refine the technology and better understand its impact on different populations.

Latest publications

Benelli et al. (2024) "Reduction of cognitive fatigue and improved performance at a VR-based driving simulator using tRNS" in iScience, 27(9), 110536. https://doi.org/10.1016/j.isci.2024.110536

Garcia et al. (2024) "Holorailway: an augmented reality system to support assembly operations in the railway industry" in Advances in Manufacturing, 12, 764–783. https://doi.org/10.1007/s40436-023-00479-5

Wagelmans, A.M.A., & van Wassenhove, V. (2024) "The day-of-the-week effect is resilient to routine change" in Memory & Cognition. https://doi.org/10.3758/s13421-024-01606-8

Vargas et al. (2024) "Feasibility of virtual reality and machine learning to assess personality traits in an organizational environment" in Frontiers Psychology, 15, https://doi.org/10.3389/fpsyg.2024.1342018

Ryan et al. (2024) "The relativity of reaching: Motion of the touched surface alters the trajectory of hand movementsEnabling uncertainty estimation in neural networks through weight perturbation for improved Alzheimer's disease classification" in iScience, 27(6), 109871. https://doi.org/10.1016/j.isci.2024.109871

Upcoming events

Executive Board and General Assembly meeting

February 6-7, 2025 | Paris (France)

The eXperience Consortium will meet again for a periodic meeting hosted by the French Alternative Energies and Atomic Energy Commission (CEA).

Rehearsal & Review Meeting

September 2, 2025 | Potentially in Pisa & Online

The final Review Meeting for the project has been scheduled for September 2025. We are looking forward to showcasing the development of the project for the appointed reviewers.