2nd International Conference on Virtual Reality in Mental Health Into the real

Abstract book

Edited by:
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Contents

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Oral presentations

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Lived Experience: "After 27 years, I'm Finally Voices Free"

Track: VR in Assessment and Treatment of Psychosis
Vibeke Andersen, Sara Leander-Pehrson

Introduction: In this oral presentation Vibeke Andersen shares her touching and engaging story of how she freed herself from her demons (auditory hallucinations) through Avatar Therapy in Virtual Reality.

Vibeke, living in the Danish town of Ribe close to the Atlantic coast, lived with auditory hallucinations and schizophrenia, for 27 years. In 2020, after have spent most of her life in the Danish psychiatric system and in dispare from the lack of effective treatment alternatives, she decided to take part in an innovative research project - "The Challenge Project". The project aimed at treating auditory hallucinations in patients with treatment resistant schizophrenia, through Avatar-Therapy in Virtual Reality.

The therapy method (treatment protocol and digital solution) enabled Vibeke to recreate her most dominant voice, in the form of a digital avatar, and subsequently confront it in Virtual Reality; in close collaboration and with the support of her therapist. Over the course of 7 session and 3 months, Vibeke was able to gradually take back control of her life and ultimately "bid farewell" to her auditory hallucinations. "To face my voice was horrible and really really difficult, but I wouldn't stand here today if I hadn't gone through with it", she tells. Today, she has been voices free for 4.5 years.

Listen to Vibeke telling her powerful story from the patient's perspective and why, in her experience, Avatar Therapy in Virtual Reality worked for her, whilst nothing else did.

This abstract is submitted by Heka VR, on behalf of Vibeke Andersen, acting as a Lived Experience Ambassador.

Methods: Avatar-Therapy in Virtual Reality

Results: - Vibeke was a part of the Challenge Trial, carried out by Virtu Research Group in Denmark, in collaboration with Heka VR (technology provider).

Discussion: - Q&A for Vibeke

Parallel sessions 3, June 13th, 2025, 13.00 – 14.00

Oral

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A Randomized Controlled Trial of a Virtual Reality Group Intervention to Enhance Mentalisation in Healthcare Professionals

Track: VR in Mental Health Settings

Veerle Andries[1], Suzanne Derks[2], Tanja Doodeman[1], Paula Sterkenburg[2, 3]
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Introduction: Mentalisation-based skills in healthcare professionals of people with intellectual disabilities are important to establish trusting relationships with the target group (Free et al., 2024). To practise these skills in a safe and controlled environment, Virtual Reality (VR) can be effective. Therefore, we developed a mentalisation-based VR group intervention and examined its effectiveness.

Methods: Healthcare students (N = 174) were randomly assigned to a VR intervention or a mentalisation-focused classroom lesson. After completing questionnaires (T0), all students watched three mentalisation-focused clips and read an article. The experimental group (n = 99) interacted with a virtual client, while the control group (n = 75) received a classroom lesson. Students then completed a second set of questionnaires (T1). These questionnaires measured: knowledge about mentalisation, certainty about mental states, reflective functioning, perspective taking and empathy, self-efficacy, and social validity. The study was pre-registered (https://osf.io/2xf3p/resources).

Results: The ITT analysis showed no significant differences between both groups concerning mentalisation and self-efficacy. Due to 58% of participants not fully adhering to the protocol, a PP analysis was conducted on 73 participants who met all protocol criteria, showing a significant time-by-group interaction effect in reflective functioning within the experimental group compared to the control group (p = .034, adjusted d = 0.47). Additionally, participants reported positive expectations and experiences with the VR intervention.

Discussion: The VR intervention aligns with participants' practice-oriented learning approach and demonstrates potential effectiveness when fully adhered to, highlighting its relevance in educational and healthcare settings. However, as the PP analysis excludes non-adherent participants, interpretation requires caution. Ensuring protocol adherence is essential for an accurate assessment of the intervention's effects.

Parallel sessions 1, June 12th, 2025, 11.30 – 12.30

Oral

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Detection of Visual-Proprioceptive Discrepancy as a Direct Measure of Perceived Self-Location

Track: Technological Aspects of VR

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Introduction: The *minimal self*, the elemental level of selfhood, is disturbed in several mental disorders, e.g. schizophrenia and eating disorders. The *minimal self* research focuses mostly on the *sense of ownership* toward a body which still lacks a reliable method of objective measurement. On the other hand, the perceived *self-location*, another principal aspect of *minimal self*, has not yet been profoundly investigated. To address this issue, perceived location of a hand was studied using a psychophysical approach offering a direct measurement of this phenomenon. The paradigm was examined in healthy participants (HPs) and patients with eating disorders (EDs).

Methods: The experiment was performed in an immersive virtual reality environment. During the experiment, heterogenous positional discrepancies between a virtual hand and a real hand (either left or right hand) were repeatedly introduced. Participants were asked to assess whether the position of the presented virtual hand corresponded to the perceived position of the real hand. The experiment was administered to 44 HPs and 23 EDs.

Results: In HPs and EDs, there was no significant difference in the sensitivity to positional offsets of virtual hands for the left and the right hand. HPs were significantly more sensitive to offsets of virtual hands directed toward the body midline compared to offsets of virtual hands directed away from the body midline. In EDs, the effect of the offset direction had a lesser impact on the discrepancy detection compared to HPs.

Discussion: The proposed paradigm represents a robust, direct and reliable measurement of *self-location*. It might therefore fill the gap in the *minimal self* research. However, future research is needed to explore the relationship between *self-location* and the *sense of ownership*. There was no significant difference in the sensitivity to positional discrepancies between HPs and EDs suggesting that hand location is perceived comparably in these groups of participants.

Parallel sessions 3, June 13th, 2025, 13.00 – 14.00

Oral

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The Use of Immersive Virtual Reality in Sensory Sessions on an Older Peoples Mental Health Ward: Service Evaluation of Feasibility and Acceptability

Track: VR in Mental Health Settings

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Introduction: Immersive virtual reality can give people admitted to inpatient wards a break from these limited environments. This service evaluation reviewed the use of immersive virtual reality relaxation activities as a part of routine occupational therapy sensory sessions in an older people's mixed mental health ward. We assessed acceptability & feasibility by reviewing user experience & therapeutic engagement in terms of relaxation, engagement & interaction.

Methods: This evaluation was approved by Cambridge & Peterborough Foundation Trust Quality Improvement panel & assessed routinely collected data from 32 users (9 from dementia unit, 23 from functional unit) across a total 158 sessions visiting nature scenes on a Pico G2 headset across an 11-month period in 2023. Demographic information included age, gender, mental health & other diagnoses, reason for admission, regular medication & legal status. Routine notes were assessed for subjective experience, positive & negative effects, interaction, therapy engagement, preferred scene, duration & repeat use.

Results: Average user age was higher on the dementia unit vs functional unit (77.5 vs. 74.5 years). Primary mental health diagnosis was a dementia subtype for most users on the dementia unit (6/9) compared to a wider variety of diagnoses on the functional unit (depression or bipolar disorder 7/23 each; schizophrenia, alcohol related or delusional disorder 2/23 each; obsessive compulsive disorder, dementia, or personality disorder 1/23 each). Most users on the dementia unit & functional unit (96% vs. 97%) reported a positive experience & therapists reported relaxation in most users (88% vs. 83%). Duration of use was shorter on the dementia unit compared to the functional unit (mean 5 minutes 36 seconds vs. 7 minutes 42 seconds) & repeat use was also lower (2.7 sessions vs. 5.4 sessions). No serious adverse effects were noted & <3% sessions resulted in any side effects.

Discussion: This service evaluation demonstrates feasibility & acceptability of immersive virtual reality relaxation activities as part of routine occupational therapy sensory sessions on an older people's mental health ward supporting services users with a wide variety of mental health diagnoses. Relaxation & calming effects were reported. Many patients chose to return to the headset on multiple occasions especially on the functional unit where they completed longer sessions compared to the dementia unit. Research is planned into benefits for anxiety, stress reduction & medication use.

Parallel sessions 2, June 12th, 2025, 13.45 – 14.45

Oral

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Journey towards the Introduction of VR/AR Interventions within a Forensic Mental Health and Intellectual Disability Service in Aotearoa, New Zealand

Track: VR in Forensic Settings

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Introduction: Virtual Reality (VR) and Augmented Reality (AR) have emerged as promising tools to provide therapeutic opportunities for people in secure forensic mental health and intellectual disability services. However, the technology is not in common place use, and little is known experientially about the forensic and culturally specific applications.

Methods: We present a narrative description of the initial phase of exploration of VR with staff, and with view to implementation of VR interventions into Mason Clinic, a secure forensic hospital in Aotearoa New Zealand. A range of disciplinary staff (n = 30) participated in a workshop with Swedish experts and experienced different forms of VR technology. Collaboration is commencing with a local university. Hui (gatherings) have been held with cultural experts, given that Māori (the Indigenous people of Aotearoa) constitute approximately 50% of service users. Site staff pilot studies were initiated with feedback across a range of security, therapeutic value and cultural appropriateness areas.

Results: The VR technology was considered to have good face validity with a wide range of potential clinical and cultural applications.
A number of ethical, security, therapeutic, practical and cultural questions were highlighted within the huis and staff exposure phase which will be discussed.

Discussion: This paper will further discuss the early progression to implementation and research design for the next phase of VR exploration in the service.

Parallel sessions 1, June 12th, 2025, 11.30 – 12.30

Oral

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Physiological Activation and Interoceptive Training during Virtual Reality Slot Machine Gambling

Track: Technological Aspects of VR

Elena Gomis-Vicent[1, 2], Daniel Balboa-Navarro[2], Jose Luis Soler-Dominguez[3], Samuel Navas-Medrano[3], Patricia Pons[3], Matthew King-Parker[4], Stephen Sharman[1], Rosa Baños[2]

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Introduction: Impairments in interoceptive processes have been linked to addictive disorders and problematic gambling behaviours, however there is no clear understanding of how gambling affects physiological states, and the role that interoception plays on regulating gambling-related behaviours. In this study we are investigating physiological reactivity and interoceptive abilities during gambling.

Methods: Participants gamble on a virtual reality (VR) slot machine that measures behavioural impulsivity and gambling persistence while electrocardiogram and electrodermal activity are recorded. Self-reported measures of impulsivity, gambling cravings and activation self-awareness are used to measure interoceptive abilities in relation to the physiological reactions. Interoceptive training using an emotional VR avatar that reflects changes on participants physiological activation is used with the aim to improve interoceptive abilities and modify risk-taking behaviours during gambling.

Results: Currently we have collected data from 30 participants and recruitment will continue to obtain a total sample of 60 participants. We expect to find lower interoceptive abilities in participants showing higher frequency of gambling behaviours, indicated by lower self-awareness of activation during gambling, higher behavioural impulsivity, gambling persistence and cravings compared to participants with no problematic gambling behaviours. Moreover, we expect that the interoceptive training will improve self-awareness of activation and reduce behavioural impulsivity and gambling persistence compared to a distraction task.

Discussion: Gambling disorder is the most widely studied behavioural addiction, however there is a lack of effective intervention strategies to tackle problematic gambling behaviours. This study helps to improve the understanding of how gambling influences physiological states and explores the potential of using interoceptive training to reduce risk-taking behaviour during VR slot machine gambling.

Parallel sessions 2, June 12th, 2025, 13.45 – 14.45

Oral

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Prerequisites for, and Outcomes of, Virtual Reality-Assisted Psychological Treatment of Aggression for Violent Offenders

Track: VR in Forensic Settings

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Introduction: Aggression presents significant challenges in forensic settings. This presentation explores the interconnections between aggression, psychopathy, and intelligence in young violent offenders while also examining the development, implementation, and impact of a novel virtual reality (VR)-assisted psychological treatment for aggression in forensic psychiatric populations.

Methods:
The aim of this thesis was to explore the prerequisites for, and outcomes of, virtual reality-assisted psychological treatment of aggression among violent offenders in forensic settings. Specifically, the thesis sought to identify the necessary conditions for the effective implementation of such treatment.

Results: VR-based interventions offer promising opportunities to reduce aggression through immersive learning. VRAPT enables training in controlled high-risk environments, but treatment responses vary between individuals. Individually tailored treatment plans are crucial, as some patients internalize skills while others revert to previous behavioral patterns.

Discussion: The interaction between VR exposure and psychiatric symptomatology warrants further investigation. Emotional regulation difficulties may have influenced participants' engagement with VRAPT, with those exhibiting pronounced dysregulation struggling with self-regulation during sessions. Even with established rating protocols, subtle interpretative differences could introduce inconsistencies in aggression scoring. Additionally, the study was conducted during the COVID-19 pandemic, a period marked by increased institutional stressors, altered staff routines, and changes in patient interactions.

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Oral

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Facing Your Inner Critic: An RCT investigating a Virtual Reality Intervention with and without a Perspective Change for Excessive Self-Criticism

Track: VR in Mental Health Settings

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Introduction: Excessive self-criticism has been associated with several psychiatric disorders, as well as poorer therapeutic outcomes. Existing compassion-based therapies are time-consuming and can be challenging because of the use of mental imagery. Virtual Reality interventions enable concrete visual representations and may be more efficient. We investigated the effects of a single-session VR intervention, based on chair dialogue exercises from schema therapy, on self-criticism and self-compassion. Furthermore, the additional effect of the novel VR technique perspective change was assessed.

Methods: Undergraduate students (n=68) with high levels of self-criticism were randomized to either the intervention with or without an additional perspective change. Pre- and post-measures consisted of self-report questionnaires on self-compassion, self-criticism, negative and positive affect. Participants underwent the single-session VR intervention where they had to respond assertively towards an avatar who expressed the participant's own excessive self-criticism. The perspective change consisted of a change to third person perspective.

Results: The VR intervention significantly decreased self-criticism and negative affect and increased self-compassion for both conditions directly after the session. No additional effect was found for the perspective change.

Discussion: This was the first study to apply VR within a schema therapy exercise. Positive effects indicate the potential of VR schema therapy for individuals with excessive self-criticism in clinical practice.

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Oral

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Virtual Calm Rooms as a Tool for Anxiety Reduction in Psychiatric Inpatient Care

Track: VR in Mental Health Settings

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Introduction: Over the past decade, calm rooms have been introduced in psychiatric inpatient care in both physical [1] and virtual reality (VR) formats [2]. The primary goal of integrating calm rooms into psychiatric settings is to provide patients with a dedicated space for relaxation, aiming to enhance their well-being, reduce anxiety, and offer a distraction during periods of stress and emotional distress [3-5]. Calm rooms may also serve as a tool for promoting self-help by creating a comfortable and safe environment while simultaneously strengthening the therapeutic relationship between patients and healthcare staff [1,6]. Research suggests that the calm rooms can be designed for clinical purposes, therapeutic interventions [1,7], stress reduction, and overall well-being improvement [1,3,4,8]. The aim of this study is to explore patients' perspectives on the option of using a virtual calm room when experiencing anxiety or distress in a psychiatric inpatient setting.

Methods: This study is part of a larger research project investigating the effects of both VR and physical calm rooms in psychiatric inpatient care in Sweden. Data were collected through 10 individual interviews and an evaluation form with three statements answered by 59 participants.

Results: The final results on patients' experiences will be presented at the conference.

Discussion: This study will provide valuable insights into healthcare professionals' experiences of supporting patients in psychiatric inpatient care who require anxiety and stress-reducing interventions. The findings are expected to contribute to a better understanding of effective support strategies that can aid in stress and anxiety reduction. Traditionally, conversations and anxiolytic medication have been the standard options available in inpatient settings. The implementation of a well-functioning VR-based or physical calm room may offer patients additional tools to manage their condition, promote self-care, and increase their engagement in their treatment and care.

Parallel sessions 2, June 12th, 2025, 13.45 – 14.45

Oral

Face Your Fears: Virtual Reality-Based Cognitive Behavioral Therapy (VR-CBTp) Versus CBTp for Paranoia in Patients with Schizophrenia Spectrum Disorders: Results of a Randomized Clinical Trial

Track: VR in Assessment and Treatment of Psychosis

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Introduction: Paranoia is a common and distressing symptom in schizophrenia spectrum disorders (SSD), markedly impairing quality of life and daily functioning. Review findings suggest that cognitive behavioural therapy for psychosis (CBTp) has a small to moderate effect in reducing SSD-related paranoia compared to treatment as usual (TAU). Immersive virtual reality (VR) may enhance the behavioural component of CBTp by enabling tailored social interaction exposures that meet individual patient needs and allow real-time modifications. The FaceYourFears study is the first study to directly compare the efficacy of VR-CBTp versus CBTp.

Methods: This assessor-masked, randomized superiority trial compared VR-CBTp to standard CBTp for paranoia reduction. Participants (N=254) were randomly assigned to 10 sessions of VR-CBTp + TAU (n=126) or CBTp + TAU (n=128). Outcomes were assessed at baseline, treatment completion, and six-month follow-up. The primary outcome was paranoia severity, measured by the *Green Paranoid Thought Scale (GPTS)* subscale *Ideas of Persecution* at treatment completion. Secondary and exploratory outcomes comprised of different clinical characteristics, social-cognitive measurements and client satisfaction.

Results: Groups did not differ significantly on the primary outcome (adjusted mean difference 1.12, 95% CI: -1.75 to 3.99, Cohen's d=0.10, p=0.44). However, with-in group analyses demonstrated substantial reductions in paranoia at treatment completion (VR-CBTp: Cohen's d=0.89; CBTp: Cohen's d=0.72) that was maintained at follow-up (VR-CBTp: Cohen's d=0.86; CBTp: Cohen's d=0.68).
Secondary outcomes showed no significant differences between groups, except for *ERT sadness accuracy*, which favored CBTp at follow-up. Among exploratory outcomes, *COGDIS* and the *Suicidal Ideation Attributes Scale (SIDAS)* demonstrated statistically significantly greater improvements in the VR-CBT group compared to the CBTp group.

Discussion: These findings suggest that both VR-CBTp and CBTp significantly reduce paranoia equivalently, reinforcing their value as effective interventions for SSD-related paranoia. It suggests that

VR-CBTp may serve as an alternative treatment, particularly for patients who may struggle with *in vivo* exposure and homework assignments.

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VR Implementation in Mental Healthcare: A Marathon, Not a Sprint - Lessons from a Longitudinal Evaluation of a VR Training Program

Track: VR in Mental Health Settings

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Introduction: Despite the recognized potential of Virtual Reality (VR) in mental healthcare, its widespread implementation in practice remains limited. This longitudinal study examines on therapists' expectations and experiences with a VR training program designed as an implementation strategy. Additionally, the study explores key factors influencing the implementation of VR and tracks how these factors evolve over time.

Methods: This longitudinal qualitative evaluation involved 11 therapists from a Dutch mental healthcare organization. The therapists participated in a three-month VR training program and completed semi-structured interviews at three time points: pre-training, post-training, and three months after the training concluded. Data were analyzed using the COM-B model and Theoretical Domains Framework (TDF) to capture changes in capability, motivation, and opportunity over time.

Results: The study identified key implementation factors influencing VR implementation in mental healthcare. Therapists' knowledge and skills improved, emphasizing the importance of training - that integrates both technical and therapeutic aspects - as a foundational implementation strategy. While earlier stages of implementation during the training focused on capability building, later phases revealed systematic barriers like workflow incompatibility, hierarchical dynamics, and lack of organizational support and vision.

Discussion: The longitudinal nature of this study provided insights into how implementation factors shifted over time. The findings reveal that while initial training is crucial, successful implementation requires a holistic approach beyond training. Organizations need to foster a supportive environment with a clear vision, adequate resources, and ongoing support. The findings of this study highlight the importance of ongoing evaluation and adaptation of implementation strategies over time to ensure sustainable integration of VR into mental healthcare.

Parallel sessions 1, June 12th, 2025, 11.30 – 12.30

Oral

Virtual Reality in Children's and Adolescents' Mental Health: A Scoping Review

Track: VR for Children and Youth

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[1] University of Leiden

Introduction: The purpose of this scoping review was to synthesize literature on available Virtual Reality (VR) applications used in assessment and treatment in mental health care. Our second aim was to shed light on the feasibility and effectiveness of VR applications that were studied.

Methods: An extensive search was conducted in four databases, resulting in 43 eligible studies on assessment and treatment. Additionally, 6 feasibility trials were identified during data extraction.

Results: Eleven studies investigated the validity of VR assessment tools, whereby the majority focussed on the assessment of attention-deficit hyperactivity disorder (ADHD) symptoms. These studies found that VR assessments show a slight performance advantage over traditional assessment tools (such as cognitive performance tasks) by increasing sensitivity and specificity. Effectiveness was studied in 36 studies including children with autism spectrum disorder (ASD), anxiety, attention difficulty, behavior problems, and children undergoing medical procedures. The working mechanisms of these VR interventions encompassed skills practice, psychoeducation and exposure. While VR interventions show promising results for all working mechanisms, virtual psychoeducation for children undergoing medical procedures aiming to reduce preoperative anxiety is supported by the most evidence. Notably, only six applications were tested in a prior feasibility trial. Nearly half of other studies lacked feasibility measures, while the rest showed inconsistencies, complicating effectiveness interpretation.

Discussion: Overall, there are indications that VR has the potential to improve today's mental health care in children and adolescents, especially VR psychoeducation applications in hospital settings. More transparent and consistent feasibility testing and generally more standardized testing is needed to determine the effectiveness of more complex VR applications.

Parallel sessions 2, June 12th, 2025, 13.45 – 14.45

Oral

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Virtual Reality Enhanced CFT Intervention for Severe Conduct Problems: CFT+VR study

Track: VR in Forensic Settings

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Introduction: Adolescents with both severe conduct problems and callous-unemotional (CU) traits have proven difficult-to-treat. CFT+VR intervention merges compassion-focused therapy (CFT) with virtual reality (VR) exposure. CFT is based on the *psychopathy.comp* program from Coimbra University, and VR aims to enhance motivation and engagement while offering an immersive training environment. The study assesses whether CFT+VR can reduce CU traits.

Methods: Participants are 15–20 yo males diagnosed with conduct disorder (CD) or antisocial personality disorder, residing in Finnish state reform schools and prisons. The intervention consists of 25 individual sessions (20 CFT & 5 VRET). Assessments occur at baseline, mid-intervention, and post-intervention. CU traits are measured with YPI-S, alongside other validated scales (e.g. TAS-20, PFQ-2, WAI-SR). Qualitative data is also collected. The study aims to include 72 probands and 72 matched controls, with data collection continuing until 2026.

Results: Preliminary YPI-S results show a significant reduction in CU traits throughout the intervention. Other findings indicate improvements in identifying and processing emotions. Qualitative data highlights changes regarding insights on aggression. Overall, CFT+VR is perceived as beneficial, with strong therapist-client relationships, especially in the bond dimension.

Discussion: Combining evidence-based CFT individual therapy with VRET can enhance engagement and motivation. Adolescents generally have a positive attitude toward digital technology, making VR a compelling tool. Overcoming oppositional attitude and resistance to therapy provides a window of opportunity for indivudual therapy. More, VR can provide a physically safe and also cost-effective setting for both psychoeducation and impulse control training. Based on our preliminary findings, CFT+VR is a promising tool for treating delinquents with CU traits.

Parallel sessions 1, June 12th, 2025, 11.30 – 12.30

Oral

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Reduced Sensitivity and Increased False Percepts Linked to Delusional Ideation in Virtual Reality Simulations of Visual Distortions

Track: VR in Assessment and Treatment of Psychosis

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Introduction: Visual distortions (VDs) are a common feature of emerging psychosis and are thought to reflect its progression. Bayesian models suggest they arise from impaired sensory processing and/or overly strong top-down effects. However, traditional perceptual tasks probing these mechanisms have limited ecological validity and explanatory power for real-world sensory experiences. To address this, we developed perceptual decision-making tasks that embed psychosis-like VDs into naturalistic 360° scenarios using virtual reality.

Methods: 120 healthy participants completed three VR tasks assessing detection of five VDs (brightness, color, movement, patterns, and peripheral shadows). The Naïve Detection Task (NDT) measured sensitivity and susceptibility to false percepts in participants unfamiliar with VDs. A 2-Interval Forced-Choice (2IFC) task estimated bias-free visual sensitivity using an adaptive psychometric method (QUEST+). The Perceptual Uncertainty Task (PUT) assessed sensitivity and false percepts under uncertainty in distortion-absent and -present trials at three detection rates (55%, 75%, and 95%). Psychotic-like experiences were measured via the Cardiff Anomalous Perceptions Scale (CAPS) and Peters Delusion Inventory (PDI).

Results: Higher PDI total scores were linked to reduced sensitivity to certain VDs in the 2IFC, particularly peripheral shadows. Additionally, higher PDI scores were associated with increased expectation-driven false percepts in the NDT. Both PDI and CAPS scores were positively associated with higher hit rates in PUT 75% distortion trials.

Discussion: Our findings suggest that both bottom-up sensory deficits and top-down expectation-driven effects contribute to psychotic-like experiences, predominantly delusional ideation. Further research in high-risk and clinical populations is needed to clarify their roles in psychosis vulnerability and evaluate their potential as early markers. Our approach offers a novel method for studying perceptual processes in ecologically valid settings.

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Oral

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Effects of Virtual Reality Relaxation on Physiological and Self-Reported Stress in People with Mental Health Conditions

Track: VR in Mental Health Settings

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Introduction: Stress is a significant contributor to the development and progression of mental health conditions. While relaxation techniques can alleviate stress, they often demand cognitive effort that exceeds the capacity of some patients. VRelax, a virtual reality (VR) relaxation tool, has shown promise in improving affective states. However, its effects on physiological stress markers and self-reported stress levels over a prolonged intervention period remain unexplored.

Methods: A multicenter, single-blind randomized controlled trial included patients with burnout or diagnosed with anxiety, depression, bipolar, psychotic, or posttraumatic stress disorder (PTSD). Participants were randomized to VRelax or standard relaxation exercises (RE). In both groups, participants were instructed to relax for at least 20 minutes, five days per week, for six weeks at home. Physiological stress markers were recorded via the Empatica E4 wristband during the first and last week. Self-reported stress levels (Visual Analog Scale, 0-100) were collected before and after each session, within the VRelax application and for the RE group via an online questionnaire.

Results: 69 participants completed the intervention (VRelax: n = 33). The sample was 76.8% female (n = 53), with a mean age of 42.5 years (SD = 13.1). The effects of both interventions on physiological stress markers and self-reported stress levels will be presented at the conference.

Discussion: This study will provide new insights into the effects of VR relaxation on physiological stress markers and self-reported stress levels during a six week intervention period. Findings will contribute to the development of cost-effective, accessible self-management tools for stress reduction, with potential implications for reducing waitlists and enhancing psychiatric care.

Parallel sessions 3, June 13th, 2025, 13.00 – 14.00

Oral

23

Framework for Conceptualizing VR Applications in Psychotherapy

Track: VR in Mental Health Settings

Sofia Seinfeld Tarafa[1], Adrián Montesano[1]
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Introduction: Virtual reality (VR) has the potential to transform psychotherapy by offering immersive and dynamic simulated environments for therapeutic interventions. In this talk, we present a novel framework for conceptualizing VR psychotherapeutic interventions along three key dimensions: **Strategy**, **Focus of Intervention**, and **Perspective**.

Methods: The **Strategy** dimension refers to the specific therapeutic modalities employed within a VR experience, such as exposure therapy, skill training, or exploratory techniques. The **Focus of Intervention** focuses on the primary target of the therapeutic process, ranging from symptom management and attitude adjustments to deeper constructs like identity and personal flourishing. Finally, **Perspective** addresses the viewpoint from which the patient experiences the therapeutic virtual scenario—whether through their own perspective, an external viewpoint, or even multiple perspectives within the same virtual scene.

Results: In this talk, we delve deeper into this framework and provide illustrative examples from clinical case studies and past research.

Discussion: The primary goal of this framework is to offer a comprehensive method for classifying and analyzing VR-based interventions across diverse therapeutic contexts, while also equipping practitioners and researchers with a conceptual map to fully harness VR's potential in psychotherapy.

Parallel sessions 1, June 12th, 2025, 11.30 – 12.30

Oral

24

Exploring Mixed Reality for Collaborative Gamified Therapeutic Interventions in Mental Health

Track: VR in Mental Health Settings

Jose Luis Soler-Dominguez[1], Samuel Navas-Medrano[1], Patricia Pons[1], Josep Carreres[1], Marta Garcia-Ballesteros[1], Lorena Adam[2], Laura Moreno[2], Susana Ortega[2], Jesús Rienda[2]

[1] Instituto Tecnológico de Informática (ITI)

[2] Fundación SASM

Introduction: Extensive research has studied collaborative Virtual Reality (VR) applications in mental health, but the potential of Mixed Reality (MR) in this domain remains underexplored. MR offers unique opportunities for creating immersive, shared therapeutic spaces that foster engagement within a safe environment, whether in cofacilitated in-person sessions or remote settings. Our project CORE-MHC introduces the first MR collaborative system designed to support gamified therapeutic activities for mental health treatment, both remotely and locally.

Methods: The gamified MR experience has been codesigned with mental health professionals from an occupational therapy center that offers daycare facilities and residential units, to ensure clinical relevance and alignment with users' needs. This activity enables therapists and patients to engage in tasks related to self-care, care of the environment, and physical mobility through interactions with a digital animal. The system allows a therapist to initiate the MR session using either a laptop or a MR headset and connect with patients using separate MR devices, enabling real-time collaborative engagement from different physical locations.

Results: The development phase is currently ongoing, with prototypes being tested and refined alongside mental health professionals. Starting April 2025, the system will be evaluated with real patients from a mental health day center and supervised housing facility. This evaluation will include multidimensional perspectives, from User Experience to Therapeutic Performance.

Discussion: This study will provide insights into the potential of MR for multiuser mental health treatments, complementing our presentation with the latest results and a discussion of MR's transformative role in collaborative therapeutic activities.

CORE-MHC has indirectly received funding from the EU's Horizon Europe research and innovation action programme, via the CORTEX2 Open Call 1 issued and executed under the CORTEX2 project (Grant Agreement no.01070192).

Parallel sessions 2, June 12th, 2025, 13.45 – 14.45

Oral

25

Switching Sides: The Effects of IVR Outgroup Embodiment on Cooperative Intergroup Decision-Making

Track: Technological Aspects of VR

Xenia Stieger[1], Elisa Cavatorta[1], Lucia Valmaggia[1, 2]
[1] King's College London
[2] University of Melbourne

Introduction: Previous research suggests embodying an outgroup member through full body ownership in virtual reality can reduce racial implicit biases. This bias change was found to be more robust than previous methods of perspective-taking. We aim to build on this finding through two studies that utilise intra– and intergroup cooperation choices in a series of one-shot prisoner dilemmas. We test whether ingroup favouritism can be reverted through outgroup embodiment and set out to draw a comparison between 2D methods of outgroup perspective-taking and VR embodiment.

Methods: In Study 1, White and Black male participants (N = 300) either play 10 rounds of a prisoner's dilemma against their racial ingroup or their outgroup on a desktop computer. Our White participants were randomly given a White or Black avatar to play as.

Results: We did not observe ingroup favouritism between White and Black opponents regardless of participants' avatars. However, White participants given a Black avatar were significantly less cooperative towards both White and Black opponents. We argue that instead of reducing intergroup bias, participants' racial biases became more salient when playing from an outgroup perspective in 2D.

Discussion: In Study 2, 70 White male participants play the same game in immersive virtual reality (IVR) where they either embody their ingroup or outgroup. We hypothesise that men playing the game in IVR will show more cooperative behaviour towards Black opponents when given a Black avatar than participants given a White avatar. Additionally, when comparing the choices from the 2D and IVR scenario, we do not expect to replicate the less cooperative behaviour towards Black and White players in the outgroup condition of Study 1. Recruitment for Study 2 will be completed on February 21st and data will have been analysed by the time of the conference. We expect that our studies will contribute to the understanding of perspective-taking, embodiment research, and the benefits of IVR over traditional methods.

Parallel sessions 2, June 12th, 2025, 13.45 – 14.45

Oral

26

Promoting Mental Health Literacy among Healthcare Workers: Illustration of how Qualitative Research can support the Development of VR Training

Track: VR in Mental Health Settings

Dominique Therrien[1], **Evy Nazon**[1]
[1] Universite du Quebec en Outaouais

Introduction: Promoting mental health literacy among healthcare workers can be achieved through programs such as Psychological First Aid (PFA). At the 2023 edition of this conference, we presented the framework for this exploratory qualitative study to understand informal support between colleagues in the workplace with a view to developing VR training to help staff acquire new PFA skills.

Methods: Methods: Interviews were conducted with 18 hospital and community workers to understand their views on how they identify distress, listen, support and refer colleagues to appropriate services when needed.

Results: Results: The thematic analysis revealed some findings, one of which inspired the main theme behind the VR training sessions: workers are sometimes reluctant to approach and intervene with their colleagues who are experiencing psychological distress. Even if they feel comfortable making PFAs, they sometimes face barriers that hinder their intention to contact their colleague; these barriers (i.e. gender, culture, hierarchy, interpersonal issues) make them reluctant to take the first steps.

Discussion: Discussion: These findings closely guided the development of two VR scenarios that allow participants to practice overcoming these barriers so that workers would become aware of them and, if necessary, ensure that another colleague would continue with the PFAs. The VR training modules were developed in close partnership with users. Receiving feedback throughout the process improved the VR scenarios, ensured acceptability and was cost effective. Many logistical barriers related to implementation in healthcare facilities (e.g. IT security, timeline, human and material resources, budgets) can be overcome this way. Together, we also developed debriefing sessions to facilitate skills development and group discussions on benevolence among coworkers, a strategy to ensure a sound knowledge transfer of PFA's with the BienVR software in hospitals and post secondary education environments.

Parallel sessions 1, June 12th, 2025, 11.30 – 12.30

Oral

27

Exploring the Impact of a Cardio-Visual Full-Body Illusion on Embodiment and Body Image

Track: Technological Aspects of VR

Fiammetta Zanetti[1], Johannes G. Herforth[2], Karsten Schönbein[3], Jean Botev[2], Annika Lutz[1]
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[3] Media Centre, University of Luxembourg, Esch-sur-Alzette

Introduction: Current theories on eating disorders suggest that individuals experience a persistent, distorted perception of their body, resistant to sensory updates. This study aims to develop a virtual reality (VR) platform designed to enhance body image by leveraging multisensory integration. The VR cardio-visual full-body illusion (CVFBI) fosters an illusory sense of body ownership by synchronizing an avatar's flashing outline with the participant's heartbeat. This illusion is hypothesized to induce somatosensory and interoceptive changes, potentially improving body image. However, the optimal conditions for achieving strong embodiment and positive effects on body perception remain unclear. To address this, we investigate different variations of heartbeat synchronicity and asynchronicity.

Methods: In active CVFBI conditions (expected to elicit high embodiment), the avatar's flashing outline appeared immediately (0ms) or with a slight delay (200ms) following the R-peak of the ECG. Control conditions (expected to induce low embodiment) included a longer delay (500ms), synchronization with a pre-recorded ECG, flashing at ±20% of heart rate, or no flashing.

Results: Seventeen healthy participants (53% male) were recruited. No significant differences were found in self-reported embodiment or body image (measured via body satisfaction questions) across conditions. Skin temperature, recorded as a psychophysiological marker, did not vary between conditions. However, a weak positive correlation was observed between arm temperature and embodiment.

Discussion: Low embodiment scores suggest that none of the tested conditions successfully induced the CVFBI or improved body image. Interestingly, the correlation between skin temperature and embodiment was opposite to findings from previous studies, highlighting the need for further exploration. Understanding and refining interventions that effectively target multisensory integration is crucial for improving body image disturbances in individuals with eating disorders.

Parallel sessions 2, June 12th, 2025, 13.45 – 14.45

Oral

Pitches

29

ZenctuaryVR+: A Co-Designed VR Environment for Stress Reduction and Cognitive Support in Elderly Care

Track: VR in Mental Health Settings

Ágnes Karolina Bakk[1], Samuel Chovanec[1]
[1] Moholy-Nagy University of Art and Design, Future Care Lab

Introduction: The ZenctuaryVR+ project, led by Moholy-Nagy University of Art and Design (MOME) and spanning three years, addresses the problems of elderly hospital care by developing a VR application tailored for older adults in palliative care or hospital settings. The aim of it is to improve their quality of life that also serves as a diagnostic tool. ZenctuaryVR+ aims to create an enriching, nature-simulated interactive VR experience that reduces stress and anxiety. The VR application will also serve as a diagnostic tool to aid in differential diagnosis of cognitive disorders.

Methods: Our approach includes three key phases:
Participatory Co-Design: We will conduct a series of co-design workshops involving psychologists, caregivers, doctors, designers, software developers, and older adults to map their needs. We will explore content, implementation strategies, hardware, interface, and data evaluation, resulting in a VR prototype that meets the requirements of end-users.
Pilot Study: A feasibility study will be conducted in a palliative care center in Strasbourg, France, with 20 patients. It will evaluate the feasibility of daily exposure to the ZenctuaryVR+.
Randomized Clinical Trial: A long-term randomized clinical trial involving 100 patients will be conducted in two Hungarian hospitals. This will assess the effects of the VR intervention on mood, anxiety, stress levels, and its usability within healthcare centers. At the end of the we aim to have a ready IP that can be included in the general care practice.

Discussion: *Personalized VR Environments*: How can we adjust the VR environment based on co-design sessions to maximize therapeutic effects?
Integration with Cognitive Assessments: What methods can be used to measure the long-term effects of VR interventions?
The 3-year project is funded by Hu-rizon Research Grant.

Parallel sessions 3, June 13th, 2025, 13.00 – 14.00

Pitch

30

Effect of VRAPT-ID in Reducing Aggression in Forensic Psychiatric Inpatients in the Netherlands and Belgium: A Multicenter Randomized Controlled Trial

Track: VR in Forensic Settings

Patricia Van Reekum[1, 2], Frank van de Boogert[1, 2]
[1] Fivoor, Science & Treatment Innovation
[2] TIlburg University, Tilburg School of Social and Behavioral Sciences

Introduction: We would like to present a new research idea and receive feedback from the audience. I am a PhD student from the Netherlands, and we are planning to initiate this randomized controlled trial (RCT) in 2025. Currently, we are in the process of submitting our application to the medical ethics review committee. Aggression is a common issue in clinical settings when treating forensic psychiatric patients. Moreover, one of the primary goals of forensic psychiatric clinics is to reduce the risk of violent recidivism. Patients with mild to borderline intellectual disabilities (MBID) are overrepresented in forensic settings. Virtual Reality Aggression Prevention Training – Intellectual Disability (VRAPT-ID) is an intervention designed to help patients manage escalating (social) situations more effectively. Additionally, VRAPT-ID aims to enhance patients' self-regulation skills. In 2023, we conducted a single-case experimental design (SCED) study on VRAPT-ID in a forensic psychiatric center (not yet published). This RCT represents the next step in further evaluating the intervention's effectiveness.

Methods: The primary objective of this study is to assess whether VRAPT-ID serves as an effective adjunctive training for reducing aggression in forensic psychiatric inpatients with MBID. The secondary objective is to examine whether VRAPT-ID improves self-regulation, social skills, and coping strategies, as well as to investigate its potential impact on therapy compliance. This study will employ a single-blind, multicenter RCT with three conditions. The first group will receive treatment as usual (TAU) + VRAPT-ID, the second group will receive TAU + VRelax (control group 1), and the third group will receive TAU only (control group 2). Participants will be recruited from multiple forensic psychiatric clinics in the Netherlands and Belgium. All participants must have a formal diagnosis of MBID and exhibit difficulties in aggression regulation.

Parallel sessions 1, June 12th, 2025, 11.30 – 12.30

Pitch

Posters

32

Virtual Nature Exposure for Older Adults: A Multiple-Case Study on Nature Connectedness, Usability, and Cybersickness in Immersive VR

Track: Technological Aspects of VR

Juliana Rojas-Rincón[1], Maria Gamiz-Sanfeliu[1], Carla Martos[1], Maria Fernandez-Capo[1], Anna Carballo-Marquez[1], **Aikaterini Ampatzoglou[1]**, **Cristina Fernández-Cardellach[1]**, Maite Garolera[2], Bruno Porras-Garcia[1]

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[2] Brain, Cognition, and Behavior Research Group. Consorci Sanitari de Terrassa-Hospital Universitari, Terrassa, Spain.

Introduction: Brief exposure to nature has been shown to reduce stress and improve well-being; however, access to natural environments is often limited for older adults due to mobility, economic, or geographic barriers. Virtual reality (VR), with its high level of immersion, is a promising alternative that may offer greater benefits than less immersive technologies and realistic access to nature-based experiences and their benefits for the older population. This multiple case study (N = 5) investigated the effects of VR-based nature exposure on older adults' perceived connection to nature, system usability, and cybersickness symptoms.

Methods: Participants completed a 10-week group-based programme involving weekly exposure to immersive, VR-generated natural environments. Perceived connection to nature was assessed before and after the intervention, while system usability and cybersickness symptoms were measured at the end of the programme.

Results: Results suggest a trend towards improvements in connection to nature, high perceived system usability, and minimal levels of cybersickness. Recruitment is ongoing and further updates will be provided as data collection continues.

Discussion: These preliminary findings suggest that nature-based VR simulations may serve as an effective therapeutic tool for older adults, providing immersive experiences that help overcome barriers to nature engagement and potentially promote greater engagement in outdoor activities.

Poster

33

PrevED MR: A Mixed Reality Intervention for Preventing Eating Disorders and Enhancing Emotional Regulation

Track: VR in Mental Health Settings

Aikaterini Ampatzoglou[1], Juliana Rojas-Rincón[1], Cristina Fernández-Cardellach[1], Samuel Navas-Medrano[2], Jose Luis Soler-Dominguez[2], Jorge Larrosa-Quesada[2], Maria Fernandez-Capo[1], Maria Gamiz-Sanfeliu[1], Carla Martos-Algarra[1], Maite Garolera[1, 3], Bruno Porras-Garcia[1], Patricia Pons[2]

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Introduction: Preventive interventions are essential to reduce the risk of eating disorders (EDs). Given the critical role of dysfunctional emotional regulation (ER) in the onset and maintenance of these disorders in adolescents, approaches such as Dialectical Behavior Therapy (DBT) may be an effective method for training ER and preventing EDs. However, it is crucial to increase adherence and engagement in this type of intervention. To this end, we propose to integrate mixed reality (MR) technology to enhance DBT training (PrevED MR). This project will assess the usability, feasibility, and early effects of PrevED MR in preventing EDs and emotional dysregulation in at-risk adolescents and young adults.

Methods: The project will be divided into two phases. Phase I, includes formative research through interviews and focus groups to gather feedback for the development of the PrevED MR prototype. A feasibility study will be conducted to evaluate usability, user experience, cybersickness symptoms, and sense of presence. Phase II will be a longitudinal, single-blind, randomized, controlled pilot study with 72 participants (ages 13-35) at risk of EDs. Participants will be randomly assigned to an experimental group (PrevED MR) or a control group (waiting list). PrevED MR will last 5 weeks (10 sessions). Pre- and post-intervention assessments will measure ED symptoms (primary outcomes) and ER and usability (secondary outcomes).

Results: Recruitment for focus groups involving adults with and without eating disorders (Phase I) is ongoing. Preliminary findings will be presented, focusing on a thematic analysis of ED symptoms and ER skills. Descriptive data will be provided on the identification and use of adaptive and maladaptive ER strategies in daily ED-related situations.

Discussion: This study will contribute to the development of effective preventive interventions for ED in adolescents. To our knowledge, this is the first study to attempt a technological adaptation of an MRI-based approach to improve ED prevention.

Poster

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Examining Self-Efficacy as a Predictor of Immersion and Enjoyment in Virtual-Reality Based Interventions Targeting Emotion Regulation in Adolescents

Track: VR for Children and Youth

Aikaterini Ampatzoglou[1], Anna Carballo-Marquez[1], Juliana Rojas-Rincón[1], Anna Garcia-Casanovas[1], Cristina Fernández-Cardellach[1], Maria Fernandez-Capo[1], Maria Gamiz-Sanfeliu[1], Maite Garolera[1, 2], Bruno Porras-Garcia[1]

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[2] Brain, Cognition, and Behavior Research Group. Consorci Sanitari de Terrassa-Hospital Universitari, Terrassa, Spain.

Introduction: Self-efficacy, defined as an individual's belief in their capacity to execute behaviors necessary to produce specific performance attainments, plays a crucial role in how adolescents approach goals and challenges. In virtual reality (VR) environments, immersion refers to the feeling of being fully engaged in the virtual world, while enjoyment reflects the positive emotional response. Both factors are crucial for the effectiveness of interventions, leading to a more successful and impactful experience. This study aims to examine how self-efficacy influences levels of immersion and enjoyment in VR interventions targeting emotion regulation.

Methods: Seventy-nine Spanish-speaking adolescents, 35 girls and 44 boys, were randomly allocated into: an experimental group receiving a gamified VR cognitive training program and a control group receiving a comparable VR nature-based relaxation experience. Self-efficacy was assessed at baseline using the General Self-Efficacy Scale (GSE), while immersion and enjoyment levels were measured after the first VR session in both groups using the Visual Analogue Scale (VAS).

Results: Linear regressions were conducted to understand the effect of self-efficacy on predicting greater immersion and enjoyment levels in the two VR interventions. In the experimental group, self-efficacy did not significantly predict greater immersion and enjoyment levels ($p > .05$). However, in the control group, higher self-efficacy significantly predicted greater immersion ($F(1,36) = 8.312$, $p = .007$) and marginally predicted enjoyment ($F(1,36) = 4.130$, $p = .05$) levels, explaining 16.9% and 8% of the variance, respectively.

Discussion: This study highlights self-efficacy's role in immersion and enjoyment experienced during VR interventions, showing its impact only in the control group. To our knowledge, this is the first study to examine these relationships in adolescent VR cognitive training and VR-based relaxation experience, highlighting the need for further research in this population.

Posters, June 12th, 2025

Poster

35

Feasibility, Acceptability and Effectiveness of Smartphone-Based Virtual Reality Relaxation for a Psychiatric Population: An Explorative Pilot Study

Track: VR in Mental Health Settings

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[8] Prevention and empowerment, Centre of Expertise Care and Well-being, Thomas More University of Applied Sciences, Antwerp, Belgium

Introduction: Adoption of virtual reality (VR) in clinical practice is limited due to barriers such as cost. In this explorative pilot study, we therefore aimed to investigate the feasibility and acceptability of smartphone-based virtual reality relaxation, as well as evaluating its effectiveness to improve relaxation in a real-world environment.

Methods: The study had a mixed-methods design, testing an intervention over an 8-week period in 29 psychiatric patients (16 F, 13 M, mean age = 64) in a closed psychiatric ward. The intervention consisted of one 15-minute smartphone VR relaxation session in which the user was immersed in a computer-generated natural environment (ie, beach, mountain landscape, or a snowy environment) with either additional audio guidance (progressive muscle relaxation or mindfulness) or the same VR environment without audio guidance. Through observations by clinical staff and an online survey, we investigated the feasibility and acceptance of using smartphone VR as a relaxation tool. Via The Affective Slider built in the smartphone VR app, we assessed the level of relaxation before and after the intervention.

Results: Participants were neutral (15/29) to (very) positive (13/29) towards VR (1/29 negative). 19/29 participants wanted to re-use the app and advised others to use is. The main reason for not using it again was the ease of use (as stated by elder participants), physical discomfort or because they did not believe it to be useful. We also found no significant differences in the levels of happiness or arousal (Affective Slider) after VR use. Participants particularly liked the auditory guidance and music, and the result of feeling relaxed, whereas a need for more practice and a stronger implementation plan were considered as points of improvement.

Discussion: Smartphone VR relaxation is feasible and acceptable for use in psychiatric patients, although its effectiveness and implementation needs further investigation. Patients were more positive toward the tool than clinical staff.

Poster

36

AI-Integrated VR and EEG Diagnostic Framework for Early Detection of Alzheimer's and Cognitive Impairments

Track: VR in Mental Health Settings

Beyzanur Demirkaya[1], **Umut Yilmaz**[1]
[1] Voctor Health

Introduction: The early detection of Alzheimer's disease (AD) is crucial for improving patient outcomes and enabling timely interventions. Traditional cognitive assessments, such as MMSE and MoCA, often lack ecological validity and fail to capture early-stage impairments, particularly in spatial navigation, a key early indicator of AD linked to hippocampal dysfunction. This study proposes a multimodal diagnostic framework integrating VR-based cognitive assessments, EEG biomarkers, and AI-driven spatial navigation analysis to enhance early diagnosis.

Methods: Our framework integrates VR-based cognitive tasks, EEG monitoring, and AI-powered data fusion for comprehensive cognitive profiling.
VR-Based Cognitive Assessments: Ecologically valid tasks measure memory, attention, and executive function, tracking real-time behavioral metrics.
EEG Biomarkers: Neural activity is analyzed, focusing on theta, alpha, and beta oscillations indicative of early AD pathology.
Spatial Navigation Metrics: VR navigation tasks assess path integration, wayfinding efficiency, and route optimization to detect hippocampal impairments.
AI models (CNNs, RNNs) process EEG signals, analyze navigation, and use multimodal fusion (transformers, VAEs) to enhance diagnosis, with SHAP improving interpretability.

Results: Preliminary findings suggest that VR-based spatial navigation assessments and EEG biomarkers significantly improve early AD detection compared to conventional tests. AI-driven models effectively identify subtle cognitive impairments, differentiating early-stage AD from healthy aging and mild cognitive impairment (MCI).

Discussion: This AI-powered multimodal framework bridges the gap between clinical research and real-world applications, offering a scalable, cost-effective, and accessible diagnostic tool. By integrating VR, EEG, and AI-driven analytics, this approach enhances early AD detection, supports precision medicine, and enables home-based cognitive monitoring, paving the way for innovative neurodiagnostic strategies.

Poster

37

In Search of Ambiguity: A Codesign Process to Develop Immersive Scenarios to Address Socio-Cognitive Biases of Forensic Patients with Schizophrenia

Track: VR in Forensic Settings

Mathieu Dumont[1, 2]
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[2] Institut national de psychiatrie légale Philippe-Pinel

Introduction: Socio-cognitive biases are a factor associated with violence in schizophrenia. Virtual reality represents a promising therapeutic modality to address those biases. However, developing situations that are intentionally ambiguous and likely to lead to violent behaviour is a challenge. Drawing on codesign approaches and a development experience spanning more than 5 years, this project aims to highlight a thoughtful approach to immersive scenario development and participants' perceptions of this process.

Methods: This project is in line with the method stories in the field of design. It aims to explore what has been done with a method in relation to the challenges encountered. It is based on a method developed in 2018-2019 that was refined during a second research phase in 2023-2024. Four codesign workshops were planned respectively with a group of clinicians (n=4) and a group of forensic psychiatric patients (n=4). Different strategies were planned to engage participants and integrate design thinking into the development process (sketching by a graphic designer, writing sessions, etc.). The implementation of this method was recorded in a research diary. At the end of the process, participants were interviewed about their perceptions. Analytical questioning was used to analyze the results.

Results: The design process took a full year and resulted in the creation of 4 immersive scenarios depicting ambiguous everyday situations that could lead to violence if misinterpreted. As planned, four series of workshops were required. Most engagement strategies were implemented, but some challenges were encountered. At the end, participants from both groups expressed satisfaction with their experience and felt they had influenced the course of scenario development.

Discussion: This project shows that developing ambiguous immersive scenarios for forensic psychiatry clients can be a long and demanding process. Nevertheless, it can lead to the creation of scenarios that are evocative and conducive to clinical work.

Poster

38

Self-Criticism and Suicidal Ideations in Students and the Impact of Two Single-Session Virtual Reality Interventions

Track: VR in Mental Health Settings

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Introduction: Excessive self-criticism is common in young adults, putting them at a higher risk for mental health problems and for suicidal thoughts and behaviors. Interventions aimed at reducing self-criticism could be an important target for improving mental health in young adults. Existing interventions are lengthy and carried out by highly specialized personnel. Help could be more efficient through shorter interventions; two different single-session VR roleplay interventions were previously studied and showed to be effective in reducing self-criticism and increasing self-compassion in students.

Methods: The current study aimed to determine whether self-criticism and self-compassion are associated with suicidal ideation in students. We also aimed to determine whether the two VR interventions differed in their effects on self-criticism and self-compassion, and whether this differed for students with high and low suicidal ideation. Undergraduate students with a high level of self-criticism participated in one of two single-session VR interventions. In the 'double standards' intervention (N=68), the participants reacted compassionately toward a virtual friend. In the 'self-criticism avatar' (N=68) intervention, the participants responded assertively towards their inner critic. A questionnaire on suicidal ideation was administered right before the intervention. Questionnaires on self-criticism, self-compassion, positive and negative affect were administered before and after the intervention.

Results: Suicidal ideation was significantly correlated with self-criticism and self-compassion. Both interventions had similar positive effects on self-criticism and self-compassion, and these effects did not significantly differ between low and high suicidal ideation groups.

Discussion: The findings in the current study show potential for VR interventions aimed at high self-criticism. Further investigation of the effects of VR therapies specifically for suicidal ideation is needed.

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Visual Characteristics of Children with ASD and/or ADHD during VR Classroom Viewing: An Analysis using Machine Learning-Based Image Classification

Track: VR for Children and Youth

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Introduction: We used a VR classroom to identify differences in gaze characteristics between developmentally disabled and typically developing children (Ide-Okochi, 2022). However, we were unable to distinguish the specific gaze characteristics associated with each disorder separately, as the developmentally disabled group included children with both autism spectrum disorder (ASD) and attention-deficit/hyperactivity disorder (ADHD). In this study, we report a new analysis using computer-assisted image analysis.

Methods: We analyzed each participant's 90-second eye-tracking data using machine learning-based image classification. The gaze data was collected while participants viewed VR classroom designed to evaluate their reactions to a school teacher's instructions despite distracting sensory events. The study was approved by the Kumamoto University Ethics Review Committee (approval number: Ethics No. 1917).

Results: The study included 8 children with developmental disabilities (7 with both ASD and ADHD, 1 with ADHD only) and 7 typically developing children. In the machine learning-based image classification, seven children with ASD and ADHD (E, F, G, H, I) did not form a distinct cluster; E and F were located near the margins, and I was positioned near the cluster of typically developing children. The child with ADHD only (subject N) was classified close to children without ASD or ADHD (subject O). Two typically developing children (D and M) were positioned close to those with developmental disabilities.

Discussion: Our analysis indicated that classifying children's gaze characteristics based solely on the presence or absence of developmental disabilities or specific diagnoses is challenging. Future research should increase the sample size and include a wider range of disorders to enhance classification accuracy. In particular, including children with only ASD or ADHD is necessary. The authors declare no conflict of interest.

Effectiveness of Mindfulness Skills Training in Virtual Reality (MST-VR) in Schizophrenia: Preliminary Results from a Controlled Trial

Track: VR in Assessment and Treatment of Psychosis

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Introduction: Mindfulness interventions in schizophrenia are effective in improving functioning and reducing psychopathological symptoms. Mindfulness Skills Training in Virtual Reality (MST-VR) may offer an advantageous alternative due to reduced distractions and the restorative properties of virtual natural environments. Our previous uncontrolled pilot study showed improvements in positive and negative symptoms. This study aims to evaluate the effectiveness of MST-VR in patients with chronic schizophrenia.

Methods: Currently 44 patients are participating, with a target of 80 patients. Both the experimental and control groups received treatment as usual, but only the experimental group received additional weekly mindfulness training sessions for 8 weeks. Pre- and post-intervention assessments were conducted using: Positive and Negative Symptoms Scale (PANSS), Brief Negative Symptoms Scale (BNSS), Psychotic Symptom Rating Scales (PSYRATS), Emotion Regulation Questionnaire (ERQ), Functioning Assessment Short Test (FAST), Depression Anxiety and Stress Scale (DASS-21) and Five Facet Mindfulness Questionnaire: Short Form (FFMQ-SF).

Results: The only significant difference between groups was observed in the PSYRATS hallucination subscale, which favored the control group. Both groups showed significant reductions in BNSS and FAST scores. FFMQ scores showed a borderline statistical trend improvement in both groups, with data suggesting possible advantages for the experimental group with a larger sample size.

Discussion: Preliminary results suggest that MST-VR may not be effective in reducing symptoms or improving functioning in patients with schizophrenia. The observed improvements in both groups may be the result of ongoing treatments, including group psychosocial interventions. The improvement in hallucinations in the control group may be a random effect related to the small sample size. The intervention duration and intensity may be insufficient to demonstrate beneficial effects in chronic schizophrenia patients.

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From Research to Clinical Practice: Implementation of VR Relaxation in Ambulatory and Inpatient Mental Health Settings

Track: VR in Mental Health Settings

Bart Lestestuiver[1], Lisanne Robbemond[1], Mathijs Nijland[1], Chris Geraets[1], Catheleine van Driel[1], Wim Veling[1, 2]

[1] UMCG

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Introduction: Virtual reality relaxation can be a useful on demand tool in clinical practice. Research indicates that VR relaxation is feasible, effective, and acceptable for promoting stress reduction in psychiatric patients. However, knowledge on implementation is still limited. We aimed to investigate clinicians' perspectives on the use of VR relaxation and explore the use of a lending library system within a mental health center.

Methods: Three focus groups and three individual interviews were conducted among 15 psychologists and psychiatrist who had used the VRelax relaxation application for four weeks in the treatment of psychiatric patients. Thematic analyses were performed. Furthermore, VRelax was implemented at one site using a lending library system. Ambulatory and clinical patients were referred by their clinician or signed themselves in. The initial lending period was two weeks. At the end of the two-week period, use was evaluated. Based on evaluation, patients were given the option to extend the use.

Results: The clinician focus groups and interviews revealed the broad applicability of VRelax as a facilitator. Identified barriers included the need for evidence-based guidelines for use and logistical challenges. Three themes were identified both as a facilitator and a barrier namely: technical considerations, patient characteristics influence indication for use, and clinicians confidence of use. Furthermore, learning points based on 3 years of use using the lending library system will be discussed.

Discussion: To enhance implementation it is crucial to gather more practical knowledge about effective use of VRelax and to optimize the logistical process. One way to overcome the logistics is the use of a lending library system which can also reduce load for clinicians. While VRelax is generally well-received, its availability and the variability in individual experiences highlight areas for further improvement and research.

Poster

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Data-Driven Identification of Areas of Interest in VR Eye Tracking

Track: Technological Aspects of VR

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Introduction: A data-driven approach is proposed to automatically detect and construct areas of interest (AOI) for eye tracking data in 360° virtual reality (VR). An Area of Interest (AOI) is a specific region in a virtual scene created by researchers to study visual attention. Traditional methods rely on hand-crafted AOIs or computationally expensive algorithms, which have rarely been explored or adapted for VR environments. We propose a novel, data-driven approach that defines AOIs through clustering, offering adjustable granularity for different research aims.

Methods: Eye tracking data was recorded in a VR environment from healthy controls and individuals with social anxiety. Participants were exposed to a job interview and a social interaction scenario. The original study employed manually defined AOIs. In this new approach, two clustering methods were applied to produce data-driven AOIs: agglomerative and mean shift clustering. Each participant's fixations were first clustered independently. The centers of the initial clusters were pooled and clustered again to create "super-cluster centers." Each fixation was reassigned to the nearest super-cluster, forming the final AOIs. The level of granularity was controlled by tuning the distance threshold for agglomerative clustering or the bandwidth for mean shift, with within-cluster sum of squares used to assess cluster structure. The resulting super clusters were compared with the handcrafted AOIs based on their positional overlap.

Results: The proposed method generates AOIs that closely align with manually defined ones, suggesting that it can effectively address the same research questions. Importantly, several additional AOIs emerged, suggesting potential regions of interest not captured by the hand-labeled approach.

Discussion: The proposed clustering framework enables adaptive AOI detection in VR settings and aligns well with established AOIs, suggesting that it can support similar research objectives.

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The Impact of Immersive 3D VR Environments Combined with Background Music on Anxiety Symptoms among Undergraduate Students at DAK University

Track: VR in Mental Health Settings

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Introduction: Anxiety can greatly affect our ability to live balanced, productive lives. New approaches like Virtual Reality (VR) and Music Therapy (MT) are showing real promise in helping reduce anxiety. This study explores how combining immersive 360-degree VR environments with background music can help alleviate anxiety symptoms among Palestinian undergraduate students. The main question of the research is: "How effective is the combination of immersive 3D VR environments and background music in reducing anxiety symptoms?" Additionally, it also examines how visual and auditory elements like water sounds, natural lighting, and greenery impact anxiety levels (*Figure 2*).

Methods: To test this, 60 students from Dar Al Kalima University are participating in a two-day study. They will experience four distinct VR environments (*Figure 2*), with baseline anxiety levels serving as a control. Each session lasts 6-minutes, with simultaneous music that was carefully composed for therapeutic purposes based on prior research . Anxiety levels are assessed using the State Anxiety Inventory (SAI) before and after the sessions, and participants provide qualitative feedback (*Figure 1*). A pilot study involving 13 students tested the intervention with two VR environments over one session.

Results: The pilot study showed promising results. Mean anxiety levels dropped significantly after the intervention, as revealed by a paired-samples t-test ($P<0.001$). This is clear in Figure 3, which shows how mean anxiety levels decreased (pre- and post-intervention measurements). These early results suggest that combining VR and music can be a powerful way to reduce acute anxiety.

Discussion: Pilot findings suggest that combining immersive 3D VR environments with background music can substantially alleviate anxiety symptoms. Participants exhibited decreases in anxiety levels following exposure, aligning with studies demonstrating VR's effectiveness. The ongoing main study will provide a more comprehensive evaluation of the intervention's impact.

Poster

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Virtual Reality (VR) for Neurodegenerative Disorders: Key Findings and Future Directions

Track: VR in Mental Health Settings

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Introduction: VR is emerging as a non-pharmacological tool in healthcare with significant potential for addressing Behavioural and Psychological Symptoms of Dementia (BPSD) in neurodegenerative diseases. The presentation is intended to summarize findings from four studies exploring VR applications and their role in enhancing patient-centered care for neurodegenerative disorders. The first study evaluated customized VR scenarios for Patients with Dementia, demonstrating high engagement, relaxation, and positive reminiscence effects. Minimal discomfort was noted, though improvements in wearability and usability are needed. The second study examined how customized VR scenes help manage BPSD by reducing agitation and promoting emotional well-being. In the third study, we explored VR-based Reminiscence Therapy for individuals with Parkinson 's-related Mild Cognitive Impairment, integrating AI-generated visuals to foster emotional engagement and improve psychological well-being. The fourth study assessed the integration of VR and digital tools within clinical settings, identifying usability, challenges, and ethical considerations based on results from focus groups deployed with stakeholders working in diverse healthcare facilities.

Methods: Participants included 23 dementia patients (study 1), 20 inpatients with cognitive impairment (study 2), 20 outpatients with Parkinson 's-related mild cognitive impairment (study 3), and 10 healthcare staff members (study 4). Data collection relied on self-reports, observational tools, and focus groups with patients and healthcare professionals.

Results: The first study showed high feasibility and acceptability. VR enables the creation of personalized environments beyond real-world constraints. During the oral presentation, preliminary findings from ongoing studies will be discussed.

Discussion: VR shows promising potential to improve BPSD. Future research will focus on expanding AI-driven customization and conducting large-scale trials to establish evidence-based practices.

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Posters, June 12th, 2025

Poster

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Non-Invasive Physiological Measures in Virtual Reality Stress Interventions: A Systematic Review

Track: VR in Mental Health Settings

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Introduction: Non-invasive physiological markers (e.g. heart rate variability, blood pressure) are increasingly being used for monitoring and evaluation of progress of individuals undergoing VR interventions aimed at stress management. However, several challenges arise when employing these markers to assess the impact of VR interventions on stress.

Methods: This systematic review examines the use of physiological markers in VR stress interventions across different contexts, study designs using physiological markers for effectiveness, marker usage, measurement setups, trends in interpreting data for stress recovery, and meanings assigned to marker changes.

Results: Among the 69 included studies, most used nature-based VR experiences and referenced the Attentional Restoration Theory (ART) and Stress Reduction Theory (SRT). The Trier Social Stress Test (TSST) was the most common stress induction method. However, many studies lacked theoretical grounding, had small sample sizes, and provided only a single VR session. Physiological markers varied, with HR, HRV (RMSSD, SDNN, LF, HF) and blood pressure being most common.

Discussion: This review indicates that 77% of studies using HR found that VR interventions reduced HR, suggesting a calming physiological effect. However, methodological inconsistencies remain. Future research should prioritize ambulant measurements to improve real-world applicability and assess long-term effects. Standardizing marker selection and measurement protocols will enhance comparability across studies, strengthening evidence on VR's potential for stress management.

Poster

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A Paradigm Shift in Psychological Support through Virtual and Real Interactions

Track: VR in Mental Health Settings

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Introduction: An innovative psychological support paradigm within the Metaverse is explored, proposing mental health care as a four-way relational system that integrates real and virtual counterparts of both the patient and the psychologist. Grounded in the fundamental principles of attachment theory and the Active Inference framework, this relational care model incorporates essential aspects of relational, mental, and organic human functioning.

Methods: A critical narrative review of the literature was conducted, examining over 150 sources spanning attachment theory, Active Inference, psychotherapy, virtual reality, AI-driven interventions, and digital mental health innovations. Sources were selected through structured searches in databases such as PubMed, PsycINFO, Scopus, and Google Scholar.

Results: As a result of the critical review of traditional psychotherapeutic techniques and emerging technologies, the study proposes a Metaverse-based model as an evolution of current mental health support frameworks. This model is defined by the interaction between the real psychologist (R-Ψ), the real patient (R-p), the virtual psychologist (V-Ψ), and the virtual patient (V-p), forming an integrated system where real and virtual entities collaborate to enhance wellbeing. Advantages and limitations of the model are explored.

Discussion: By integrating real and virtual therapeutic agents within an adaptive, data-driven mental health system, the model represents a paradigm shift in mental health, bridging the gap between conventional therapeutic settings and the emerging possibilities offered by AI and VE. Future research will focus on validating this model, exploring its efficacy, ethical considerations, and practical integration into contemporary clinical practice.

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Virtual Reality Aggression Prevention Training: Feasibility Study of a New Module focused on Arousal Regulation

Track: VR in Forensic Settings

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[3] Erasmus MC, Department of Psychiatry

Introduction: Aggression in forensic psychiatry is common. One of the factors that affect human behavioral responses, and more specifically aggressive behavior, is arousal. Arousal refers to the body's adaptive responses to environmental stimuli, altering physiological states to facilitate the recognition and regulation of emotions. Problems with emotion regulation or appraisal of arousal can result in problematic, often aggressive responses. Reducing aggressive behavior necessitates a different appraisal of situations or social interactions as well as more an adequate regulation of arousal. Our new virtual reality aggression prevention training is specifically focused on arousal regulation.

Methods: The study's main objective is to explore the feasibility, appropriateness and acceptability of a newly developed virtual reality aggression prevention training, focused specifically on arousal, among forensic psychiatric inpatients and forensic healthcare practitioners. A mixed methods data collection is currently in progress, consisting of two separate phases. During the first phase, multiple focus groups were consulted during the initial development process of the training. During the second phase, a pilot intervention study is carried out within Fivoor's 'De Kijvelanden' forensic psychiatric centre. Six to ten patients currently receive the newest version of the training. During the intervention and afterwards, all participants share their experiences during the training in interviews and questionnaires. Additionally, a wearable measuring variables related to arousal is used during the training to evaluate its added value for our VR-assisted arousal intervention.

Results: The second phase of our feasability study is in advanced progress. During the proposed presentation, qualitative data of phase one as well as qualitative and quantitative data of phase two will be provided and discussed.

Discussion: All results will be discussed within the context of existing virtual reality aggression prevention interventions.

Poster

Exploring the Effects of Sociodemographic and Clinical Factors on VR Aggression Treatment

Track: VR in Forensic Settings

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Introduction: Violent behavior is a significant issue in forensic populations. As a result, efforts have been made to enhance the effectiveness of aggression treatment, including the integration of virtual reality (VR). However, limited research has explored the *"what works for whom"* principle, which could provide valuable insights into the specific characteristics of violent offenders that predict treatment outcomes. Understanding these factors could potentially help tailor interventions, identify patients most likely to benefit and improve treatment responsiveness.

Methods: Data from a previous randomized controlled trial, investigating the effectiveness of a VR aggression prevention training (VRAPT) was used in this study. First, linear regression analysis was conducted to evaluate treatment effects. Second, individual differences were examined. Finally, a moderation analysis was performed to evaluate whether sociodemographic and clinical variables moderated the effects of VRAPT compared to the control group in reducing aggression and hostility.

Results: The overall means of self-reported aggression and hostility decreased in both the VRAPT and control group. However, regression analyses revealed a significant effect only for hostility between pre- and post-treatment (B = 2.58, p = .03), favoring VRAPT. Individual differences showed that, in general, participants in both groups experienced a reduction in the primary outcome measure (AQ), though only a minority showed a reliable change. No significant moderation effects were found for the sociodemographic or clinical variables.

Discussion: We hypothesized that certain subgroups would benefit from VRAPT. However, no specific predictors were identified. Although several forensic inpatients showed improvement during the trial, we found no evidence that certain groups were more likely to benefit in aggression outcomes from VRAPT compared to treatment as usual. This suggests that multiple factors may contribute to therapeutic outcomes.

Symposium

Virtual Reality-based Cognitive Training in Mental Health (three abstracts[a])

Track: VR in Mental Health Settings

Johannes Andresen[1, 2]
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[2] Department of Psychology, University of Copenhagen, Denmark.

Introduction: Many psychiatric conditions – including mood disorders, autism spectrum conditions, and psychosis – involve significant neurocognitive and social cognitive deficits, severely impacting psychosocial functioning and quality of life. These deficits include difficulties with attention, memory, executive function, and social cognition, such as interpreting emotions and understanding social cues. As these challenges are not adequately addressed by pharmacological or standard psychotherapeutic interventions, cognitive training and remediation programmes have been developed to enhance cognitive and social functioning.

Methods: Traditional cognitive training, often computer-based or therapist-guided using pen-and-paper exercises, has shown some effectiveness, particularly in schizophrenia. However, improvements tend to be small to moderate, with limited transfer to real-world functioning. In response to these challenges, virtual reality (VR) has emerged as a promising tool for cognitive training in mental health. VR provides immersive and interactive environments that simulate real-life social and cognitive tasks, offering individuals a safe and engaging space to practise and develop skills.

Results: Recent studies have shown that VR-based cognitive training can enhance social skills in autism, improve executive function in mood disorders, and have demonstrated both cognitive and social benefits in psychotic disorders. Compared to traditional interventions, VR appears to increase engagement and may facilitate better generalisation of acquired skills into daily life. Feasibility studies indicate that VR interventions are generally well tolerated, with high user acceptability.

Discussion: While VR-based cognitive training holds significant potential for improving cognitive and social functioning and enhancing real-world outcomes, large-scale, rigorous randomised trials are still needed to fully establish its effectiveness, long-term efficacy, and clinical applicability.

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[a]Using Virtual Reality to Enhance Socio-emotional Cognition in Mood Disorders: Design of a Randomized Controlled Trial

Track: VR in Mental Health Settings

Astrid Endrup Iversen[1, 2], Marie Louise Reinholdt-Dunne[3], Johannes Sivesgaard[4], Gitte Moos Knudsen[5, 6], Maj Vinberg[7], Lars Vedel Kessing[6, 8], Kamilla Woznica Miskowiak[1, 2], Hanne Lie Kjærstad[1]

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[7] The Early Multimodular Prevention and Intervention Research Institution (EMPIRI), Mental Health Centre, Northern Zealand, Mental Health Services, Copenhagen, Denmark

[8] Copenhagen Affective Disorder Research Centre (CADIC), Psychiatric Centre Copenhagen, Frederiksberg Hospital, Copenhagen, Denmark

Introduction: Socio-emotional cognitive (SC) impairments, including difficulties with emotion recognition and regulation, are common in individuals with mood disorders and are associated with poorer illness course. This randomized controlled trial will investigate the effects of intensive socio-emotional cognitive training using virtual reality (VR) on SC abilities and associated changes in neural activity in individuals with mood disorders and unaffected first-degree relatives (UR).

Methods: A total of 150 individuals with mood disorders (bipolar disorder and major depressive disorder) and UR will be recruited, including 100 with SC impairments and 50 with intact SC. Participants with SC impairments will be randomized to either eight weeks of SC training or treatment as usual, while participants with intact SC will serve as baseline comparison. The intervention consists of immersive VR scenarios with 360-degree videos featuring real actors, allowing participants to practice emotion regulation strategies in realistic social situations. Assessments, including neuropsychological tests, mood ratings, questionnaires, and functional magnetic resonance imaging (fMRI), will be conducted at baseline and post-treatment.

Results: Preliminary findings from our pilot study (N=5) indicate significant improvements in SC following emotion regulation training in VR, demonstrating the feasibility of using VR for SC training. In the trial, the primary outcome will be a composite SC score encompassing emotion regulation and facial expression recognition. The secondary outcome examines treatment-related changes in dorsal prefrontal cortex activity. Exploratory analyses will evaluate the long-term effects on illness course.

Discussion: The results will provide insights into whether SC training has beneficial effects on SC abilities and illness prognosis in individuals with mood disorders and UR. The findings may also provide evidence for a brain-based biomarker of pro-cognitive effect.

Symposium

[a]Design and Preliminary Feasibility of STEPS: A Randomised Clinical Trial on Virtual Reality-based Social Cognitive Training for Autistic Adults

Track: VR in Mental Health Settings

Johannes Andresen[1, 2]
Alberte Cathrine Ehrhardt Jeppesen[1, 2], Anne Sofie Due[1], Lise Sandvig Mariegaard[1], Rizwan Parvaiz[3], Carsten Hjorthøj[4, 5], Amy Elizabeth Pinkham[6], Merete Nordentoft[4, 7], Cathriona Cantio[8], Jens Richard Møllegaard Jepsen[9, 10], Louise Birkedal Glenthøj[1, 2]
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[10] Centre for Neuropsychiatric Schizophrenia Research & Centre for Clinical Intervention and Neuropsychiatric Schizophrenia Research, Mental Health Centre Glostrup, Copenhagen University Hospital, Mental Health Services CPH, Denmark.

Introduction: Autistic adults (AA) constitute a growing yet largely overlooked population with limited clinical and research resources. Social cognitive impairments significantly impact social interactions, education, employment, and quality of life in this population. Interventions targeting social cognition in AA have shown promising results. Recent studies on virtual reality (VR)-based interventions provide preliminary evidence supporting the feasibility and effectiveness of using this technology. These studies indicate that VR interventions can enhance psychosocial functioning and improve specific neurocognitive and social cognitive functions. However, large-scale, randomised clinical trials are urgently needed to fully assess the effectiveness of VR-based interventions for AA.

Methods: STEPS is a randomised, assessor-blinded, parallel-group superiority trial. A total of 140 participants will be allocated to receive either VR-based social cognitive training (VRSCT) plus treatment as usual (TAU) or TAU alone. The experimental group will receive 12 weekly, one-hour VRSCT sessions aimed at improving psychosocial functioning and social cognition through exposure to virtual social environments. Core training modules include Emotions, Social Understanding, and Complex Social Interactions. Assessments occur at baseline, at the end of the intervention (3 months post-baseline), and at 6 months post-baseline.

Results: Recruitment began in May 2024, with completion expected by January 2026. Preliminary feasibility and acceptability data, including completion rates and qualitative participant feedback, will be presented at the conference. Data analysis is planned for summer 2026, with results expected by autumn 2026.

Discussion: STEPS is the largest randomised clinical trial globally investigating the effect of VRSCT for

AA. The results may significantly advance the field of autism research and potentially improve interventions for social cognitive impairments in AA.

[a]Virtual Reality-based Cognitive Remediation in Mood and Psychosis Spectrum Disorders: Results from a Randomized, Controlled, Double-blind Trial

Track: VR in Mental Health Settings

Andreas Elleby Jespersen[1, 2]
Anders Lumbye[3], Maj Vinberg[4, 5], Louise Birkedal Glenthøj[2, 6], Merete Nordentoft[4, 7], Caroline Fussing Bruun[8], Cecilie Von Bülow[9], Guido Makransky[2], Eva Ejlersen Wæhrens[9, 10], Kamilla Woznica Miskowiak[1, 2]
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[10] Occupational Science, User Perspectives and Community-based Interventions, Department of Public Health, University of Southern Denmark, Odense, Denmark.

Introduction: There is a need for cognitive training programs that more closely mimic real-world situations to enhance the transfer effects of cognitive improvements to daily life functioning. The current randomized, controlled, double-blinded trial assessed the effectiveness of a novel, intensive, four-week virtual reality-based cognitive remediation therapy (VR-CRT) compared to an active VR control treatment on cognitive and functional outcomes in individuals with mood or psychosis spectrum disorders.

Methods: Symptomatically stable patients were randomized to either four weeks of VR-CRT or VR control treatment. Assessments were conducted at baseline, upon treatment completion and at a three-month follow-up. The primary outcome was a composite score on an ecologically valid VR test of daily life cognitive skills. Co-secondary outcomes included activities of daily living (ADL) ability and neuropsychological verbal learning/memory performance. Tertiary cognitive and functional measures were also explored. Linear mixed models were used to analyse treatment effects.

Results: A total of 62 participants were randomized (VR-CRT: *n*=31, VR control: *n*=31), and all participants with baseline assessments were included in the analysis. Of those participants who commenced VR-CRT, 93% completed per protocol. At treatment completion, VR-CRT vs. control had a significant large effect on the primary VR-based cognitive composite outcome, which prevailed at follow-up. VR-CRT vs. control also had significant effects on ADL process ability and verbal learning/memory post-treatment, which prevailed at follow-up for verbal learning/memory. Across

tertiary outcomes, durable treatment effects were observed for global neuropsychological performance and interview-based functioning.

Discussion: VR-CRT showed moderate-to-large effects on cognitive and functional outcomes, highlighting the clinical relevance of this intervention in individuals with mood or psychosis spectrum disorders

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VR-Based Eye-Tracking for Psychiatric Assessment and Machine Learning-Driven Analysis (three abstracts[b])

Track: VR in Mental Health Settings

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[2] Department of Psychology, University of Copenhagen, Denmark

Introduction: Virtual reality (VR) integrated with eye-tracking presents a novel methodology for investigating psychiatric conditions, offering increased ecological validity and experimental control for assessing visual attention patterns. This symposium explores the use of VR-based eye-tracking in psychiatric research, focusing on its potential for early detection and objective assessment of conditions such as Social Anxiety Disorder (SAD) and Autism Spectrum Condition (ASC). Furthermore, we highlight the role of data-driven analysis, including machine learning (ML), in extracting meaningful behavioral markers from eye-tracking data.

Methods: The presented studies investigate gaze behaviour in SAD and ASC utilizing VR-based paradigms, evaluating fixation patterns, attentional allocation, and avoidant behaviours in immersive social scenarios.

Results: By applying ML techniques to enhance classification and visualization of gaze data, subtle attentional biases may be revealed, with the potential to serve as diagnostic indicators. Findings have the potential to support how VR-based eye-tracking may distinguish between clinical and healthy/neurotypical populations as well as offering insights into visual social attention mechanisms across psychiatric conditions.

Discussion: Together, these studies explore the potential of VR-based eye-tracking as an objective assessment tool. By combining gaze behaviour with data-driven analyses, this symposium examines its potential for supplementing current psychiatric assessment methods and informing more targeted intervention strategies.

Parallel sessions 1, June 12th, 2025, 11.30 – 12.30

[b]iSCAN: Visual Attention Patterns in Social Anxiety Disorder across Various Socio-Evaluative Tasks: Findings from a Virtual Reality Eye-Tracking Study

Track: VR in Mental Health Settings

Fatime Zeka[1, 2],Merete Nordentoft[3], Teresa Hirzle[4], Ingrid Jakobi Wolff Madsen[5], Benjamin Arnfred[1], Mette Øllgaard Pedersen[6], Dan Witzner Hansen[5], Louise Birkedal Glenthøj[1, 2]

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Introduction: Social Anxiety Disorder (SAD) is a debilitating condition with high lifetime prevalence, early onset, and comorbidities, highlighting the need for innovative early detection. Virtual Reality (VR) simulates real-life environments, providing high experimental control and ecological validity, while eye-tracking offers objective measurement of eye movements. Combining these technologies is a promising tool for investigating visual attention as a behavioral marker for SAD. The iSCAN project aims to identify visual attention patterns in SAD using a VR eye-tracking paradigm.

Methods: A cross-sectional design was used with SAD participants and a matched healthy control group (HCG). Participants viewed VR stimuli of three social-evaluative tasks: a job interview, an unstructured social interaction, and a presentation task with negative evaluation threat. Eye movements, tracked via the VR headset's integrated eye tracker, included fixation-based metrics (e.g., total fixation duration) and spatial eye movement data (e.g., mean distance between fixations), analyzed across social (faces, bodies) and nonsocial (environment) areas.

Results: Sixty participants (30 SAD, 30 HCG) were included, with a mean age of 29 years, 63% female. Compared to HCG, SAD participants demonstrated avoidant behavior, fixating significantly less on faces and more on the environment, suggesting selective avoidance of faces in two of three tasks. No differences were found for the body area. The SAD group exhibited a longer mean distance between fixations across all tasks, consistent with a hyperscanning strategy.

Discussion: This paradigm differentiated individuals with SAD from HCG through eye-tracking metrics, showing that VR eye-tracking is a suitable tool for assessing visual attention patterns in SAD. These findings provide foundational knowledge for developing more effective assessment tools and therapeutic interventions targeting early detection and intervention improvement of SAD.

[b]The EYEdentify Project: Examining Gaze Behaviour among Autistic Adults using a VR-Based Paradigm

Track: VR in Mental Health Settings

Alberte Cathrine Ehrhardt Jeppesen[1, 2]
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Introduction: Atypical gaze behaviour is a frequently occurring clinical feature among individuals with autism spectrum condition (ASC), and may serve as a behavioural marker for this population. Eye-tracking provides an objective method for assessing visual social attention. Integrating eye-tracking within virtual reality-based environments presents a novel approach for measuring gaze behaviour in immersive environments, with increased ecological validity and precision. This study aims to investigate whether VR-based eye information can reveal group differences between autistic adults and a neurotypical control group in simulated social scenarios.

Methods: This study employs a case-control design, including 140 autistic adults and a matched control group of 50 neurotypical individuals. Participants are presented with 6 computer-generated social scenarios with increasing degrees of social complexity and non-social distractors. Eye-information is recorded using eye-tracking technology integrated into the Varjo Aero head-mounted display. Between group analyses examine fixation-based metrics, including number of fixations, mean fixation time, and dwell time on predetermined Areas of Interest (AOIs). AOIs comprise social stimui, including eyes, mouth, forehead, between eyes, nose and body of avatars, as well as non-social areas, including shopping windows and an ambulance.

Results: The study is currently in progress, with ongoing data collection. This presentation will explore the use of VR-based eye-tracking as an assessment tool, situating it within the broader context of existing eye-tracking measures in autism research.

Discussion: Findings have the potential to advance current understanding of visual social attention in ASC, and may support further research into VR-based eye-tracking to supplement existing clinical assessment methods.

[b]Exploring Visual Attention Patterns in Social Anxiety Disorder Leveraging Virtual Reality Eye-Tracking and Machine Learning for Gaze-Based Assessment

Track: VR in Mental Health Settings

Ingrid Jakobi Wolff Madsen[1], Fatime Zeka[2, 3], Merete Nordentoft[4], Louise Birkedal Glenthøj[2, 3], Dan Witzner Hansen[1]

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Introduction: Social Anxiety Disorder (SAD) is a prevalent psychiatric condition that varies in severity, impacting both social interactions and daily functioning. Early intervention can help mitigate its effects, highlighting the need for reliable tools to detect its initial stages. Combining eye tracking and machine learning (ML) in a virtual reality (VR) setting provides a platform for precise experimental control while reliably measuring attention and aversion behaviors that often go unnoticed in conventional SAD diagnostics. ML further enhances data analysis by enabling more complex models and data visualization techniques to identify attention characteristic of SAD. This paper utilizes ML based methods to support analysis of gaze data collected in a social-evaluative task. It extends beyond traditional statistical analysis to enhance understanding of the gaze patterns for early diagnosis and intervention.

Method: Participants from SAD and control group (HCG) were exposed to a social-evaluative task-an unstructured social interaction, in VR. The integrated eye tracker in the VR headset continuously records gaze data, with three predefined Areas of Interest (AOI) representing social and non-social areas of the environment. Fixation and saccade metrics were extracted and analyzed. Specific linear and non-linear ML classification and visualization methods were selected for their suitability in analyzing smaller datasets where large-scale ML techniques are not appropriate.

Results: The application of ML classification techniques allows for automated data-driven gaze behavior analysis, improving the detection of subtle characteristics associated with SAD. The study is currently ongoing, but preliminary analyses suggest that gaze behavior metrics can serve as meaningful indicators for group separation.

Discussion: These findings indicates that the combination of VR, eye-tracking and ML could be a valuable step towards developing effective screening tools for SAD.

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Virtual Reality Interventions to Promote Mental Health in Children and Families: Innovations Across Developmental Stages (three abstracts[c])

Track: VR for Children and Youth

Pia Enebrink[1], Livia van Leuven[1], Camilla Söderberg[2]
[1] Department of Clinical Neuroscience, Karolinska Institutet, Sweden
[2] Psykologpartners, Sweden

Introduction: Advancements in virtual reality (VR) are creating new opportunities to enhance psychological interventions for children and families by enabling realistic simulations of scenarios that are otherwise difficult to replicate in therapy.

Methods: This symposium showcases three innovative VR-based approaches designed to support mental health across key developmental stages, focusing on the prevention and treatment of externalizing and internalizing difficulties.

Results: The first presentation introduces the development and pilot testing of a VR intervention for expectant and new parents aimed at fostering emotional readiness and reduce fear of giving birth. The second describes how VR will be incorporated in a clinical trial of parent treatment for children with behavioral challenges. This format enables parents to practice essential parenting skills in immersive, simulated parent-child scenarios. The third presentation describes two separate pilot studies of VR-based cognitive behavioral therapy (CBT) programs for children with externalizing behaviors and their parents, respectively. The CBT-interventions use skill-building in role-plays and immersive VR to enhance emotional regulation, child/parenting skills, and treatment engagement.

Discussion: Collectively, these projects demonstrate how VR can be meaningfully integrated into evidence-based practices to strengthen parent-child relationships, improve motivation, and broaden access to effective mental health interventions. We address practical considerations for implementing VR in clinical settings, emphasizing the balance between technological capability and scalability.

Parallel sessions 3, June 13th, 2025, 13.00 – 14.00

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[c]Can Virtual Reality Birth Simulations Support Emotional Readiness in First-Time Mothers and Improve Access to Perinatal Mental Health Support?

Track: VR for Children and Youth

Camilla Söderberg[1]
[1]Psykologpartners

Introduction: This presentation outlines the development of a VR-based childbirth preparation film, designed to simulate a real vaginal hospital birth from the birthing woman's perspective.

Methods: The film aims to increase emotional readiness and reduce fear by providing realistic, first-person exposure to the birthing process. The initiative was taken by a midwife who experienced a lack of interventions to support women suffering of fear of childbirth. Traditional childbirth preparation usually relies on verbal and written information, and experienced-based preparation is difficult to achieve. Virtual reality can enable an immersive, sensory-rich experience that helps users mentally rehearse birth, anticipate emotions, and build clearer expectations. This supports experiential learning by offering direct, reflective, and emotionally engaging preparation.

Results: The intervention was piloted with first-time pregnant women and showed high acceptability and indications of increased preparedness. Beyond these initial findings, the project continues to explore how VR can be integrated into stepped care models, both as preventive support and as a component in treatment for childbirth fear.

[c]Can Video Modelling and Skill Training Help Parents Learn More Quickly? Parent-Child Interaction Therapy with Virtual Reality

Track: VR for Children and Youth

Livia van Leuven[1]

[1] Department of Clinical Neuroscience, Karolinska Institutet, Sweden

Parent training programs that focus on enhancing parent-child interaction skills are strongly evidence-based for reducing externalizing behavior problems in children. Parent-Child Interaction Therapy (PCIT) is one of the most effective and well-supported such treatments. However, the standard PCIT program often requires over 20 sessions, and many parents discontinue treatment prematurely.

To improve efficiency and engagement, this project integrates scalable virtual reality (VR) technology (360-degree videos) into PCIT as a tool for skill rehearsal and behavioral modelling. This project explores whether VR can help parents acquire parenting skills more quickly within a shorter treatment format. Using a single-case experimental design, children with behavior problems and their parents will participate.

To date, we have developed VR video modules and trained clinicians. This presentation will demonstrate how the technology is applied, share insights from the development process, and report initial experiences.

[c]Virtual Reality–Based CBT Interventions for Children with Externalizing problems and their Parents: Development and Implementation Experiences

Pia Enebrink[1]

[1] Department of Clinical Neuroscience, Karolinska Institutet, Sweden

Parent training programs and child CBT are recommended treatments for intervening with externalizing problems. However, not all families are helped by these interventions, and it is sometimes difficult to engage children in treatment. To overcome these challenges, we piloted two new interventions including VR as a way for improved engagement and learning. This presentation describes an early evaluation of a CBT-VR program for children aged 10–16 with anger and emotion regulation difficulties, the YourSkills program (Alsem et al, 2023) and the development and piloting of a new VR-based CBT-parent training program for parents of children aged 8–16 with externalizing behaviors. The child-focused intervention uses immersive scenarios to facilitate skills practice, while the parent program focuses on coaching parental emotion-regulation and parenting skills through roleplays and behavioral rehearsal partly in VR. Initial clinical impressions and implementation data will be presented.

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The Use of Virtual Reality to Assess and Improve Mental Health in Children and Adolescents (four abstracts[d])

Track: VR for Children and Youth

Catharina Bergwerff[1]

[1] Institute of Education and Child Studies, Leiden University, Leiden, The Netherlands

Text: Virtual Reality (VR) technology has evolved to contribute to mental health assessment and intervention, particularly in adults. As a recent scoping review shows, VR applications are increasingly being used in assessment and treatment in mental health care settings for children and adolescents as well (Krupljanin et al., in preparation). This symposium presents four studies highlighting the promising applications of VR for juveniles in mental healthcare. The studies explore VR's potential to assess aggression between siblings aged 8 to 15 years old (abstract 1) and aggressive behaviour in juveniles aged 15 to 23 years old, residing at a juvenile detention centre (abstract 2). Furthermore, these studies show some insights into the added value of a short-term VR shame intervention for adolescents suffering from PTSD after having experienced sexual abuse (abstract 3) and of VR supported coaching to improve future time perspective in adolescents and young adults (abstract 4). This symposium aims to provide the audience with comprehensive insights into how VR can be used to improve mental health care for the next generation.

Parallel sessions 1, June 12th, 2025, 11.30 – 12.30

Symposium

[d]Virtual Reality as a Window into Sibling Aggression.

Track: VR for Children and Youth

Sheila van Berkel[1], Andrea Haccou[1], Catharina Bergwerff[1]

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Text: Introduction: Sibling aggression is the most common form of domestic violence, which can have a negative impact on both child and adolescent mental health. The hand full of studies thus far that investigated aggression between siblings, assessed aggression primarily through self- or parent-report, with the limitation of reporter bias. The current study examined whether an interactive Virtual Reality (VR) experiment can provide an ecologically valid assessment of adolescents' aggressive responses towards their sibling. Additionally, we examined associations of known risk factors for sibling aggression with the aggression observed in the VR-experiment.

Methods: Pairs of young adolescents and one of their siblings (*N*=26; aged 8-15 years) were invited to the lab to complete several questionnaires and participate in a custom-made interactive VR experiment. In the VR experiment, participants interacted with their virtual sibling both verbally and physically. Participants' responses to the virtual sibling's behaviour, designed to provoke anger and aggression, were observed during two different VR scenarios.

Results: Results showed that observed aggression as measured in the VR experiment was related to self-reported aggression, but not to parent- or sibling-reported aggression. Individual factors (e.g. behavioural problems) or sibling factors (e.g. age difference between siblings) were not related to observed aggression. Of the investigated family factors, only the perceived quality of the father-child relationship was associated with observed aggression.

Discussion: Despite the limited alignment with parent- and sibling-reported aggression, these findings highlight the potential of VR-based assessments to complement self-report methods, emphasizing the need for a multimethod approach to capture the complexities of sibling aggression.

[d]Come As You Are – Interactive Virtual Reality Assessment in Forensic Youth Care.

Track: VR for Children and Youth

Jet Westerveld[1], Jessica Asscher[2], **Hanneke Creemers**[1]

[1] University of Amsterdam. Forensic Child and Youth Care Sciences, Amsterdam, the Netherlands.

[2] Utrecht University. Child and Adolescent Studies, Utrecht, the Netherlands.

Introduction: To improve assessment in forensic youth care, a virtual reality (VR) task was developed to assess behaviour without the limitations associated with traditional self-report instruments. The aim of the current study is to examine the potential of this task to assess aggression and its origins, with a focus on hostile intent attribution and low self-control, and to predict violent infractions in a juvenile detention facility.

Methods: Participants were juveniles (N = 84; aged 15-23 years old) residing at two all-boys juvenile detention centres in the Netherlands. Responses to four social VR scenarios were observed and, to assess the role of hostile intent attribution (HIA) and low self-control in aggressive responses in these scenarios, questions were asked. In addition, self-report questionnaires were used to assess aggression, HIA and self-control. Two months after participation, violent institutional infractions were retrieved from casefiles.

Results: Results showed that particularly the more provocative and emotionally engaging scenarios have the potential to elicit aggressive responses. Overall, VR responses and self-report questionnaires showed little convergence, which could not be explained by social desirability nor VR engagement and immersion. Violent institutional infractions were predicted by reactive aggression and low self-control in one of the four scenarios.

Discussion: Concluding, despite little convergence between VR and self-report questionnaires, VR assessment provides potential important information about future violence, which makes it worthwhile to further experiment with and study VR assessment in forensic youth care.

[d]The Effectiveness of a Virtual Reality Intervention on Trauma-related Shame in Sexually Abused Adolescents: A Single-Case Experimental Study.

Track: VR for Children and Youth

Nina Krupljanin[1], Lenneke Alink[1], Anja van der Voort[1], Ramón Lindauer[2, 3], Catharina Bergwerff[1]

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[3] Levvel, Academic Centre for Child and Adolescent Psychiatry, Amsterdam, the Netherlands

Introduction: Suffering from Post-Traumatic Stress Disorder (PTSD) in childhood can have detrimental consequences. Individuals experiencing interpersonal trauma, such as sexual abuse, are at high-risk developing trauma-related shame, which in turn can impact the course and effectiveness of PTSD treatment. Social sharing and practicing self-compassion have been proposed to reduce the impact of that negative self-conscious emotion. These aspects get partially addressed in evidence-based trauma therapies, however, there appears to be a need for a more specific trauma-related shame intervention in addition to existing treatments. Virtual Reality (VR) is a promising tool for such an intervention. Findings suggest that including VR in a treatment results in high treatment satisfaction and that it is highly motivating for its users, which is a crucial component for treatment success. This study aims to test the effectiveness of a short-term VR shame intervention (SHINE-VR) for adolescents suffering from PTSD after having experienced sexual abuse.

Methods: The effectiveness will be assessed using a nonconcurrent multiple baseline single-case experimental design (SCED). The target group is adolescents aged 12 to 17 who have experienced sexual abuse. The primary objective of this study is to assess the effect of SHINE-VR on trauma-related shame, self-compassion, and PTSD symptom reduction. Secondly, we evaluate SHINE-VR by assessing treatment motivation and the feasibility of the intervention.

Results: Preliminary results will be presented as data are currently being collected. To this end, visual and complementary quantitative analyses will be conducted. Furthermore, lessons learnt from recruitment and data collection of this SCED study will be shared.

Discussion: This study aims to provide novel insights into the potential of a VR intervention for decreasing shame in adolescents suffering from PTSD.

[d]A Brighter Future for Young People: Exploring the Effectiveness of Future Oriented Coaching Supported by Virtual Reality.

Track: VR for Children and Youth

Catharina Bergwerff[1], Julia van Tongeren[1], Ineke van der Ham[2]

[1] Institute of Education and Child Studies, Leiden University, Leiden, The Netherlands

[2] Institute of Psychology, Leiden University, Leiden, The Netherlands

Introduction: Many young people struggle to visualize their future, which is thought to contribute to feelings of hopelessness, impulsive behaviour and difficulties in making decisions that are beneficial for their future. Recently, a novel mental health intervention was developed, consisting of future-oriented coaching supported by Virtual Reality (VR), called the 'Future Room®'. The Future Room® is designed to improve the future time perspective of adolescents and young adults by helping them to visualize their own future.

Methods: The study included 61 participants aged 16 to 26 years old, randomly assigned to either the Future Room® condition or to regular cognitive behavioural therapy (treatment as usual). Outcomes were assessed using a self-developed questionnaire and the Future Time Perspective Scale in pre- and post-tests. Moderators, such as hopelessness, self-confidence, and visualization skills, were measured using the Becks Hopelessness Scale, Rosenberg Self-Esteem Scale, and Vividness of Visual Imagery Questionnaire, respectively.

Results: Results showed that future time perspective increased in both conditions. Moreover, results indicated that the Future Room® was significantly more effective than treatment as usual in improving future time perspective, based on the self-developed questionnaire, but not on the Future Time Perspective Scale. Moderators, including age, self-confidence, visualization skills, and hopelessness, did not significantly affect the effectivity.

Discussion: This study contributes to understanding the potential of VR interventions in fostering future-oriented thinking, particularly in young individuals. By exploring the effectiveness of VR supported coaching in comparison to established therapeutic methods, the research offers insights into the integration of digital technologies in mental health interventions. This study supports the potential of the Future Room® to help young people make healthier decisions.

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Virtual Reality-Assisted Therapy (VRT) for Distressing Voices in Psychotic Disorders and Eating Disorders: Exploring User and Therapist Experiences (three abstracts[e])

Track: VR in Assessment and Treatment of Psychosis

Mads Juul Christensen[1, 2], Katrine Rasmussen[3], Nina Kappel Hansen[3, 4]

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Text: Virtual reality assisted therapy (VRT) for distressing voices is an adaptation of avatar therapy within the emerging field of relational therapies. VRT targets patterns of interaction and relational dynamics, aiming for therapeutic change through an experiential dialogue with the identity associated with the voice.

Originally developed to voices linked to psychotic disorders, the VRT approach has been adapted to other conditions where internal voices play a critical role, such as eating disorders. This symposium presents qualitative findings from studies exploring the experiences of both service users and therapists engaged in VRT.

Through in-depth accounts, we will examine the personal meanings ascribed, the professional observations made, and the perceived therapeutic potential of VR-assisted dialogue with distressing voices. By highlighting both the shared and unique features of VRT for distressing voices in psychosis and eating disorders, this symposium aims to advance our understanding of its broader applicability and potential for clinical implementation.

Parallel sessions 2, June 12th, 2025, 13.45 – 14.45

Symposium

[e]Virtual reality-assisted therapy for distressing voices in psychosis: A qualitative study of user and therapist experiences in the Challenge trial

Track: VR in Assessment and Treatment of Psychosis

Mads J. Christensen[1, 2]

Matilde Rydborg[1], Cecilie D. Nielsen[1], Rikke Jørgensen[1], Jan Mainz[1, 2, 3], Lisa C. Smith[4, 5], Lise S. Mariegaard[4], Merete Nordentoft[6], Thomas Ward[7, 8], Louise B. Glenthøj[4, 9], Ditte L. Vernal[1, 2]

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[9] Department of Psychology, University of Copenhagen.

Introduction: Hearing voices, or auditory verbal hallucinations, can manifest as a non-clinical phenomenon, across various disorders, and is particularly common and often distressing within the psychosis spectrum. Virtual reality-assisted therapy (VRT), used in the Challenge randomized controlled trial (RCT), enables immersive dialogue between individuals and an avatar representing their most distressing voice. While VRT and its UK counterpart, avatar therapy, demonstrate efficacy, qualitative research on participant and therapist experiences remains limited. This study examines these experiences to enhance VRT understanding and guide clinical implementation.

Methods: A topic guide, based on focus group discussions with service-users and clinicians, was used in the conductance of ten semi-structured interviews with VRT participants and interviews with eight VRT therapists from Challenge RCT. Selection criteria included recruitment site and voice-hearing duration to align with the RCT's sample distribution. All interviews were recorded, transcribed, analyzed by thematic analysis, and discussed in relation to implementation outcomes.

Results: A total of 2093 (participants: 1086, therapists: 1007) references were coded. Preliminary analysis suggests four themes: 1) A different approach to voices and treatment; 2) Using technology to meet the voice; 3) Limitations, obstacles, and adaptations; and 4) Changes, mechanisms, and prerequisites.

Discussion: Preliminary results indicate that VRT is generally acceptable, appropriate, and feasible. Most users found avatar interactions meaningful and beneficial. All participants reported positive but variable and not always quantifiable outcomes. Users struggled with anxiety and negative voice reactions, impacting their overall comfort. Feasibility challenges include access to therapist training

and supervision, given the novelty of the approach, as well as technical support, since technological issues were common and distressing.

[e]Experiences of Modified VR-Assisted AVATAR Therapy for Persistent Auditory, Verbal Hallucinations: A qualitative sub-study of the CHALLENGE trial

Track: VR in Assessment and Treatment of Psychosis

Katrine Rasmussen[1], Ditte Lammers Vernal[2, 3], Lise Sandvig Mariegaard[1], Gry Jørgensen[1], Fatime Zeka[1, 4], Lisa Charlotte Smith[1, 5], Merete Nordentoft[5, 6], Julie Midtgaard[5, 7], Louise Birkedal Glenthøj[1, 4]

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Introduction: Auditory, verbal hallucinations (voices) are a frequent symptom of schizophrenia spectrum disorders (SSD). Approximately one-third of patients with SSD exhibit insufficient response to antipsychotic medication and continue having psychotic symptoms. Virtual reality-assisted AVATAR therapy (VRT) targeting persistent, distressing voices has shown promising results, but the field is in its early stages. More research is warranted to identify the components which are important to simulate the experience of voices in virtual reality and effect therapy outcome. This qualitative sub-study to the CHALLENGE randomized clinical trial aimed to examine whether adaptions of VRT could optimize the therapeutic experience and its effectiveness.

Methods: We explored the experiences of participants (n=15) who received seven individual sessions of one of three modified VRT versions (VRT-Emotions, VRT-Environment, and VRT-Whiteboard). Upon cessation of therapy, participants underwent individual semi-structured interviews to share their perspectives on the modified treatments. Data were analyzed with a hybrid deductive-inductive approach to thematic analysis.

Results: We identified one overarching theme: *A challenging yet transformative therapy*, and three sub-themes, relating to each one of the specific modifications: *Emotional connection with the voice*, *Recognizability builds resistance*, and *The power of the written word*. Our findings show that the modified VRT versions were perceived to enhance both the therapeutic experience and its effectiveness by most participants. Further, the findings suggest that the modifications have potential to optimize VRT for persistent voices.

Discussion: This study provides a deeper and nuanced understanding of VRT for persistent voices based on patient experiences. Additionally, this study informs the ongoing development of VRT as its findings offer actionable insights to guide application and future adaptations of this innovative therapy.

[e]The Dialogue study: A pilot exploring the feasibility and acceptability of a virtual reality assisted intervention for eating disorders

Track: VR in Assessment and Treatment of Psychosis

Nina Kappel Hansen[1, 2], Emma Slebsager Ries[1], Thomas Ward[3, 4], Valentina Cardi[5], Anne Bryde Christensen[2, 6], Carsten Hjorthøj[7, 8], Merete Nordentoft[7, 9], Nadia Micali[6], Louise Birkedal Glenthøj[1, 2]

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Introduction: Eating disorders have severe physical and psychological costs. An estimated 94% of patients report a dominant, critical internal voice, often referred to as the "eating disorder voice". The experience of a more powerful eating disorder voice has been linked to the use of compensatory behaviors (e.g., fasting, vomiting, compensatory exercise) and longer illness duration. Avatar therapy is a relational approach originally designed to target the power-dynamic between the voice hearer and the psychotic voice. This pilot study explored a virtual reality-assisted avatar intervention for eating disorders, with the goal of helping individuals regain increased control over their eating disorder voice, potentially reducing symptoms and improving quality of life.

Methods: The pilot study included 10 participants who engaged in a VR-assisted avatar intervention alongside standard treatment. In this intervention, participants interacted with a virtual representation of their eating disorder voice in real time. They were encouraged to confront the voice to gain increased control over it. The study assessed feasibility and acceptability through qualitative interviews.

Results: The intervention was found to be feasible and acceptable, with preliminary indications that engaging with the avatar facilitated a shift in the perceived power balance. Participants reported increased agency and a sense of control over their eating disorder voice. These findings will be presented at the VR Mental Health Conference 2025, contributing to discussions on avatar therapy across psychiatric disorders.

Discussion: The pilot study suggests that a relationally focused VR-assisted intervention is engaging and holds promise in empowering individuals to challenge the eating disorder voice. By fostering a new way of relating to this internal experience, the intervention may offer a valuable complement to existing treatments.

Industry round table discussions (two abstracts[f])

Track: Technological Aspects of VR

Annika Gustafson[1]

[1]Helsingborg city

Practical applications of VR.

Parallel sessions 2, June 12th, 2025, 13.45 – 14.45

[f]Industry – Practical Applications of VR in Public Service – Round Table Discussion:

Track: Technological Aspects of VR

Filip Sterving, CEO (VR pedagogen), Annika Gustafson, (Helsingborg City)

This roundtable explores how virtual reality is being practically implemented within public services to enhance accessibility, inclusion, and efficiency. With perspectives from VR education, hospital and municipal innovation , the discussion will highlight practical examples from the fields of education, healthcare, and social services. Participants will share experiences, challenges, and insights on integrating VR into everyday practice, with a focus on creating value for both users and service providers.

[f]Industry – Bridging the Gap: Bringing Research Innovations to Market – Round Table Discussion:

Sara Leander Persson (Heka VR), Marieke Jongsma (VRelax), Annika Gustafson (Helsingborg City)

This roundtable brings together leading voices from both industry and the public sector to explore how cutting-edge research in VR for mental health can successfully transition into real-world applications. With insights from Heka VR, VRelax, Goes Art, and the City of Helsingborg, the discussion will focus on the challenges and opportunities of scaling innovation, fostering collaboration, and creating sustainable impact in practice.

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Virtual Reality Applications in Forensic Psychiatry (four abstracts[g])

Track: VR in Forensic Settings

Fedde Sappelli[1, 2]

[1] Pompestichting Forensic Psychiatry, Nijmegen, the Netherlands

[2] Donders Centre for Cognition, Radboud University, Nijmegen, the Netherlands

In Forensic psychiatry an increasing number of VR applications is developed and investigated for a broad spectrum of applications. In this symposium we will cover a diverse selection of those applications: VR aggression assessment, VR-assisted staff training for patient-staff interactions and VR for biofeedback to reduce anger, stress and aggressive outburst in forensic patients.

The symposium will progress from VR development for a fundamental problem in forensic psychiatry, towards the major challenge of effective implementation. Jill lobbestael and Fedde Sappelli will start with addressing their experience of the development of a VR scenario for valid aggression assessment for both research and clinical practice. They will show how parallel, independent studies and a fruitful cooperation can lead to effective development of VR scenario's. Andrea Lockertsen-Pedersen and Martina Gajski Vidovic will present their VR solution for a very relevant topic in forensic psychiatry involving patient-staff interactions. They will show how they developed their scenario in close relation with clinical practice. Finally, Lisa Klein-Haneveld will introduce a VR application of biofeedback to reduce stress and anger in forensic patients. She will also address the topic of effective implementation of (VR-)technology.

Parallel sessions 3, June 13th, 2025, 13.00 – 14.00

[g]Virtual Reality and Aggression Assessment (part 1)

Track: VR in Forensic Settings

Jill Lobbestael[1]

[1] Department of Clinical Psychological Science, Maastricht University, Maastricht, the Netherlands

Introduction: Validly measuring aggression is challenging because self-reports are plagued with biased answer tendencies and behavioral measures with ethical concerns and low ecological validity. The current study, therefore, introduces a novel virtual reality (VR) aggression assessment tool, differentially assessing reactive and proactive aggression.

Methods: Two VR tasks were developed, one in an alley environment (N = 24, all male, Mage = 23.88, 83.3% students) and an improved second one in a bar (N = 50, all male, Mage = 22.54, 90% students). In this bar VR task, participants were randomly assigned to either the reactive condition where they were triggered by a cheating and insulting dart-player or to the proactive condition where they could earn extra money by aggressing. Participants' level of self-reported aggression and psychopathy was assessed, after which they engaged in either the reactive or proactive VR task. Changes in affect and blood pressure were also measured.

Results: Aggression in the reactive VR task was evidenced to mostly display convergent validity because it positively correlated with self-reported aggression and total and fearless dominance factor scores of psychopathy, and there was a trend relationship with increased systolic blood pressure. The validity of the proactive aggression variant of our VR bar paradigm received less support, and needs more refinement.

Discussion: It can be concluded that VR is a potentially promising tool to experimentally induce and assess (reactive) aggression, which has the potential to provide aggression researchers and clinicians with a realistic and modifiable aggression assessment environment.

[g]Virtual Reality and Aggression Assessment (part 2)

Track: VR in Forensic Settings

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Introduction: See introduction presentation 1.

Methods: A scenario – Virtual Reality Aggression Assessment (VRAA) – is investigated in a pilot with aggression prone patients (n=12) and a follow-up with students (n=12). It existed of social interactive roleplays with avatars (Social Worlds). Neutral, instruction and two provocative scenes were compared, one with a socially and verbally aggressive, uncooperative female avatar (prov 1), and one with a dominant, intimidating male avatar (prov 2). Aggressive behavior was assessed with a VR-customized version of the Social Aggression and Dysfunction Questionnaire. Life-time aggression self-report scales were also administered.

Results: Both patient and students showed more aggression in provocative scenes, compared to neutral and instruction scenes. Patients showed more aggression in prov 2 then in prov 1. Also, patients showed more aggression in prov 2 scenes then students. Positive moderate correlations were found between VR-displayed aggression and trait questionnaires.

Discussion: The current study shows that aggressive behavior can be evoked with our VR aggression assessment scenario, and that the level of aggression can be systematically assessed by a standardized aggression observation scale. Results also suggests that VR is potentially closing the correlational gap between behavioral tasks and trait questionnaires. However, the explorative nature of the current study warrants replication.

Follow-up. A new VR-scenario was developed based on the results of Lobbestael & Cima and VRAA. Participants play a frustrating dartgame and can verbally and physically interact with provocative avatars. Students (n=68) show more in-game physical and observed aggression (adapted SDAS-9) in a high, compared to low level provocative scenario, however no evidence was found for convergent validity. The scenario is currently investigated in a study with aggression prone patients (n=49) and a matched control population (n=49).

[g]Evaluation of a VR-assisted staff training protocol within forensic psychiatry: a pilot study

Track: VR in Forensic Settings

Andrea Lockertsen-Pedersen[1, 2]
Martina Gajski Vidovic[1]
[1] Regional Forensic Psychiatric Clinic, Växjö, Sweden
[2] Medical Faculty, Lund University

Introduction. Forensic psychiatric patients constitute a group of individuals in need of specialized care, considering the complexity of their psychopathology. Since these patients are sanctioned by the court to receive care, this means that they need to engage in treatment and care daily, and highlights the need to provide evidence-based everyday care methods. Patient-staff interactions are a central part of all forensic psychiatric care and can give rise to conflicts but also to caregiving interactions. To create a safe, evidence-based care it is important to train staff. A new development in staff training concerns Virtual Reality (VR). Research has not yet investigated the use of VR in staff training aiming to improve communication techniques to enhance patient-staff interactions.

Methods: This mixed-methods study evaluates a VR-assisted staff training for patient-staff interactions in forensic psychiatry through self-report and third-party observation, in comparison to a control group. This will be combined with a qualitative examination of staff's experiences of the effects and feasibility of the staff training. Participants (N=27) will be randomly assigned to one of three groups. Group 1 (n=9) will receive individual training, group 2 (n=9) will receive group training, and group 3 (n=9) will be a control group and receive no training.

Results: We will present preliminary results of this study.

Discussion: It is important to evaluate new healthcare methods to ensure safe and evidence-based care. A strength of this study is the direct implementation of the method in a forensic setting, which enhances its relevance and ecological validity. Further, there are advantages to using VR in staff training, considering "learning-by-doing" experiences but also the possibility to practice scenarios that are difficult or unethical to (re-)create in reality.

[g]A first step towards implementing DEEP within (forensic) mental healthcare – a pilot study

Track: VR in Forensic Settings

Lisa Klein Haneveld[1, 2]

[1] Centre for eHealth and Wellbeing Research, Department of Psychology, Health and Technology, University of Twente & Department of Research

[2] Transfore forensische GGZ, De Dimence Groep (NL)

Introduction: Treating forensic psychiatric patients is a complex endeavor, as patients often show complex psychosocial problems and lower cognitive abilities. There is need for interventions that better align with the interests and abilities of forensic patients. An example is DEEP, a VR biofeedback-based environment, supporting relaxation through diaphragmatic breathing. Earlier studies with DEEP showed its promise to help patients reduce their anger and stress. However, it was important to also gain insight into the benefits and barriers professionals and patients experience when using DEEP.

Methods: A pilot study was conducted, in which DEEP was introduced in two forensic wards for a 3 months. Results from previous studies, as well as the *Consolidated Framework of Implementation Research*, were used for preparation. During the pilot, healthcare professionals were free to use DEEP with their patients in ways they found most beneficial. They evaluated the DEEP sessions using evaluation- and sign-up forms. Finally, 6 professionals and 3 patients were interviewed.

Results: DEEP was used both ad hoc and structurally integrated within treatment. Moreover, professionals recognized their value as ambassadors as they felt intrinsically motivated to use DEEP and had a key role in introducing DEEP to their team. Finally, all professionals agreed that planning, execution, and evaluation of the implementation process should be done structurally; using implementation leaders and ambassadors to help move the implementation forward.

Discussion: This study showed that DEEP could be used in various ways as long as it meets the patient's needs. There was a recognized necessity for structural support for healthcare professionals if DEEP were to be implemented, emphasizing periodic supervision, (refresh)trainings, and involving an implementation leader and ambassador. Future research will focus on gaining insight into whether the found implementation factors and strategies can be transferred across other psychiatric fields.

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Normative Aspects of Extended Reality in Forensic Mental Healthcare: Results from the VIRTUETHIC Project (four abstracts[h])

Track: VR in Forensic Settings

Matthé Scholten[1], Stefanie Solar[1], Liezl Launspach[2, 3], Madeleine Kirschstein[2, 3, 4], Cyril Boonmann[2, 3, 5], Madleina Manetsch[2, 3], Lydia Feito[6], Christoph Bublitz[7, 8]

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[4] Research & Development, Corrections and Rehabilitation, Zürich, Switzerland

[5] LUMC Curium - Department of Child and Adolescent Psychiatry, Leiden University Medical Center, the Netherlands

[6] Faculty of Medicine, Complutense University of Madrid, Spain

[7] Faculty of Law, University of Hamburg, Germany

[8] Institute of Criminal Law and Criminal Sciences, University of Lisbon, Portugal

Our symposium explores four distinct approaches to the use of Virtual and Extended Reality (VR/XR) in forensic psychiatry as part of the VIRTUETHIC project. We begin with a systematic review of reasons examining arguments for and against XR in mental health, followed by a scoping review assessing its benefits and risks. We also present a case study on the application of VR in a child and adolescent forensic psychiatric ward to offer practical insights. Then, we discuss the legal implications of using VR in forensic psychiatry and their ethical and regulatory challenges.

Parallel sessions 2, June 12th, 2025, 13.45 – 14.45

[h]Extended reality in mental healthcare: a systematic review of reasons

Track: VR in Forensic Settings

Stefanie Solar[1], Liezl Launspach[2, 3], Madeleine Kirschstein[2, 3, 4], Cyril Boonmann[2, 3, 5], Madleina Manetsch[2, 3], Lydia Feito[6], Matthé Scholten[1]

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[6] Faculty of Medicine, Complutense University of Madrid, Spain

Introduction: Extended reality (XR), including virtual reality (VR), augmented reality (AR), and mixed reality (MR), is increasingly integrated into mental healthcare. XR offers immersive environments, enabling solutions for exposure-based therapies and other treatments. While the literature focuses on the acceptability, and feasibility and efficacy of XR-based treatments, ethical aspects usually remain a side note. This review aims to identify and categorize normative reasons for and against the use of XR in mental healthcare to guide responsible innovation and lasting implementation.

Methods: This study followed the methodology for systematic reviews of reasons according to Strech and Sofaer (2012). We will search the literature according to JBI recommendations and report the findings according to PRISMA guidelines. Records will be retrieved from PubMed, Scopus, CINAHL, PsycINFO, Embase, Web of Science, and Google Scholar. Two independent reviewers will screen and select records based on predefined inclusion and exclusion criteria, with any disagreements resolved by consultation with a third, independent reviewer. We will analyze the data using thematic analysis to synthesize the data into broad and narrow categories of reasons.

Results: The systematic search is expected to reveal new ethical aspects of XR in mental healthcare, offering insights not previously explored in a structured way. As the first review of its kind, it can contribute to the ethical discourse surrounding XR implementation. The results will be available by June.

Discussion: This systematic review of reasons provides an overview of normative reasons for and against the use of XR in mental healthcare. Its findings can inform the development of ethical guidelines and policies to ensure responsible implementation.

[h]A Scoping Review of the Benefits and Harms of Extended Reality in Forensic and Correctional Mental Healthcare

Track: VR in Forensic Settings

Liezl Launspach[1, 2], Cyril Boonmann[1, 2, 3], Matthé Scholten[4], Javier Júdez[5], Marc Graf[1, 2], Henning Hachtel[1, 2], Madleina Manetsch[1, 2], Madeleine Kirschstein[1, 2, 6]

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[5] Murcian Health Service, Pascual Parrilla Murcian Institute of Biohealth Research, Region of Murcia Health Training and Research Foundation, Murcia, Spain

[6] Research & Development, Office of Corrections and Rehabilitation, Zürich, Switzerland

Introduction: There has been increasing research interest in the use of immersive Extended Reality (XR) in forensic and correctional mental healthcare settings. These applications offer significant opportunities for mental health, with the potential to transform the way services are delivered. In addition, XR can be used to facilitate training outcomes for justice professionals. However, the extent of the benefits and harms associated with this approach, as well as the facilitators and barriers to its implementation, remain largely unexplored. This is a concern in the treatment of detained persons, who are considered to be a particularly vulnerable group. The implementation of new technologies often present challenges. To ensure that XR is implemented responsibly and ethically, it is essential that mental health professionals are aware of the potential impact of these emerging technologies on persons involved in the criminal justice system.

Method: A scoping review was conducted to address this research gap and provide a comprehensive synthesis of empirical evidence on the application of XR in forensic and correctional mental healthcare settings. We conducted a search strategy in 4 major bibliographic databases, including PubMed, PsycINFO, CINAHL and Scopus, to identify original empirical studies.

Results: The presentation reports on the findings of this scoping review, which is the first to provide a qualitative description of the benefits and harms, and facilitators and barriers, to the implementation of XR in forensic and correctional mental healthcare settings.

Discussion: The efficacy of XR treatment in such contexts is contingent upon programs being properly designed and implemented according to explicit principles. Consequently, empirically derived evidence pertaining to the benefits and harms of XR in forensic and correctional mental healthcare settings is essential to ensure that the rights and well-being of individuals are respected and protected.

[h]VR on a child and adolescent forensic psychiatric ward – Report on a case study

Track: VR in Forensic Settings

Madleina Manetsch[1, 2]
[1] Department of Forensic Psychiatry, University Psychiatric Clinics Basel, Switzerland
[2] Department of Forensic Psychiatry, University of Basel, Switzerland

Text: Introduction:
Therapeutic interventions based on virtual reality (VR) in forensic mental health settings are imminent and emerging fast. In our pioneering clinical study on VR-based aggression prevention training (VRAPT), we are collecting data with an adolescent forensic patient population in a closed setting.

Methods:
The case studies focus on the clinical practicability of the intervention, the reasons for adherence to it, and the progress of the aggression prevention plan. We collected suggestions for improvements to the actual intervention in general and the VR-environment specifically.

Results:
The first 12 months of structured VRAPT interventions showed very optimistic results. Most importantly, the clinical practicability was evident and the benefits of the VRAPT intervention for a future life on the outside could be demonstrated.

Discussion:
Future implications for a smooth clinical application of the VRAPT intervention are discussed and practical suggestions from an actual user are presented.

[h]Legal Issues of using VR in forensic psychiatry

Track: Symposium

Christoph Bublitz[1, 2]
[1] Faculty of Law, University of Hamburg, Germany
[2] Institute of Criminal Law and Criminal Sciences, University of Lisbon, Portugal

Text: Introduction:

The talk addresses some of legal issues raised by the use of VR for treatment purposes forensic settings, with a focus on human rights and criminal law, which are hopefully of interest to an audience from various legal jurisdictions. The talk also addresses problems of the use of behavioral observations in VR environments for forensic assessments and predictions.

Methods:

I conducted a literature review and a legal-philosophical analysis.

Results:

As legal research, there are no fixed results. Views and cases that may affect researchers to various degrees will be presented.

Discussion:

Implications and open questions for further research will be presented and discussed with the audience.

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VR Interventions for Psychosis: Advances in the Treatment of Paranoia, Auditory Verbal Hallucinations, Negative Symptoms and Social Functioning (four abstracts[i])

Track: VR in Assessment and Treatment of Psychosis

Elise van Der Stouwe[1], Chris Geraets[1], Wim Veling[1], Sara Breivik Soleim[2], Valentin Maximilian Donath[2]
[1] University Center of Psychiatry; University Medical Center of Groningen
[2] Copenhagen University Hospital

Research on VR in psychotic disorders emerged approximately two decades ago and ever since, the field has expanded rapidly. Recent reviews reported results of around ten randomized controlled trials investigating VR applications in the treatment of psychosis and currently there are several treatment trials ongoing and new applications are being developed and piloted. The current symposium on advances in the treatment of psychosis offers a cohesive set of treatment studies that target different psychosis symptoms.

The first speaker will focus on paranoia by presentation of the results of the TOPIC-VR study in which VR-CBTp was compared with standard CBTp. The researchers hypothesized that VR-CBTp would show greater symptom reduction in fewer treatment sessions than CBTp. Next, Sara Breivik Soleim will present the Neuro-VR pilot study that examines the feasibility and acceptability of integrating virtual reality (VR) and biofeedback technologies in the treatment of auditory verbal hallucinations. Following, Valentin Donath will focus on the treatment of negative symptoms by targeting social reward learning in his talk about the ENGAGE pilot study. Finally, Elise van der Stouwe will present the VR-SOAP study which aims to enhance social functioning by means of modules targeting paranoia, self-esteem, social cognition, negative symptoms and social skills.

Parallel sessions 1, June 12th, 2025, 11.30 – 12.30

[i]VR-CBTp versus CBTp for paranoid ideations: a pragmatic, single-blind multi-centre randomised clinical superiority trial

Track: VR in Assessment and Treatment of Psychosis

Wim Veling[1]

[1] University Center of Psychiatry; University Medical Center of Groningen

Introduction: Virtual reality may improve psychological treatments for psychotic disorders. We investigated the effects of virtual-reality-based cognitive behaviour therapy for paranoid ideations (VR-CBTp) compared to standard CBTp.

Methods: We performed a pragmatic single-blind, randomised clinical trial in seven mental health centres in the Netherlands and Belgium. 98 participants with a psychotic spectrum disorder and paranoid ideations were randomised to VR-CBTp (n=48) or CBTp (n=50). Both interventions consisted of 16 sessions maximum, treatment could be completed early when goals had been achieved. The primary outcome was momentary paranoia, measured with the experience sampling method (ESM). Secondary measures included symptoms (paranoia, hallucination, depression, cognition and anxiety related), social functioning, self-esteem, and schemes. Also measures were performed on paranoid ideation by the patients and the clinical impression of the clinician in each session.

Results: Both groups showed reductions in momentary paranoia between baseline and post-treatment (effect size 0.65) but those were greater for VR-CBT (effect size 0.62). Reductions remained at follow-up (effect size 0.57) but not the interaction. Limited ESM compliance resulted in data loss, however, secondary paranoia measures did confirm the improvements in both groups (effect sizes range 0.66 to 1.15), but not the interaction. Both groups also improved in symptoms, self-esteem and social functioning. Interaction effects in favour of VR-CBTp were found for safety behaviour, depression and self-esteem at post-treatment, and for self-esteem and anxiety at follow-up. Of the VR-CBTp group 37.5% did not complete treatment, for CBTp this was 24.0%. Completers on average received 12.4 (VR-CBTp) and 15.0 (CBTp) sessions.

Discussion: CBTp and VR-CBTp are both efficacious treatments for paranoid ideations, but VR-CBTp may be somewhat more effective than CBTp.

[i]The Neuro-VR pilot study: a virtual reality-based intervention employing biofeedback to increase tolerability and therapy efficacy in psychosis.

Track: VR in Assessment and Treatment of Psychosis

Sara Breivik Soleim[1]

[1] Copenhagen University Hospital

Introduction: This study examines the feasibility and acceptability of integrating virtual reality (VR) and biofeedback technologies in the treatment of auditory verbal hallucinations in schizophrenia. Additionally, it evaluates the preliminary indications of treatment efficacy for this innovative combined approach.

Methods: A randomized clinical pilot trial utilizing a mixed-methods design, recruiting thirty participants with schizophrenia spectrum disorder in Denmark. Participants are allocated to eight sessions of either VR-assisted therapy or VR-assisted therapy supplemented with real-time biofeedback to monitor arousal and anxiety levels. VR-assisted therapy uses a digital avatar of the voice to facilitate a therapeutic dialogue, while the biofeedback is based on Galvanic Skin Response (GSR) and heart rate. The primary outcomes of feasibility and acceptability are assessed by achieving ≥ 80% recruitment in 12 months, ≥ 80% retention at therapy completion, and ≥80% satisfaction ratings (≥ 7 on a Likert scale). Secondary outcomes include treatment effects assessed via pre- and post-intervention comparisons of clinical metrics, further explored with EEG data and qualitative interviews with patients and therapists.

Results: Recruitments began November 2024 and is ongoing. Preliminary findings on feasibility, acceptability and treatment effect will be presented.

Discussion: If the intervention proves feasible and acceptable, it serves as the foundation for a larger appropriately powered efficacy trial. The combined VR and biofeedback therapy has potential to provide a more personalized and effective treatment, which can be integrated in routine care for patients with auditory verbal hallucinations in the psychiatric settings.

[i]The ENGAGE pilot study: Alleviating negative symptoms in schizophrenia using a virtual reali-ty-based intervention targeting social reward learning

Track: VR in Assessment and Treatment of Psychosis

Valentin Maximilian Donath[1]

[1] Copenhagen University Hospital

Introduction: (1) To examine feasibility and acceptability of an innovative short-term Virtual Reality (VR) based treatment for negative symptoms (NS) in patients with schizophrenia-spectrum disorders (SSD); (2) to assess the preliminary efficacy of the treatment in alleviating NS levels, improving daily life functioning and altering the reward processing system.

Methods: In a clinical pilot trial, 30 patients are currently being recruited from Copenhagen Mental Health Services' outpatient units for early intervention in psychosis. Participants are randomised to receive either treatment-as-usual (TAU) or an additional 10 sessions of VR based psychotherapy targeting social reward learning. Feasibility and acceptability are opera-tionalised as recruitment of ≥ 80% of the target sample within 15 months, ≥ 70% retention to study protocol at cessation of therapy (10 sessions) and ≥ 80% reporting a satisfaction rating of ≥ 7 on a 10-point Likert scale. Treatment effect will be evaluated comparing patients' symp-tom levels and level of functioning as assessed by a rater and by Ecological Momentary As-sessment at baseline and at treatment cessation (3 months). Additionally, structural and func-tional MRI, and free speech employing Natural Language Processing will be analysed at pre- and post-timepoints.

Results: Patient enrolment is ongoing since November 2024. Preliminary results on feasibility, acceptability and treatment effect will be presented.

Discussion: A novel psychological treatment for negative symptoms in SSD is currently being piloted. If feasible and acceptable, a following, appropriately powered trial will scrutinise the intervention's efficacy, possibly expanding the hitherto unsatisfactory repertoire of treatment options for negative symptoms.

[i]VR-SOAP, a modular VR treatment for improving social activities and participation: a single-blind multi-centre randomized controlled trial

Track: VR in Assessment and Treatment of Psychosis

Elise van der Stouwe[1]

[1] University Center of Psychiatry; University Medical Center of Groningen

Introduction: Young people with a psychotic disorder have the same social goals as their healthy peers, but their social networks are smaller, they participate less often in leisure activities and are less successful in work and education. Causes of these problems are multifaceted, but culminate in difficulties with interacting in daily life social situations. Current treatments have only moderate effects on social functioning. Virtual reality (VR) has the potential to improve the treatment of social interaction difficulties. We developed a modular VR treatment for social functioning and participation (VR-SOAP). In this single-blind multi-centre randomized controlled trial we investigated the effect of VR-SOAP.

Methods: 53 patients (age 18–40) with a DSM-5 psychosis spectrum disorder and problems with social functioning were recruited from 6 mental healthcare institutes. Patients were randomized to either VR-SOAP or VRelax. VR-SOAP consists of 14 sessions and 5 modules addressing causes of impaired social functioning: four optional modules and one fixed module. Vrelax consisted of 14 sessions that include psychoeducation, stress management, relaxation techniques, and relaxing environments in VR. Primary outcomes are quantity and quality of social contacts, leisure activities and social participation, measured with the experience sampling method (ESM). Treatment effects were compared at baseline, post-treatment and at 6-month follow-up.

Results: The recruitment has finished but currently the last treatments are provided and post/fu assessments remain to be completed. At the conference we will present the study design, details of the VR-SOAP treatment and descriptives such as how many patients followed each optional module.

Discussion: Since the amount of participants was lower than anticipated results need to be interpreted with caution. If findings indicate that VR-SOAP is effective, this provides therapists with a treatment to improve social functioning.

Workshops

Enhancing Early Alzheimer's Detection Through VR-Based Cognitive Assessments: A Scalable and Ecologically Valid Approach

Track: VR in Mental Health Settings

Umut Yilmaz[1], **Beyzanur Demirkaya**[1]
[1] Voctor Health

Introduction: Traditional cognitive assessments, such as MMSE and MoCA, often lack ecological validity and fail to capture subtle impairments in memory, attention, and executive function. This workshop will demonstrate how VR-based cognitive tasks provide a more immersive, engaging, and precise assessment battery for early Alzheimer's disease (AD) detection. Using VR headsets, participants will experience interactive cognitive tasks that replicate real-world challenges, showcasing their potential as a scalable and cost-effective alternative to conventional assessments.

Working methods :

1. Hands-on VR Demonstration
    - Participants will engage in VR-based cognitive tasks designed to evaluate memory, attention, and executive function.
    - Tasks will simulate real-world challenges, improving ecological validity over traditional tests.
    - Different task variations will be demonstrated, showing how customization can address individual cognitive profiles.
2. Live Data Tracking & Performance Feedback
    - Real-time behavioral metrics will demonstrate task accuracy, response time, and adaptability.
    - Adaptive difficulty mechanics will showcase how VR dynamically adjusts task complexity based on user performance.
    - Data-driven insights will highlight how VR tasks can track longitudinal cognitive changes, supporting early diagnosis and intervention strategies.
3. Discussion on Clinical Applications & Implementation
    - Case studies on how VR assessments complement clinical neuropsychological evaluations.
    - Insights into scalability for clinical and home-based monitoring, including integration with telehealth solutions.
    - Discussion on potential regulatory and adoption challenges in clinical and rehabilitation settings.

Learning objectives: Participants will:

- Understand how VR-based cognitive tasks improve assessment accuracy and ecological validity.
- Experience interactive cognitive tasks designed for early AD detection.
- Explore the potential for scalable, home-based VR cognitive evaluations.

VR playground 12th and 13th of June, 2025

Immersive Healing: Exploring Virtual Reality in Mental Health

Track: Technological Aspects of VR

Farah Shiraz[1]

[1] Heka

Introduction: This interactive workshop will provide participants with hands-on experience in Virtual Reality (VR) applications for mental health. Through live demonstrations and guided discussions, attendees will explore how VR is being used in therapeutic interventions, exposure therapy, and cognitive rehabilitation. The session will include real-world case studies, expert insights, and an opportunity to try different VR experiences tailored for mental health applications.

Working methods : Workshop Outline: 1. Welcome & Introduction (10 min)

- Brief overview of VR in mental health
- The role of immersive technology in psychological well-being
- Introduction to the workshop agenda

2. Live Demonstrations of VR Use Cases (30 min total) Participants will rotate through different VR stations, each showcasing a distinct **mental health application**:

- ***Exposure Therapy :** Virtual environments for treating social anxiety
- **Avatar Therapy for Psychosis:** How VR is used for treating auditory hallucinations and schizophrenia.
- ***Using VR for mental health diagnosis**

3. Hands-on Experience & Participant Engagement (30 min)

- Attendees will get a chance to try selected VR experiences
- Guided reflection on the impact of immersive therapies
- Q&A session

5. Challenges & Future of VR in Mental Health (group discussion) (10 min)

- Barriers to adoption in clinical practice
- The future of VR-powered mental health interventions

6. Closing & Key Takeaways (10 min)

- Summary of learnings
- How participants can further explore VR in mental health

- Next steps and open discussion

Learning objectives: By the end of this workshop, participants will:

1. **Understand** the scientific and therapeutic foundations of VR in mental health.
2. **Experience** different VR applications for mental health first-hand.
3. **Evaluate** the effectiveness and potential challenges of using VR in therapy.
4. **Identify** real-world use cases for VR in psychological treatment.
5. **Engage** in discussions about the ethical considerations and clinical adoption of VR technologies.

VR playground 12th and 13th of June, 2025

Experience BienVR: Training Workers in Psychological and Mental Health First Aid

Track: VR in Mental Health Settings

Dominique Therrien[1], Evy Nazon[1]

[1] Universite du Quebec en Outaouais

Introduction: The Experience BienVR workshop is an opportunity to immerse yourself in two short VR scenarios specifically designed to practice Psychological and Mental Health First Aid (PFA-MHFA) skills. Based on exploratory qualitative research aimed to understand informal support between colleagues in the workplace, interviews with hospital and community workers led to the development of VR scenarios to raise awareness of the different signs of distress and socio-cultural barriers to applying PFA-MHFA.

Working methods : The workshop consists of three parts. First, we will briefly review the concept of mental health literacy as a modifiable determinant of health and provide an overview of the development of PFA-MHFA over the last two decades. We will then explore two aspects of VR scenario development that contribute to the creation of respectful inclusive educational tools that are easier to implement: diversity and co-development. Finally, participants will experience the two BienVR scenarios and debriefing session where will give participants the opportunity to comment and make suggestions to improve future versions of the BienVR trainings.

Learning objectives: After this workshop, participants will be able to:
1) Identify interventions that contribute to the development of mental health literacy, a modifiable determinant of health.
2) Summarise the historical benchmarks of Psychological and Mental Health First Aid (PFA-MHFA).
3) Explain the importance of considering socio-cultural and socio-professional elements when developing VR training scenarios to improve PFA-MHFA skills.
4) Consider the advantages and disadvantages of co-developing VR training sessions.
5) Comment on how they recognise distress, and what barriers might hinder their approach to applying PFA-MHFA.
6) Critically evaluate the use of VR technology to develop PFA-MHFA skills.

VR playground 12th and 13th of June 2025