Virtual Reality in Mental Health

New Horizons

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Abstract book

Research   Technology   Implementation   Treatment

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Sessions Thursday November 9 2023

Symposium stress

Effects of virtual reality relaxation on perceived stress levels in patients with burnout and psychiatric disorders

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Introduction:The role of stress in the development and course of mental health problems are widely acknowledged. Relaxation techniques have demonstrated effectiveness in reducing stress, however they often demand cognitive effort that exceeds the capacity of patients with mental health problems. Therefore, a relaxation tool that uses virtual reality (VR), named VRelax, has been developed and seems to create improvements in affective states among patients. Nevertheless, the impact of incorporating VRelax into standard treatment on perceived stress and affective states during the intervention period remains unexplored.

Method: A multicenter single-blind randomized controlled trial was conducted among patients receiving treatment for burnout, anxiety, depressive, bipolar or psychotic disorder. Participants were randomly assigned to either VRelax or standard relaxation exercises (SRE) for at least twenty minutes, five days a week, for six weeks at home. Perceived stress scale (PSS) was used at baseline (T0) and 6-week follow-up (T1). Two visual analog scales (VAS; range 0-100) were scored immediately before and after each session, for VRelax within the application, and for the SRE with an online questionnaire.

Results: Inclusion is ongoing, currently 52 participants have completed the intervention period, 24 in the VRelax group. 82.8% were women (48 of 58) with an average age of 42.9 (SD = 14.9). The improvement in the preliminary PSS data for the VRelax group (M = 2.52 ,SD = 4.7) after the intervention period was lower than the relaxation exercises group (M = 5.12, SD = 4.8). The difference was not significant ($t (42) = -1.814$; $p = .077$). For VRelax, the VAS data shows 48.7(SD=14.4) beforehand and 56.0 (SD=14.8) afterwards for level of relaxation and for the level of calmness 49.4 (SD=14.4) and 57.9 (SD =14.4). For the SRE, the level of relaxation was 45.2 (SD = 12.1) and 59.8 (SD =15.0), and for the level of calmness 44.1 (SD = 11.3) and 57.9 (SD=12.5).

Discussion: The preliminary results indicates that both VRelax as SRE seem to be effective in reducing stress. Our results will provide a contribution to obtaining a more suitable (cost-)effective self-management tool for reducing stress among patients, reduce waitlists, and enhance psychiatric treatments.

Symposium stress, november 9, 2023, 11:20 - 12:20

A qualitative approach to the application of virtual reality relaxation for patients with psychiatric disorders and/or burnout. What is the opinion of healthcare professionals?

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Background
The use of virtual reality in healthcare is a fast-growing technology. It is user-friendly and can be tailored to fit the individual's needs. The use of virtual reality for relaxation has been found to effectively reduce stress levels and alleviate symptoms in psychiatric patients. However, it is unclear how healthcare professionals perceive and experience the use of VR technology in healthcare delivery. In order to ensure successful implementation it is crucial to have access to this necessary information.

Aim
What are the facilitators and barriers experienced by healthcare professionals in the use of virtual reality relaxation (VRelax) while treating patients with depression, anxiety, psychosis, bipolar disorder and/or burnout?

Method
We conducted focus groups from November to December 2021 among healthcare professionals who had used VRelax for 4 weeks for the treatment of patients with depression, anxiety, psychosis, bipolar disorder and/or burnout.
A total of 3 focus groups were conducted, as well as 4 individual interviews. Thematic analysis using Braun and Clarke's method was used to provide systematic insights into facilitators and barriers.

Results
A total of 16 psychologists and psychiatrists were included. We found themes that were perceived as barriers among healthcare providers, they include 'technical difficulties', 'needing to learn new skill set' and 'time constraints'. Identified facilitators for use were 'ease of use for the patient' and 'transdiagnostic application in broad patient population'.

Conclusion
In this study, we focused on facilitators and barriers experienced by healthcare professionals using VRelax for the treatment of patients with psychiatric disorders and/or burnout. VRelax is generally perceived as easy to use and an addition to the therapy, however instructing the patient is perceived as time-consuming and healthcare provided perceive they need additional training. The information provided is vital for developing and implementing new treatment methods, such as virtual reality and other e-health therapies.

<div align="right">Symposium stress, november 9, 2023, 11:20 - 12:20</div>

ARCADIA: A Gamified Journey to Emotional Regulation and Self-Compassion in Mixed Reality

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There is a growing interest in applying XR technologies to support and practice emotional regulation strategies. Mixed Reality (MR) has barely been used in the context of mental health treatment although it has great immersion and presence-generation possibilities. MR offers interesting possibilities for co-located and social therapeutic scenarios, and remains an accessible alternative for user groups facing potential difficulties with VR. Therefore, we present the design and user study of ARCADIA, a Mixed Reality (MR) system consisting of gamified therapeutic activities that use biofeedback to support emotional regulation and self-compassion.

The system design has been conducted through several co-design sessions with psychologists. In order to get preliminary insights into the feasibility of using MR systems for emotional regulation, we performed a dual study involving therapists (N=21) and users of mental health services (N=23). We assessed the therapeutic potential of the system, and evaluated participants' user experience as well as their perceived benefits.

Overall, the system was motivating, innovative and easy to use. After using ARCADIA, participants reported experiencing positive emotions. They actively engaged in self-compassion practices and playful exploration of the scenarios, expressing a strong interest in continuing to use the application. In addition, mental health professionals considered ARCADIA to be a promising tool for their clinical practice.

These findings lead us to believe that the combination of Mixed Reality and gamified therapeutic activities could be a significant tool in the future of mental health. We also identified and discussed a series of limitations in our approach itself and in the current state of MR technology, which could serve as design guidelines for future MR scenarios.

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Symposium Implementation 1

Understanding public perceptions of virtual reality psychological therapy: development of the attitudes towards virtual reality therapy (AVRT) Scale

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Background: Virtual reality (VR) psychological therapy has the potential to increase access to evidence-based mental health interventions by automating their delivery while maintaining outcomes. However, it is unclear whether these more automated therapies are acceptable to potential users of mental health services.
Objective: The main aim of this study was to develop a new, validated questionnaire to measure public perceptions of virtual reality therapy including those guided by a virtual coach. We also aimed to explore these perceptions in greater depth and test how aspects such as familiarity with VR and mental health are associated using both quantitative and qualitative approaches.
Methods: We used a cross-sectional mixed-methods design and conducted an exploratory factor analysis of a questionnaire that we developed, the attitudes towards virtual reality therapy (AVRT) Scale, and a qualitative content analysis of data collected through free-text responses during completion of the questionnaire.
Results: We received a total of 295 responses and identified four factors within the AVRT Scale. The four factors are: (1) attitudes towards VRT, (2) expectation of presence, (3) preference for VRT, and (4) cost-effectiveness. We found that being more familiar with VR was correlated with more positive attitudes towards VRT (factor 1), a higher expectation of presenc e (factor 2), preference for VRT over face-to-face therapy (factor 3), and believing that VRT is cost-effective (factor 4). Qualitative data supported our factors and indicated that VRT is acceptable when delivered at home and when guided by a virtual coach.
Conclusion: This study is the first validated scale to explore attitudes towards VRT, including VRT guided by a virtual coach, within the general population. Our findings indicate that people are willing to try VRT, particularly as it offers increased access and choice, and that as VR becomes more ubiquitous, so too will positive attitudes towards VRT. Future research should seek to further validate the AVRT Scale.

Symposium Implementation 1, november 9, 2023, 11:20 - 12:20

The Usage of Virtual Reality among Children and Adolescents: A Feasibility Study.

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Virtual Reality (VR) headsets and controllers have not specifically been built for minors; however, VR equipment is increasingly being used by and for children and adolescents in both private and health care settings.

In order to develop a tolerable and hence potentially effective health care intervention in VR for children and adolescents, it is crucial to assess the usability and acceptability of VR first. To date, there is no consensus about the minimum age recommendation. Exploring whether VR is feasible for children and adolescents involves both physical and psychological aspects, such as visually induced motion sickness, pleasure and motivation.

This study aims to assess possible negative impacts on the target group's physical well-being after playing a self-developed interactive VR task. A second aim is to assess whether media use, age, gender and the experienced physical response predict the pleasure, acceptability and usability of VR.

In the current study 85 children aged 8 to 17 years participated (M = 10.55 years, SD = 2.06 years), of which 31 (36.5%) identified as female. A pre- and post-test design was implemented, using self-report questionnaires.

The main results indicate that none of the participants developed motion sickness. However, there was a significant increase with a small effect size in the symptom "Dizziness with Eyes Open". The results further show that the participants were highly motivated about using VR and that they experienced VR as very pleasant. The analyses aiming to assess the predictability of pleasure, acceptability and usability of VR are still ongoing and the results will be displayed at the conference. These preliminary findings are promising for the feasibility of future VR health care interventions for children and adolescents considering that treatment motivation and satisfaction are crucial factors for treatment success.

VR-assisted staff training within inpatient care

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Forensic psychiatric care sets special demands on professional staff-patient interactions since staff meet people convicted of serious crimes and who exhibit complex psychiatric problems. Research shows the importance of the caring relationship between staff and patient in influencing a perceived participation in the care. Staff-patient interactions constitutes an area within forensic psychiatry with a great need for method development. Developing an evidence-based training for healthcare staff is therefore necessary to facilitate professional staff-patient interactions and promote the caring relationship and the care process. Virtual Reality (VR) may enhance learning regarding a central component in staff training: role-playing. This study integrates perspectives of person-centered care and innovative technology by developing an interactive, VR-assisted staff training using focus groups. User representatives (n=4) and staff representatives (n=3) were gathered to 1) identify areas where staffs' competence in staff-patient interactions needed to be improved, and 2) provide feedback on a preliminary staff training protocol. This presentation will provide an overview of the method development and share initial experiences from VR-assisted staff training in staff-patient interactions.

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Symposium 360 video

360° stereoscopic videos for virtual reality exposure in the SoREAL trial

Fatime Zeka

360° stereoscopic videos for virtual reality exposure in the SoREAL trial: The developmental process Introduction: The SoREAL trial aims to investigate the effect of group-based cognitive behavioral therapy (CBT) with in vivo exposure versus group-based CBT augmented with Virtual Reality (VR) exposure for patients diagnosed with social anxiety disorder (SAD) and/or agoraphobia. For the SoREAL trial, VR scenarios consisting of high resolution 360° stereoscopic videos have been developed by a panel of developers from a VR media company, CBT-trained clinicians, and patients. The aim of this presentation is on the experiences of clinicians and patients on the developmental process of creating and using 360° stereoscopic videos in VR exposure. Methods: The process of developing the VR scenarios lasted approximately 16 months involving regular meetings between developers of the VR media company, the CBT-trained clinicians, and patients. The involvement of patients aimed to determine the validity of the scenarios and assess the anxiety level provoked by the videos. The usability of the VR exposure was tested in a group format by two clinicians. The feedback from the clinicians and patients on the delivery of the exposure in the group, guided the initial draft for a group-based CBT manual with VR exposure for SAD and agoraphobia. Results: Thirteen VR exposure scenarios relevant for SAD and agoraphobia were developed for the CBT-VR exposure. Each scenario includes four to six scenes of increasing difficulty as well as a neutral scene to familiarize patients with the VR setting. Actors have been used to play out the scenarios. To facilitate the lack of direct user interaction, multiple junctions have been added where the actors talk directly and unsolicited to the viewer whilst also allowing time for the viewer to respond. The SoREAL trial has included 185 patients and final results on treatment efficacy and acceptability are expected in 2024. Discussion: 360° VR delivery may enhance the sense of presence due to the immersive and realistic presentation and may have advantages to animated environments. Compared to computer-generated 3D graphic based VR, immersive 360° technology may be easier and more affordable to implement in a daily clinical practice due to lower costs and less technical skills needed.

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Virtual Reality-Based Exposure with 360° environments for Social Anxiety Disorder: A feasibility study

Mathias Torp Ernst

Virtual Reality-Based Exposure with 360° environments for Social Anxiety Disorder: A feasibility study Introduction: Social Anxiety Disorder (SAD) is amongst the most common anxiety disorders. SAD is characterized by an overwhelming fear of social situations, causing affected individuals distress, affecting their wellbeing and performance in social arenas, including work, school, relationships and other daily activities. Cognitive behavioral therapy (CBT) is an effective tool for treating SAD, however, few seek treatment and many drop out. Research has investigated the effectiveness of virtual reality-based exposure (VR-Exp) with promising results. Each VR-Exp environment and setting is different, and few studies have investigated the feasibility of VR tools utilizing mixed methodology prior to assessing efficacy of treatment. The current study seeks to assess the feasibility, usability, and presence of four 360° VR-Exp environments. Methods: Twenty adult participants (10 with SAD, 10 healthy controls) were recruited for one experimental session of approximately 150 minutes (age range 21-32 years, 40% female). Questionnaire- and interview data was collected and analysed. A mixed methods triangulation design was applied. Qualitative data was analyzed using a general inductive approach. Results: Quantitative results are still pending analysis but may be presented during the symposium. Twelve common themes emerged, related to the pre-established categories (Anxiety, Treatment Relevance, Usability). Themes included: 'Experiences of anxiety', 'Bodily reactions to anxiety', 'Anxiety levels', 'Anxiety in virtuo vs. in vivo', 'Self-focused attention', 'Relevance', 'Presence', 'Interaction', 'Realism', 'User friendliness', 'Technological limitations', 'Production quality'. Discussion: The developed 360° VR-Exp environments may be useful as a first step of exposure therapy for individuals with SAD.

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Cognitive behavioral therapy with Virtual Reality-based Exposure Using 360-degree Videos: A Randomized Controlled Trial

Per Trads Ørskov

Cognitive behavioral therapy with Virtual Reality-based Exposure Using 360-degree Videos: A Randomized Controlled Trial Introduction: Anxiety disorders are associated with considerable lower quality of life, lowered social functioning and represents a considerable disease burden. Social Anxiety Disorder (SAD) has an early onset typically occurring during adolescence and is one of the most prevalent anxiety disorders. People with SAD tend to hesitate to seek treatment possibly because they fear negative evaluation by others. Consequently, they often wait many years before seeking treatment. Developing new treatments that lower the threshold for seeking treatment are therefore warranted. Research shows that patients prefer treatments that adopt exposure in virtual reality over treatments that conduct exposure in vivo. Methods: The study was a three-arm randomized controlled trial, comparing results between a group receiving cognitive behavioural therapy (CBT) with VR-based exposure, a group receiving CBT with in vivo exposure, and a group receiving VR relaxation. The study included 51 participants (62% female). Three 360-degree videos were used for exposure including the following social settings: 1) eating lunch in a cantina, 2) going on a bus ride, and 3) participating in a job interview. The theoretical framework underlying the exposure therapy was inhibitory learning. Exposure (both in virtue and in vivo) was undertaken in 6 out of a total of 10 sessions. The primary outcome of the intervention was the Social Interaction Anxiety Scale (SIAS). Results: Mixed linear models were used to analyze the data. At post-test the preliminary results show that both the group receiving CBT with VR-based exposure, mean = 38.4, 95% CI (33.7, 43.0), and the group receiving CBT with in vivo exposure, mean = 34.7, 95% CI (29.7, 39.7), had a greater reduction on SIAS than the group receiving VR relaxation, mean = 49.9, 95% CI (45.2, 54.6). This effect was statistical significant, $p < 0.001$. There were no statistical significant difference between the intervention with in vivo exposure and the intervention with VR-based exposure. Discussion: This study show that CBT with VR-based exposure, using 360-degree videos, is more effective than VR relaxation. CBT with VR-based exposure is not superior to CBT with in vivo exposure. In fact, the two interventions appear to be equally effective.

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Gaze Exposure in Virtual Reality Using 360-Degree Videos Reduces State Anxiety During Public Speaking

Fabian Mueller

Gaze Exposure in Virtual Reality Using 360-Degree Videos Reduces State Anxiety During Public Speaking Background: Public speaking anxiety (PSA) is a prevalent social anxiety affecting up to 30% of the population. Individuals with PSA often express fear of being evaluated by others and avoid eye contact. Despite this behavioral characteristic, the potential of gaze avoidance reduction as a therapeutic intervention to alleviate PSA-related anxiety remains unexplored. Methods: We designed a standalone virtual reality (VR) gaze exposure treatment and evaluated its effectiveness in reducing state anxiety during public speaking. The gaze exposure treatment focused on enhancing eye contact in public speaking contexts using 360-degree videos with increasing levels of social exposure. In a single-blind, randomized controlled trial, 89 participants with subclinical PSA were assigned to either a gaze exposure treatment or a control group. Assessments occurred at baseline, following a one-hour intervention, and after nine additional 20-minute home interventions. The primary outcome was state anxiety, assessed using the Subjective Units of Distress Scale during a real-life public speaking test. Results: Repeated, but not acute VR gaze exposure reduced state anxiety during public speaking compared to the control group (treatment: baseline 48.95 [SD 19.52], post-intervention 2: 26.60 [SD 19.23]; control: baseline 48.92 [SD 18.43], post-intervention 2: 56.34 [SD 28.15]; adjusted mean group difference: -29.82, 95% CI: -41.77 to -17.87; Cohen's $d = -1.07$, $p < 0.0001$). Conclusions: Our findings indicate that repeated VR gaze exposure treatment in public speaking contexts can effectively reduce state anxiety during public speaking among individuals with subclinical PSA. These promising results call for further investigations in clinical populations.

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Workshop 1 Labyrinth Psychotica

How We Build Realities: Making sense of the subjective experiences of psychosis and other 'labels'

Dr. Jennifer Kanary

Research conducted at Queensland University estimates that one in thirteen people will experience an episode of psychosis before the age of 75. Despite its prevalence, most people do not know what it entails. As a consequence, it is often not recognized on time. It is feared and stigmatised costing our societies deep emotional and financial suffering.

Understanding psychosis is difficult, even for professionals. Labyrinth Psychotica has studied the subjective experiences of psychosis since 2006. This workshop takes a deep dive into an understanding of these experiences. Revealing how hallucinations and delusions are not the fringe experiences we often think they are but are logical reactions to altered sense-perceptions that are central to human function and survival. Intricately related to how we build our realities.

Through playful thought experiments and inspiring insights and a VR psychosis simulation this workshop will transform your view of the phenomena and raise awareness of experiences of other "labels" in general, as well as provide insight into how we build our own realities and the conflicts that may arise within them.

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Pitch Hour

Automated Virtual Reality Cognitive Behavioral Therapy to treat Anxiety in an Inpatient Dual Diagnosis Population

Benjamin Arnfred

Psychotic disorders often result in marked social isolation, severely reduced level of functioning, repeated hospitalization, early medical retirement, and early death, either due to suicide or lifestyle disease.

Research indicates that more than a third of patients with psychosis also suffer from substance use disorder (SUD). When SUD co-occurs in patients with psychosis, the condition is referred to as dual diagnosis and is associated with more severe symptomatology, higher morbidity, and less treatment adherence.

Currently, clinical guidelines for dual diagnosis recommend integrated treatment. However, meta-analysis shows that the evidence supporting interventions for comorbid psychosis and SUD is still insufficient.

Thus, treatment needs to be improved, with recommended key areas being anxiety, accessibility and long term efficacy. Several randomized trials have shown that virtual reality (VR)-based therapy can reduce paranoid thinking and agoraphobic avoidance and distress in populations suffering from psychosis.

In this pitch, we present a protocol for a pilot RCT evaluating partially automated VR-based CBT for anxious avoidance in a dual diagnosis population. The treatment will be delivered by non-specialists in an inpatient setting, as a supplement to integrated treatment.

It is our hope that this line of research will utltimately lead to an easily implementable intervention, that improves long-term efficacy of integrated care by increasing accessibility of psychotherapy without being prohibitively expensive.

Pitch Hour, november 9, 2023, 13:40 - 14:25

Attentional threat bias and avoidance behavior in virtual social interactions under social stress

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Social anxiety disorder (SAD) is characterized by persistent and excessive fear of humiliation and embarrassment in social situations. Research suggests that individuals with SAD exhibit selective attention bias toward socially threatening information and hyper-awareness of facial expressions, contributing to the formation and maintenance of anxiety. This heightened sensitivity to negative cues can lead to avoidance behavior as a coping mechanism to reduce immediate anxiety and prevent anticipated negative outcomes. It has been revealed that socially anxious individuals show increased avoidance tendencies to faces expressing approach-oriented emotions, such as anger and happiness. However, it remains unclear how they differ in their responses to emotional facial expressions in stressful social situations. Our study will employ a virtual reality (VR) scenario to investigate attentional threat bias and avoidance behavior among non-clinical individuals who are socially anxious following stress induction. The VR version of the Trier Social Stress Test will be used to induce stress in one group, while a second group will undergo a neutral scenario. Both groups will subsequently partake in a VR approach-avoidance task, during which gaze behavior, brain activity, and physiological responses will be collected. So far social approach-avoidance tasks in SAD studies often involve contexts like parties, where participants are instructed to approach or avoid virtual characters showing specific emotions. Yet many tasks rely primarily on keyboard or joystick input for action control and decision-making, avoiding physical interactions due to concerns about movement artifacts in mobile EEG-VR. During our pitch, we seek suggestions and ideas regarding suitable VR programs and methodologies to study approach/avoidance behaviors in social situations, especially when combined with concurrent EEG measurements. More specifically, given the unique features of VR and EEG equipment, is it feasible to design an active task that allows flexible social interaction in the virtual environment while maintaining high-quality EEG data collection? What indicators can more accurately reflect the participants' avoidance behaviors?

Pitch Hour, november 9, 2023, 13:40 - 14:25

The role of 'place' in virtual reality treatment

Thorben Simonsen[1]
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Can virtual reality (VR) improve accessibility, lower avoidance behavior, and increase participation, all by changing where psychiatric treatment takes place? If so, how does 'place' make a difference for the production of clinical knowledge about the role and usefulness of such a technological intervention? This project addresses these questions through clinical experimentation and social scientific exploration, a unique approach that answers what key stakeholders in Denmark have called the need for more 'cross disciplinary research' capable of 'expanding our understanding of the use of new technologies' to improve the frameworks for psychiatry (Ministeriet for Sundhed og Forebyggelse, Ministeriet for børn, ligestilling, integration og sociale forhold, 2015). Consisting of two interdependent subprojects, and by building on the PIs previous research on the spatial organization of psychiatric practice, this project aims to 1): test the feasibility of using remote VR exposure therapy for Social Anxiety Disorder (SAD), and 2): explore how physical and simulated 'places' make a difference in remote virtual reality treatment (VRT) and with what implications for the production of clinical knowledge.

Pitch Hour, november 9, 2023, 13:40 - 14:25

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

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Previous research suggests embodying an outgroup member through a 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 and interventions. During my PhD, I aim to build on this finding through a series of three studies which utilise a cooperative economic decision-making task. Data collection for Study 1 is completed and I am pitching this project to receive feedback for Study 2 and Study 3.

Study 1 and Study 2 set out to draw a comparison between conventional, 2D methods of virtual outgroup perspective-taking and VR embodiment in intra- and intergroup one-shot prisoner dilemmas. In Study 1 (N = 150), White male participants either played 10 rounds of a prisoner's dilemma against their racial ingroup or their outgroup on a desktop computer. They were either given a White or Black avatar. We did not observe ingroup favouritism between White and Black opponents regardless of participants' avatars. However, we found that White participants were significantly less cooperative towards both White and Black opponents when given a Black avatar. We argue that instead of reducing intergroup bias, participants' racial biases became more salient when they were playing from the perspective of their outgroup in 2D. We hypothesis that participants playing the same game in IVR (Study 2) will show more cooperative behaviour towards Black opponents when given a Black avatar than participants given a White avatar, and participants given a Black avatar in 2D.

In Study 3, we add a Black and White advisor into the virtual room of our participants. When playing the prisoner's dilemma, the advisors will tell the player with a 70% chance what the opponent will play. We will measure which advisor is chosen, whether participants believed the advisor was telling the truth and which choice was made in the prisoner dilemma. Whenever a participant says that he believes that their opponent is cooperating, we will also examine if they decide to exploit that cooperation. Furthermore, we will test moderating variables (e.g. previous intergroup contact, right-wing authoritarianism, and social dominance orientation).

Pitch Hour, november 9, 2023, 13:40 - 14:25

Symposium Implementation 2

Implementation of Virtual Reality in psychiatric care

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Introduction
In the past decades, many studies on the application of virtual reality (VR) in psychological treatment have been conducted. Although the technological developments advance quickly, the implementation of VR in clincial practice remains behind. Therefore, not many patients have access to VR in their psychological treatment. In a collaboration between GGZ Delfland and UMCG, we aim to develop a practical guideline for the implementation of VR in psychiatric care.

Methods
We conducted focusgroups amongst patients who have been treated with VR to find out their opinion on the treatment. Furthermore, we conducted focusgroups and a survey amongst therapists who have been working with VR. The results of the focusgroups and the survey will be the foundation of the practical guideline.

Results
In this presentation, we will present preliminary data of the focusgroups amongst VR therapists. Furthermore, the results of the survey will be presented based on the unified theory of acceptance and use of technology (UTAUT) theory.

Discussion
The focusgroups and the survey will expose both obstructive and accelerating factors towards VR implementation. These factors will be invastigated and incorporated in the guideline. We aim to make the guideline widely available for both national and international mental health care organizations.

Symposium Implementation 2, november 9, 2023, 13:40 - 14:25

360° nature video for relaxation: does the medium matter?

Sylvie Bernaerts, Bert Bonroy[Thomas More UAS], Glen Debard[Thomas More UAS], Marlon van Loo[Thomas More UAS], Tom Van Daele[Thomas More UAS]

Aim
Adoption of virtual reality (VR) in clinical practice is limited due to implementation barriers such as cost. This study, comprising two experiments, aimed to compare the efficacy and user experience of a 360° nature video for relaxation presented via VR headset and low-cost alternatives.

Methods
Both experiments had a between-subject design and were conducted in a student sample (N1=87, N2=61). The 360° video presented five nature locations. We compared the efficacy and user experience of three low-cost smartphone VR headsets (experiment 1) and, subsequently, the preferred headset out of these to a Meta Quest 2 VR headset and a laptop (experiment 2). In both experiments, pre-to-post changes in participant's tension (Profile of Mood States Questionnaire), level of relaxation (Visual Analogue Scale) and physiological measures (Empatica E4) were assessed. User experience was also assessed (User Experience Questionnaire). Additionally, in experiment 1, participants ranked all headsets on usability criteria.

Results
In experiment 1, all groups reported more relaxation and less tension after watching the 360° video, irrespective of the headset used. There were no significant differences in user experience between groups. The ranking questions, however, revealed that participants preferred the Bobo Z6 VR headset. In experiment 2, all groups reported more relaxation and less tension after watching the 360° video, irrespective of the medium used. Regarding user experience, both VR headset conditions were rated as more attractive than the laptop, and participants felt more attentive towards the VR headsets than the laptop. There were no differences in user experience between the VR headset groups. Analyses of physiological data are ongoing.

Conclusions
This study shows that using a low-cost smartphone VR headset can be as effective as a high-end VR headset to present a 360° nature video for relaxation, indicating that smartphone VR might be a feasible low-cost alternative for healthcare organizations.

Symposium Implementation 2, november 9, 2023, 13:40 - 14:25

Oral

Mental imagery in acrophobia elicited by virtual reality exposure

Katharina Meyerbröker

Introduction:
Studies have shown that mental imagery of experiencing threat play a role in the development and maintenance of anxiety disorders. The content of mental imagery corresponds to the specific content of the disorder's anxiety (Çili & Stopa, 2015). These images constitute important targets for new imagery-based interventions, but it often remains unclear how these images can be effectively activated. Additionally, the emotional intensity of the mental imagery seems to be influenced by the perspective taken (Holmes & Mathews, 2010). The aim of the current study is to determine whether a virtual reality paradigm for fear of heights can be used to evoke mental imagery related to fear of heights.

Methods:
Participants with elevated fear of heights (n=21) were compared to participants with no fear of heights (n=24). The hypotheses were that (1) participants with elevated fear of heights would experience more intrusive images than participants with no fear of heights; (2) these images would be more vivid, negative, and emotionally charged during exposure to heights, and (3) these mental images would differ in perspective between participants with elevated fear of heights (observer perspective) and participants with no fear of heights (field perspective). Exploratory analysis was conducted to determine whether these mental images were related to anticipated future events or past memories.

Results:
Participants with elevated fear of heights exhibited more general and non-height-relevant intrusive images (43%) compared to participants with no fear of heights (8%). No differences were found between the groups regarding emotional intensity, and the images were not different in perspective between participants with and without fear of heights. In both groups, the mental imagery were based on anticipated future events.

Discussion:
By using a virtual reality paradigm anxiety-related future-oriented imagery was elicited in participants with elevated fear of heights. Contrary to expectations, no difference in perspective-taking was found between participants with acrophobia and those without. Potentially a virtual reality paradigm for heights can be used to target mental imagery and break avoidance behavior.

Symposium Implementation 2, november 9, 2023, 13:40 - 14:25

Symposium Psychosis 1

Exploring the Role of clinical and demographic patient characteristics on the effects of virtual reality cognitive behavioral therapy for psychosis: a moderator analysis.

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Background: VR-CBT is an effective treatment method for paranoia and anxiety in psychosis. However, it is unknown which individuals benefit most from VR-CBT. Previous studies examined factors affecting the treatment effect of regular CBT, including illness duration, paranoia, depression, and pre-therapy avoidance behaviors. Results were inconsistent; some studies found that lower or higher symptom levels of these factors at baseline predicted a better treatment response, while others did not. The first automated VR-CBT particularly benefited patients with severe avoidance behaviors. The aim of this study is to investigate the factors that determine when VR-CBT is most effective and which individuals benefit the most from it.

Methods: A total of 116 participants with a DSM-5 diagnosis of psychotic disorder and at least moderate paranoia (GTPS > 40) were included in the study. Data were collected as part of a multicenter randomized controlled trial (RCT) in which participants were randomly assigned to VR-CBT (n = 58) or usual treatment (TAU; n = 58). Participants completed questionnaires and interviews to assess demographic and clinical characteristics before (T0) and directly after treatment (8-12 weeks; T1). A moderator analysis was conducted to examine the influence of baseline demographic and clinical characteristics on treatment effects.

Results: Greater severity of safety behaviors at baseline resulted in greater benefits of VR-CBT on paranoid ideation (paranoid ideation interaction effect -0.66, 95% CI -1.24 up to -0.08; p=0.03). A higher age resulted in greater benefits of VR-CBT on social interaction anxiety (social interaction anxiety interaction effect -0.41, 95% CI -0.83 up to 0.00; p=0.05). There was no evidence of moderation of treatment effects by any of the other sociodemographic or clinical variables for paranoid ideation and social interaction anxiety.

Conclusions: Our findings suggest that a diverse spectrum of patients, with different backgrounds, circumstances, clinical presentations, symptom severity (specifically high levels of safety behaviors) and clinical profiles may be able to benefit from VR-CBT. Therefore, we would recommend VR-CBT to a broad spectrum of patients with psychotic disorders, and particularly those with high levels of safety behaviors, including severe avoidance.

Symposium Psychosis 1, november 9, 2023, 13:40 - 14:25

Oral

Virtual Reality Supported Therapy for Negative Symptoms: A Pilot Randomised Controlled Trial

Dr. Matteo Cella[1]
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Background: Negative symptoms are common in people with schizophrenia and linked to loss or reduction of normal functioning as a result of reduced motivation and pleasure experience. Despite their importance the development of interventions for negative symptoms has received very limited attention. This study aims to develop and evaluate a novel Virtual Reality (VR) assisted Therapy for the Negative Symptoms of schizophrenia (V-NeST) and assess its feasibility and acceptability.

Method: A single blind randomised controlled study with two conditions: V-NeST plus treatment-as-usual (TAU) vs. TAU alone. Participants are people with psychosis under the care of community mental health services in the UK. Assessments is at baseline and 3-month post-randomisation. The primary outcome is client therapy goal achievement, secondary outcomes are negative symptoms and functioning. Acceptability is evaluated using interviews and content analysed qualitatively. Feasibility parameters are also assessed. The therapy effect is reported descriptively.

Results: Thirty participants were recruited in the study (15 randomised to V-NeST). Four participants dropped-out of the study (i.e. two in the active arm and two in TAU). Those attending therapy were able to attend 75% of the sessions offered. The main outcomes completion was over 80% and the study procedures feasibility was good. Participants' feedback suggested the therapy was acceptable and considered valuable. There was indication of positive changes in the study outcomes associated with V-NeST.

Discussion: Psychological therapies for negative symptoms can benefit from using engaging and immersive digital technologies such as VR. The acceptability and ease of use of this technology is appropriate for people with schizophrenia experiencing negative symptoms and the study procedures and therapy were well tolerated. Further studies should continue to develop this approach and formally evaluate its efficacy.

Symposium Psychosis 1, november 9, 2023, 13:40 - 14:25

FaceYourFears: Virtual reality-based CBT for paranoia

Ulrik Nykjær Jeppesen[1]
[1]VIRTU - Copenhagen Centre for Mental Health, Copenhagen, Denmark

Introduction:
Paranoia frequently occurs in schizophrenia. Cognitive Behavioral Therapy (CBT) has shown small to moderate effect-sizes. The behavioral part of therapy is difficult to perform and an improvement may increase therapy efficacy.
In virtual reality, exposure and experiments can be personalized in safe and controlled conditions. Preliminary research shows promising results in alleviating paranoia, but more research is needed. We are therefore conducting the hitherto largest randomized clinical trial (RCT), comparing VR-CBT with traditional, symptom-specific CBT, for paranoia in schizophrenia spectrum disorders (ICD-10 F20-29). We hypothesize that VR-CBT will show superiority in reducing clinical symptom, improve social cognition, daily functioning, and quality of life.

Method:
Randomized, assessor-blinded, clinical trial with parallel intervention arms, fulfilling the CONSORT criteria. 256 participants are allocated to either VR-CBT + treatment as usual (TAU) or traditional symptom-specific CBT + TAU. Both groups receive 10 individual sessions and are assessed at baseline, treatment cessation (3 months post baseline) and 9 months post baseline. A stratified block-randomization with concealed randomization sequence will be conducted. Independent assessors blinded to the treatment evaluate outcome. Primary outcome is level of ideas of persecution measured with Green Paranoid Thought Scale (GPTS).

Preliminary results for included participants:
At total of 232 participants are included, 167 have completed 3 mo. follow-up assessment and 106 9-mo follow-up.
Female: 56%, male: 44 %
Age: Mean 30 yrs. SD 10,5 yrs. Median: 27 yrs. Range: 18-72 yrs.

Diagnosis: Paranoid schizophrenia: 61,3 %, schizotypal disorder: 18,2 %, other subtype of schizophrenia 10,7 %, delusional disorder: 4,7 %, schizo-affective disorder: 3,4 %, non-organic psychosis: 1,7 %.
Vocational functioning: In job: 17%, studying: 17%, unemployed: 45 %, retired: 17 %, other: 4 %.
Ideas of persecution (GPTS) baseline: Mean 40,3 SD 15,3.
Level of functioning, PSP: Baseline: Mean 43.5, SD 12,5.
Positive symptoms, SAPS total global: Baseline: Mean 21,4 SD 12,0.
Attrition rate: VR-CBT: 13,9 %; CBT: 20,3 %.
Descriptions from participants and therapists will be presented at the conference.

Conclusion:
While the study is ongoing, preliminary findings indicate the interventions to be tolerable with the potential for significant changes. Trial results with follow-up data are expected ultimo 2024.

Symposium Psychosis 1, november 9, 2023, 13:40 - 14:25

Sessions Friday November 10 2023

Symposium Trauma

Virtual Reality treatment for Posttraumatic Stress Disorder: two novel approaches

Rick de Haart, Nicola Klein

Background
Virtual Reality interventions are considered experimental interventions for PTSD according to the Dutch treatment guideline for PTSD. Currently, two novel approaches are studied at the Trauma Center of GGZ Drenthe in the Netherlands. The first approach is a Virtual Reality exposure treatment in which patients walk on a treadmill towards self-selected, trauma-related pictures, called 3MDR.

In the second approach, patients use a VR headset through which they receive an EMDR session, called Virtual Reality EMDR. To date, there is no empirical evidence for this VR intervention.

Method
In a multicenter randomized controlled trial the effectiveness of 3MDR in uniformed personnel with PTSD was investigated. Participants (N = 134) either received 3MDR treatment or regular trauma-focused treatment. PTSD symptoms were measured before, and after treatment, and at 3 and 6 months follow-up.

Currently, a feasibility study (N = 16) into VR-EMDR is ongoing in veterans with PTSD. In this study we study the feasibility of VR-EMDR as an add-on intervention to regular EMDR treatment. Participants rate the feasibility of the VR-EMDR session after each session they perform in their home environment. After treatment, participants are interviewed about their experience using this VR application.

Results
In this presentation the current evidence of Virtual Reality interventions for PTSD will be discussed. Moreover, two studies will be discussed investigating two different VR approaches for PTSD (3MDR and VR-EMDR).

Conclusion
To date, VR interventions are considered experimental treatments for PTSD. Results of these studies contribute to determining the effectiveness and/or feasibility of VR interventions.

Symposium Trauma, november 10, 2023, 10:30 - 11:30

Oral

Virtual reality to support the development of psychological first aid skills in healthcare workers: identifying relevant training scenarios.

Prof. Dominique Therrien[1], Professeure Evy Nazon[1], Professeur Stéphane Bouchard[1], Professeur Daniel Milhomme[2], Professeure Nancy Granger[3], Ph D. (c) Aicha Taamalli[3], Ph D. (student) Marwa Haddad
[1]Université du Québec en Outaouais, Gatineau, Canada, [2]Université du Québec à Rimouski, Lévis, Canada, [3]Université de Sherbrooke, Longueuil, Canada

As part of this conference, we would like to present the rational leading to the development of virtual reality (VR) simulation scenarios aimed at developing psychological first aid (PFA) skills in healthcare workers. PFA requires the mastery of skills such as recognizing distress in others, approaching colleagues, listening to them, supporting them, and referring them to specialized resources when necessary (Jorm, 2012). VR enables recreating a variety of scenarios in which learners can be immersed to practice and develop these very skills to promote resilience (Everly, 2020) in a multitude of contexts (Bond et al., 2019). The first step is to select which VR scenarios to create to be evocative of work situations while being relevant to developing the expected skills.

The ongoing study has identified relevant training opportunities for acquiring and practicing PFA skills, which will then be used to develop VR scenarios. Participants were recruited from the psychiatric sector of a public healthcare organization (14,000 employees) using the reasoned choice method, i.e., their immediate superiors invited them to share their experience with the research team because they are leaders in peer support. To favour a diversity of perspectives, staff from both urban and rural services were recruited. Based on a questionnaire exploring informal support provided between colleagues, individual interviews and group workshops with health and social care workers in psychiatry (7 of the 21 planned), we have gained a better understanding of the ways in which PFA skills are put into practice during critical moments of mutual support between colleagues. The qualitative analysis shows that offering informal help is customary, but not self-evident. It depends on cultural, interpersonal, and organizational factors. Indeed, daring to intervene depends on whether one knows the person being helped, on the configuration of the workplace, on the availability of the helper, and on the range of approach strategies available to him or her to make contact with the person being helped. The data shows that the skill labelled "daring to intervene" is a key target for the development of PFA training in VR.

Symposium Trauma, november 10, 2023, 10:30 - 11:30

IMMERSE: a new Trauma-focused VR-treatment for Military Personnel and Veterans with PTSD

Remco van Zijderveld[1], Prof. Dr. Elbert Geuze[1], Prof. Dr. Eric Vermetten, Dr. Bastiaan Bruinsma[1]
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Current golden standard trauma-focused therapies focus on repeated exposure of the traumatic memory and fear extinction. However, these treatments seem to have limited effectiveness for military personnel and veterans, for instance due to higher levels of avoidance. Therefore, a new Virtual Reality (VR) trauma-focused treatment has been developed to mitigate avoidance during the exposure sessions. Relaxing environments are presented through a head mounted display (HMD), in which patients will use a virtual photo book to go through photos and videos that are reminiscent of the traumatic memory. This treatments incorporates several multi-sensory elements, such as odors, sounds, heat or wind, to enhance the immersion of the VR-sessions. Therapists are in constant communication with the patient via a webcam and monitor their focus through eye tracking and arousal via respiratory and heart rate measurements. In this open label uncontrolled pilot study, the current aim is to examine the feasibility and acceptability of this new treatment. Besides, preliminary effectiveness is tested by means of reduction in PTSD and depressive symptoms, depression and increases in wellbeing. Preliminary findings (N=5) suggest that the VR-treatment is safe, and more importantly, PTSD symptoms do not increase following the completion of the treatment.

Symposium Trauma, november 10, 2023, 10:30 - 11:30

Effects of autonomous EMDR-VR on the efficacy and accessibility of EMDR treatment for PTSD and trauma

Dr. Ilse Verveer, Sophie Dekker, Patricia Kuperij
[1]Mentaal Beter, Hilversum, The Netherlands

Background: Post Traumatic Stress Disorder (PTSD) is one of the most prevalent mental disorders addressed in primary mental healthcare settings in the Netherlands. Eye Movement Desensitization and Reprocessing (EMDR) therapy is a first-choice treatment for PTSD. However, the scarcity of therapists and the escalating prevalence of mental health disorders pose challenges to providing prompt and high-quality EMDR therapy to all individuals necessitating it. To address this challenge, digital autonomous tools capable of acting as substitute interventions offer a potential solution by sparing practitioner resources. Particularly, the application of EMDR in a Virtual Reality (VR) environment (EMDR-VR) holds substantial promise. This study seeks to investigate the effects of autonomous EMDR-VR on the efficacy and accessibility of EMDR treatment for PTSD and trauma.
Methods: In a practice-based controlled study employing a pre-post test design, we enlisted 80 clients from the mental healthcare organization Mentaal Beter. Eligible participants met DSM-5 criteria for PTSD or comorbid psychiatric disorders with trauma-related symptoms. The experimental group underwent autonomous EMDR-VR sessions at home, totaling four sessions over two weeks, in conjunction with conventional EMDR treatment. Conversely, the control group solely received standard EMDR therapy. Pre- and post-intervention evaluations encompassing PTSD symptoms and trauma were conducted for both groups using the PTSD Checklist for DSM-5 and the Brief Symptom Inventory. Additionally, we compared client satisfaction, number of conventional EMDR sessions needed, and treatment duration between the two groups.
Results/hypotheses: We hypothesize that fewer conventional EMDR sessions will be necessary subsequent to autonomous EMDR-VR, as compared to treatment as usual (TAU). Furthermore, we anticipate an equivalent reduction in PTSD and trauma symptoms within the experimental group, and similar client satisfaction, when contrasted with the control group. The results are expected in October 2023.
Discussion: This study represents a first exploration into the utilization of autonomous EMDR-VR as a replacement for conventional EMDR therapy sessions in PTSD and trauma. We anticipate that the findings will indicate a reduction in EMDR sessions involving practitioner interaction, while maintaining treatment quality and client satisfaction. Such an outcome could be revolutionary for mental healthcare, enhancing accessibility, minimizing waiting lists, and expediting therapeutic outcomes.

Symposium Trauma, november 10, 2023, 10:30 - 11:30

Symposium Eating disorders

Virtual reality-based attentional bias modification training to improve the efficacy of mirror exposure therapies: user experience optimization with healthy women and preliminary results with patients with anorexia nervosa.

Franck Alexandre Meschberger-Annweiler

Introduction. Mirror exposure therapies (METs) have been shown to be effective in reducing anorexia nervosa (AN) symptomatology through habituation process. Virtual reality (VR) combined with eye-tracking (ET) techniques can provide innovative solutions to some of METs' limitations reported with AN patients, especially the negative influence of body-related attentional bias (AB), which may limit its efficacy.

Method. An attentional bias modification training (ABMT) was initially adapted for the VR environment from previous studies. The ET feature integrated into the VR head-mounted display was also used to assess directly and objectively the AB in real-time. As a first step, the ABMT procedure was evaluated with sixty healthy college women, to optimize its duration and assess its effectiveness and user experience. The resulting optimized procedure was then applied to four adolescent females with AN. Over five exposure sessions, patients were immersed in a VR environment and were embodied in a real-size body virtual avatar reflected in a mirror, that gradually increased body mass index (BMI) until reaching a healthy BMI in the last session. In every session, the participants completed the ABMT followed by the MET.

Results. The first study with healthy women showed that ABMT was effective in reducing AB significantly after 150 trials (about 10 minutes long). Additionally, the software received an acceptable "C rating" on a scale from "A" (most usable) to "F" (least usable). Overall, the second study with four AN patients revealed that applying the ABMT before the MET over five weekly sessions enabled a reduction of AN symptomatology (body dissatisfaction, drive for thinness, weight-related body parts anxiety, body checking behaviours) and an increase in body appreciation, in three of the four participants. Only one patient showed no improvement, which may be caused by higher body anxiety and lower full body ownership illusion (lack of identification with the virtual body) of this participant.

Discussion. This augmentation of MET by means of VR-ET-based ABMT achieved promising results for reducing AN symptomatology. To advance this preliminary study and evaluate the effectiveness of incorporating ABMT into MET, a controlled randomized clinical trial will be conducted.

Symposium Eating disorders, november 10, 2023, 10:30 - 11:30

Oral

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Investigating self-disgust in anorexia nervosa using virtual selves

Klaske Glashouwer

Introduction
One of the most enigmatic features of anorexia nervosa (AN) is the excessive restriction of food intake. How do individuals with AN succeed in opposing the strong biological urge to eat, where common dieters typically fail? We propose a theoretical model that points to disgust-induced avoidance as a mechanism that can help explain the persistent and excessive food restriction in individuals with AN. The core hypothesis is that the source of disgust is not food per se, but the implied impact of food on the own body (i.e., "becoming fat"). Following this perspective, food restriction serves the avoidance of self-directed disgust by preventing (perceived) appalling changes in body size.

Method
To test our hypothesis, it is crucial to study self-disgust in real-time. However, when food restriction in AN is driven by the anticipated appalling consequences of food ingestion on weight and shape, responses to the current body might not provide relevant information. Therefore, we developed a VR paradigm in which we can expose individuals to their own body with different sizes including overweight. Facial electromyography (fEMG) will be used as a specific index of psychophysiological disgust responses next to self-report measures.

Results and discussion
We will present the VR paradigm which we want to use in the upcoming years to assess disgust towards the own (overweight) body in AN and test the validity of our theoretical model. In addition, clinical implications and potential interventions to decrease self-disgust in individuals with anorexia nervosa will be discussed.

Symposium Eating disorders, november 10, 2023, 10:30 - 11:30

Combined use of Virtual Reality and Eye-Tracking techniques: new opportunities for the study of body dissatisfaction and self-disgust as main onset and maintenance factors of anorexia nervosa.

Franck Alexandre Meschberger-Annweiler

Introduction. Body dissatisfaction (BD) has been shown to be one of the strongest risk and maintenance factors of anorexia nervosa (AN). Moreover, recent theorical model introduced self-disgust (i.e., intense negative feelings of revulsion, and overwhelming and irresistible urge to avoid potential disgust elicitors) as a factor that could lead to avoidance behaviours when patients with AN face their body, and make individuals vulnerable to relapse. These variables may also influence body-related attentional bias (AB) (e.g., selective attention towards weight-related body areas), which contributes to limiting the efficacy of body exposure therapies. The combined used of virtual reality (VR), with high ecological validity, and eye-tracking (ET) function built into the VR head-mounted display, enabling the direct and objective assessment of AB in real-time, allowed to set up two studies, which aimed to better understand the relationship between BD, self-disgust and AB.
Method. In the first study, 116 college students were immersed in VR environment, where AB was assessed during 30-second free exposure to the participant's avatar reflected in a virtual mirror. AB was recorded through the HMD ET function and processed using OGAMA software. BD and self-disgust were assessed through questionnaires, to check if they significantly predicted AB (through multiple linear regression analyses). In the second study, a similar VR-ET-based procedure enabled a correlation analysis between self-disgust and AB, both assessed in specific body areas (i.e., weight- and non-weight-related), and in different groups with high or low BD.
Results. Analyses of the first study showed that both BD and self-disgust predicted AB, but in the opposite way: while BD regression coefficients were positive (greater fixation towards weight-related body parts as BD increased), self-disgust ones were negative (avoidance of weight-related body parts as self-disgust increased). The second study showed a positive significant correlation between self-disgust and AB, both assessed in weight-related body areas, but only in individuals with high BD.
Discussion. These studies showed how the combined use of VR and ET offers new opportunities to assess body-related AB, improve research to understand the underlying mechanisms that contribute to the onset and maintenance of AN symptomatology, and enhance AN treatment.

Symposium Eating disorders, november 10, 2023, 10:30 - 11:30

A cognitive reappraisal intervention for the reduction of anxiety in eating disorders: an experimental study with exposure in virtual reality

Eline de Rijk

Introduction: High anxiety levels are a common and significant feature of eating disorders (EDs). One contributing factor to this association is the presence of emotion regulation difficulties. Individuals with EDs often employ maladaptive emotion regulation strategies, such as expressive suppression, while relying less on adaptive strategies, like cognitive reappraisal. Training reappraisal abilities might be effective in reducing anxiety levels. Virtual reality (VR) creates realistic and controlled environment where patients can safely confront and process their fears (Clus et al., 2018; Colombo et al., 2021). Therefore, the main goal of the current study was to induce anxiety in people with EDs by exposure to a VR restaurant setting and to examine whether training reappraisal leads to changes in anxiety levels.

Method: The present sample consisted of N=34 (total goal N=46) individuals with an ED diagnosis. Participants were randomly assigned to a cognitive reappraisal or an expressive suppression condition. All participants firstly entered a neutral setting (i.e. a park) followed by the anxiety inducing restaurant. Before, during and after exposure to the restaurant, self-reported anxiety, heart rate and skin conductance were measured. Additionally, ED psychopathology, emotion regulation strategies and ED subtype were investigated to explore for which individuals the intervention was effective.

Results: Our preliminary findings demonstrated that a VR restaurant could effectively induce self-reported and physical anxiety among individuals with EDs (p <.001). Contrary to our expectations, anxiety levels did not decrease more in the reappraisal condition compared to the suppression condition (p =.289). ED subtype and prior emotion regulation strategies did not moderate these effects. However, a higher level of ED psychopathology increased levels of anxiety.

Discussion: Although VR appears to be an effective tool to increase anxiety in individuals with an ED, cognitive reappraisal was not superior to expressive suppression in reducing anxiety. This could be due to the fact that suppression is effective in the short term (Larsen et al., 2013), implicating that multiple sessions might be needed to effectively employ cognitive reappraisal and decrease the use of suppression to reduce anxiety levels for individuals with EDs. Final results will be discussed at the VR symposium

Symposium Eating disorders, november 10, 2023, 10:30 - 11:30

Workshop 2 Kana

Kana VR - Stress is a gift. You can learn how to play with it.

Anne-Rixt Cnossen[1]
[1]Kana, Leeuwarden, The Netherlands

We are Kana, an innovation lab, originated from a large psychology practice in Leeuwarden. We are driven by the bold idea to turn new research about the upside of stress and stressmindset into powerful tools to help people thrive and boost mental health.

One of our tools is Kana VR, a virtual reality game played in an inspiring environment. In Kana VR we have mixed psychology, biology, neuroscience and technology into unique, easy to use and effective experiences with the goal of helping people discover and master their personal stress system. At the same time people are encouraged to develop a stress-is-enhancing mindset. That is, the belief that stress has beneficial effects regarding health, goal-attainment, performance, and recovery

As a player in Kana VR, your experience is tailored by your personal stress system, measured through an ECG biofeedback sensor. The gameplay and environment will respond and change, in real-time, based on how your stress response works and how you are able to deliberately influence that response. The gameplay in Kana VR entails for example deliberately stressing to climb a 'stress rope', or deliberately relaxing to calm down a nest of stinging wasps. During sessions with Kana VR, a certified Kana Specialist is present to set goals, evaluate together with you and help transfer the learned skills to daily life.

We aim to reach as many people, from business specialists to healthcare professionals, students and high performers, as well as people who are sick or want to amplify. With Kana VR we aim to teach all those people insights into their personal stress system and use that wisdom to their advantage. Because being smart with stress means that you are in control and able to create health stress rhythms, perform when needed, recover faster and create greater overall health.

Workshop:
A presentation about the theory behind Kana Tools.
1 or 2 people can play Kana VR and others learn by watching and listening as we tell about experiences and interpretations.

Max number of participants: maximum number in the room.
Extra: General stand so people can experience Kana VR in between sessions.

Workshop 2 Kana, november 10, 2023, 10:30 - 11:30

Symposium Innovations 1

iSCAN project: Examination of gaze behavior in social anxiety disorder using a virtual reality eye-tracking paradigm: a case–control study

Fatime Zeka

Introduction: Social Anxiety Disorder (SAD) has a high prevalence, an early onset and is considered a risk factor for developing other mental disorders, stressing the importance of an early detection of SAD as a strategy for prevention of chronicity and comorbidity. Early detection of the disorder may be aided by identifying behavioral markers of the disorder. In SAD gaze behavior is considered aberrant hence may be a behavioral marker. Gaze behavior is typically examined using eye-tracking; a technology that enables a direct measure of visual attention by recording overt eye movements directly and continuously in real time.

Experimental paradigms, consisting of viewing static images of emotional faces, has been a prevalent method to study gaze behavior, however with inconsistent results. Employing naturalistic contexts to conduct experiments is recommended due to its high ecological validity.

The advances of Virtual Reality (VR) technology involve the integration of eye-tracking in head mounted VR displays, opening up for possibilities to conduct experiments with high ecological validity since VR technology allows a simulation of real-life environments.

The objective of the iSCAN project is to examine gaze behavior as a potential behavioral marker for SAD utilizing a VR-based eye-tracking paradigm.

Methods: A case–control study design is employed including a clinical sample of 29 individuals with SAD and a matched healthy control group of 29 individuals. Participants are presented to stimuli in VR consisting of high-res 360° 3D stereoscopic videos of three social-evaluative tasks designed to elicit social anxiety. To collect gaze data, eye movements are tracked using eye-tracking integrated in the HTC VIVE Pro Eye HMD. The Imotions software is used to collect, calculate, and analyze gaze-based data. The outcome measures are eye movement data consisting of fixation-based parameters and raw data parameters. The study will investigate between-group gaze behavior differences during stimuli presentation.

Results: Preliminary results may be presented at the conference.

Discussion: Determining behavioral markers may have important clinical implications, not only for enhancing the understanding of the etiology of SAD but also by attempting to develop a VR-based eye tracking as an objective screening tool that may aid the assessment of SAD.

Symposium Innovations 1, november 10, 2023, 10:30 - 11:30

Oral

Jumping in at the DEEP end: Evaluating and Implementing VR Biofeedback Game DEEP in Forensic Inpatient Care

Lisa Klein Haneveld[1]
[1]Stichting Transfore, Deventer, The Netherlands

Background: Psychosocial problems, low treatment motivation and suboptimal cognitive skills often occur in forensic psychiatric patients. Technologies that focus on doing and experiencing could offer an alternative to existing treatment for this group of patients. A promising technology is DEEP, a virtual reality biofeedback game that teaches diaphragmatic breathing. DEEP has already shown its potential in other populations. This research project aimed to identify if, how and for whom DEEP can be of added value in forensic psychiatric inpatient care.

Methods: The first study used a qualitative approach by conducting focus groups with healthcare providers and semi-structured interviews with patients on the potential added value of DEEP. Second, a single-case experimental design (SCED) was conducted to gain insight in the short- and long-term effect of DEEP. For three weeks, six Dutch forensic inpatients with aggression-regulation problems participated in individual DEEP-sessions, with three days in between each session. Participants were monitored continuously, using experience-sampling, physiological data, validated questionnaires and interviews. Third, to examine the applicability and implementation of DEEP, a pilot study was conducted in which DEEP was used for three months in two forensic psychiatric inpatient clinics.

Results: The first study showed that DEEP has much potential as a way to provide relaxation on the short term and teach patients emotion regulation skills. The second study showed that DEEP was effective in reducing short-term physiological arousal. Additionally, some participants showed a significant decrease in stress during the SCED. However, some patients stated to find it hard to use deep breathing in daily life as they were not always physically aware of their negative emotions. Finally, the third study provided insights into how DEEP should be implemented in practice.

Discussion: With its experience-based and gamified design, DEEP shows value for forensic mental healthcare. If implemented well, DEEP can offer new ways to provide forensic psychiatric patients with coping strategies to better control their anger. However, more research is needed to 'deep breathing' and 'interoceptive awareness' to support patients to recognize their negative emotions, effectively use their deep breathing and prevent aggressive outbursts.

Symposium Innovations 1, november 10, 2023, 10:30 - 11:30

A pilot of virtual reality hypnotherapy in healthcare students

Dr. Aileen O'Brien[1]
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Introduction
Universities are struggling to provide adequate support for students experiencing mental health difficulties, especially since the Covid pandemic. There is evidence that hypnotherapy can be helpful in anxiety, and that virtual reality (VR) can be of use in combination with established psychological therapies. There is also some evidence that VR can help facilitate the induction of hypnotherapy. This study was an observational study piloting a new, specifically designed virtual reality hypnotherapy experience in healthcare students.

Methods
The virtual reality clinical hypnotherapy experience lasting approximately eight minutes was available in an oculus headset. Students St George's University of London tried it every day for three days. They completed measures of wellbeing and stress before and after the three day experience and on each day pre and post pulse, blood pressure and analogue scales measuring stress and anxiety were performed. They were asked to fill out a feedback questionnaire at the end of the three days and the content was analysed using conventional content analysis. Quantitative measures were analysed using ANOVA and pair sampled t tests.

Results
Fifteen students took part in the study. All attended and no students reported any ongoing adverse effects. There was a significant improvement in well-being at the end of the intervention period, reflecting a moderate effect and a significant decrease in PHQ-2 scores. Both perceived stress and anxiety numerically decreased at intervention end but differences with pre-intervention scores on the corresponding measures were not significant and effect sizes were modest in both cases. There were significant improvements on all the Analogue scale measures and in pulse rate but not in blood pressure.

Discussion
Participants overwhelmingly described the experience as positive, especially in terms of the guided breathing and immersion. The majority reported feeling more relaxed and some described an intention for future use, volunteering that they thought this would be useful around exams. The results of the pilot suggest this may be a useful intervention to aid stress in a student population; further research and evaluation is warranted.

Symposium Innovations 1, november 10, 2023, 10:30 - 11:30

Symposium Psychosis 2

Voice-hearers' experiences with virtual reality-assisted therapy for persistent auditory hallucinations

Lisa Charlotte Smith[1,2], MSc Lise Mariegaard[1], MSc, PhD Ditte Lammers Vernal[3,4], MSc Gry Jørgensen[1], MD Annette Gosvig Christensen[5], MSc Fatime Zeka[1,6], MD, PhD Nikolai Albert[7], Msc, PhD Julie Midtgaard[2,8], MSc, PhD Neil Thomas[9], MSc, PhD Carsten Hjorthøj[7,10], MSc, D.M.Sc, PhD Louise Birkedal Glenthøj[1,6], MD, D.M.Sc, PhD Merete Nordentoft[2,7]
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Background: In a currently active randomised controlled clinical trial (CHALLENGE) it is tested whether nine sessions of a novel virtual reality (VR)-assisted psychotherapy for persistent auditory verbal hallucinations can decrease the severity of auditory hallucinations and enhance daily functioning in patients suffering from schizophrenia spectrum disorders. With the use of qualitative data from a smaller experimental sub-study (N=15), the focus of this oral presentation is on participants' experiences with VR-assisted therapy. This experimental sub-study's primary aims are to improve therapy effectiveness through minor software modifications, meanwhile also conducting an in-depth qualitative exploration of the voice-hearers' experiences with VR-assisted therapy.
Methods: During the VR-assisted therapy, participants create an avatar that corresponds to their visual perception (or imagination) of the source of their most dominant voice. Additionally, and with the use of a software program the voice of the therapist is transformed to sound like the voice heard by the participant. Part of therapy is conducted in virtual reality with the therapist initiating a dialogue between the participant and the avatar by alternating between talking as the avatar and as a supportive therapist. Throughout therapy the focus is on gradually altering the relationship between the participant and the avatar with the avatar becoming less dominant.
In the sub-study, all participants were interviewed after finishing therapy. The semi-structured interviews covered themes such as 'treatment motivation,' 'acceptability,' 'feasibility,' 'tolerance,' 'empowerment,' 'transferability,' 'effectiveness,' 'adverse effects,' 'collaboration with the therapist,' and 'sense of security.' The themes were addressed through broad, open-ended questions to capture participants' immediate experiences.
Results: The qualitative data brings forward a patient perspective, exploring on the therapy's impact on empowerment, self-awareness, and voice relationship. It also assesses acceptability in handling voice confrontation in VR therapy and the potential for improving VR therapy.
Discussion: Preliminary quantitative findings indicate that the method of conducting therapy with the use of an avatar in VR is promising. It is important to enhance our understanding of the intervention and possibly further qualify it by learning from voice-hearers' important, first-hand experiences with VR-assisted therapy.

Symposium Psychosis 2, november 10, 2023, 14:15 - 15:15

Oral

Out of Touch with Reality: The EMPoWVR-ZN (Exploring Mechanisms of Psychosis With Virtual Reality in KwaZulu-Natal) study

Dr. Thejini Naidoo[1], Prof. Bonginkosi Chiliza[2], Prof. Stefan Du Plessis[3], Prof. Wim Veling[4]
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Introduction
Virtual reality (VR) offers the advantage of exposure to controlled social environments thus enabling the study of a variety of mental disorders. Despite over a decade of research in this area indicating such VR exposures are safe to use in patients with psychotic disorders, there is a paucity of research conducted in this area in low-to-middle income countries (LMICs). The aim of this study is to investigate environmental mechanisms of psychotic disorders within the South African context.

Methods
This case-control study forms part of PSYchosis MAPping in KwaZulu-Natal (PSYMAP-ZN) study. Interactive, immersive VR experiments were designed to assess symptoms and mechanisms of psychosis using CleVR Social Worlds software. Measures before, during and after VR experiments are being administered.
Measures from the baseline PSYMAP-ZN assessment are included.
Prior to VR exposure, questionnaires are being administered to assess paranoid thoughts, social anxiety, perceived stress, momentary mental states, negative and positive beliefs about self and others, sensory gating, simulator sickness, perceived poverty, perceived discrimination and subjective social status.
Baseline physiological stress, stress during the VR experiments as well the VR experiments themselves are being recorded. VR exposures are a bar environment looking at population density and social interaction/stress; as well as a LMIC suburb environment with cues that elicit an implicit fear response. After each experiment the following is assessed: paranoia, momentary mental states and the experience of the experiments (qualitative questions).
After the last experiment, simulator sickness, presence and acceptability and cultural appropriateness (qualitative questions) of experiments is assessed.
Regression analyses will be conducted with responses to VR stressors as dependent variables and variables obtained from the PSYMAP-ZN data as covariates.
The recordings of the experiments will be analysed by rating social behaviors and gaze directions. The interview questions will be analysed with qualitative methods.

Results and discussion
The design of VR experiments was adapted for local context, making sure that environment, avatars and scenarios are acceptable and relevant for KZN. The pilot study has been conducted and the case-control study is ongoing, with 20 cases and 37 controls included. Preliminary results of statistical analyses will be presented at the conference.

Symposium Psychosis 2, november 10, 2023, 14:15 - 15:15

Symposium (self)compassion

FutureU: Increasing identification with the future self through virtual reality

Jean-louis van Gelder

Ample research has shown that people's willingness and ability to consider the longer-term consequences of their actions predicts a range of positive outcomes, including improved health, increased goal attainment, and better academic performance. Conversely, a tendency to focus on the more immediate outcomes of one's choices is associated with a host of negative behaviors, such as substance abuse, debt, risk-taking, and delinquency. Recent experimental research has shown that the degree to which people act with the future consequences of their decisions in mind is malleable. This research is premised on the assumption that the degree to which people identify with themselves in the future results impacts on how they weigh immediate benefits against longer-term costs. Stronger identification with the future self, results in more balanced tradeoffs, leading to more future-oriented and less self-defeating behavior.

In this talk, I will present preliminary findings of a recently concluded randomized controlled trial (N=300) testing the effectiveness of FutureU, a virtual reality and smartphone app intervention that aims to increase future-orientation and future-self-identification by connecting people to their future self. Over a period of three consecutive weeks participants, university students, interacted with avatars representing their future self, either in virtual reality or using a smartphone app. Future self-identification was strengthened in the intervention through psychoeducation, exposure to, and interaction with the future self in various tasks. Future-orientation and future self-identification were measured at baseline, at weekly intervals during the intervention, post-intervention, and at 3-month follow-up. Other outcomes include goal attainment, self-defeating behavior (e.g., alcohol and drug use, delinquency), academic performance, self-efficacy, and impulsivity.

Symposium (self)compassion, november 10, 2023, 14:15 - 15:15

Oral

A Single-Session VR Intervention Addressing Self-Compassion and Self-Criticism With and Without Perspective Change: Results of a Randomized Controlled Experiment

Marit Hidding

Background: Excessive self-criticism is an important transdiagnostic psychological factor. On the other hand, self-compassion can contribute greatly to the resilience and recovery of clinical populations, making this an important target for treatment. Virtual Reality (VR) has the potential to improve existing interventions as it allows for personalized roleplays that can be experienced from different perspectives, by using the novel VR technique of perspective change.
Aims: The aim of the study was to investigate the effects of a single-session VR intervention on self-criticism and self-compassion, as well as the added value of changing perspectives.
Method: In total, 68 Dutch undergraduate psychology students with high levels of self-criticism were randomized either to the perspective change condition or the control condition. Participants played two roleplays in which they were instructed to react compassionately toward a virtual character that expressed the participants' own self-critical thoughts. In the perspective change condition, after each roleplay perspective change was used to receive one's own self-compassionate words from the perspective of the virtual character. Self-criticism, self-compassion, self-esteem, positive and negative affect were assessed pre- and post-intervention.
Results: The VR intervention significantly increased self-compassion and decreased self-criticism in both conditions. Furthermore, both conditions enhanced positive affect and self-esteem and reduced negative affect. No differences were found between the conditions. Conclusions: Both VR interventions show positive effects in a subclinical sample. The change of perspectives was not of added value, which indicates that expressing compassion to someone else with similar self-criticism, is sufficient to reduce self-criticism and increase self-compassion.

Symposium (self)compassion, november 10, 2023, 14:15 - 15:15

Protocol for a pilot randomised controlled trial

Emma Jayne Kilford

Excessive self-criticism is a key psychological process influencing susceptibility to and maintenance of depression. Self-compassion can provide balance to self-criticism by enabling processes of self-acceptance and self-reassurance. Although compassion-based therapies are effective, they can be relatively time-consuming and costly, and can be challenging for those who struggle to draw upon previous compassionate experiences or find mental imagery difficult.

We have previously demonstrated that immersive virtual reality (IVR) can be used to create scenarios which help both self-critical individuals and patients with depression develop their capacity for self-compassion and use it to counter self-critical narratives. For patients, this was also associated with clinical improvement in depression symptoms. The IVR scenario is based upon embodiment theory, in which having one's body synchronised with a virtual one creates an illusion of body ownership. By delivering compassion in one virtual body and receiving it in another, it is possible to simulate the experience of receiving compassion from oneself. This scenario has now been developed into a brief intervention for depression, incorporating recent technological innovations and lived experience expertise.

The primary objective of this study is to assess the feasibility and acceptability of conducting a randomised control trial of this IVR intervention. We intend to recruit 50 adults with mild to moderate depression on the waitlist for low-intensity psychological therapy within a local NHS trust. Participants will be randomly allocated to either IVR or waitlist control arms, with those allocated to IVR receiving 4 sessions over 2 weeks. All participants will be assessed at baseline and followed up after approximately 2 weeks and 6 weeks.

Feasibility will be assessed in terms of adherence, demand and uptake, ease of delivery and recruitment capacity. Acceptability will be assessed both quantitatively and qualitatively. Secondary outcomes include symptoms of depression, quality of life, self-criticism and self-compassion.

Providing a range of effective treatments that are cost effective to deliver and can reduce treatment time and relapse rate is a critical goal for mental health research. If successful, the results of this study will inform a subsequent effectiveness trial to determine the extent of clinical improvement associated with the intervention.

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Virtual reality for psycho-education on self-stigma in depression: A randomised controlled trial

Nancy Schipper-Kramer Freher

Introduction
Major Depressive Disorder (MDD) is one of the most prevalent mental health conditions and has a tremendous impact both on those affected and on their significant others. Patients with MDD are often hindered by self-stigma, which diminishes self-esteem and self-efficacy (Corrigan et al., 2005). Moreover, for significant others, taking care of a patient with MDD can result in heavy psychosocial burden. Psychoeducation about depression has proven to be effective in reducing depressive symptoms and self-stigma. Involving a significant other in psychoeducation for depression, may increase mutual understanding and empathy. Virtual reality (VR) offers the opportunity to experience the perspective of having a depression or living with someone with a depression. For this study an immersive VR environment was developed. The main objective of this study is to examine whether our VR psychoeducation intervention is more successful in reducing self-stigma than standard psychoeducation for MDD.

Method
In this randomised controlled trial (RCT), 80 couples of patients and their significant others are randomly assigned to one of two conditions: the VR psychoeducation intervention and standard psychoeducation (Kramer Freher et al., 2022). Patients are aged 18 to 65, diagnosed with MDD. The main study parameter is self-stigma. Secondary parameters include depressive symptoms, loneliness and perceived social support for the patient and burden of care and quality of life for the significant other.

Results & discussion
Self-stigma can hamper recovery of depression and may as such be a target for improving the efficacy of interventions for depression. An effective psychoeducation intervention for depression involving both patients and their significant others, may reduce self-stigma and contribute to better treatment outcome. Since this is an ongoing trial (current status: 54 of 80 couples are included), we are able to share preliminary data and experiences from participants. Preliminary results show that the overall sample of patients reported a mild to moderate level of internalized stigma before intervention (M = 2.45, SD = 0.27), which significantly decreases after the (VR-)psycho-education intervention (Greenhouse-Geisser $F(1.850) = 15.398$, $p < .001$).

Symposium (self)compassion, november 10, 2023, 14:15 - 15:15

Symposium Forensic Psychiatry

Implementation of VR in forensic mental healthcare: lessons learned and future directions.

Hanneke Kip

Introduction. VR has the potential to improve and even transform care for forensic psychiatric patients, mostly due to its unique immersive characteristics that allow for a focus on doing and experiencing, as opposed to talking and thinking. However, the high expectations are not met in clinical practice. One reason for this is disappointing usage, which can be explained by suboptimal implementation. Consequently, the objective of this presentation is to provide an overview of lessons learned regarding the implementation of VR in forensic psychiatry.

Methods. In this presentation, three different studies will be presented. First, the outcomes of a systematic scoping review on the implementation of VR in healthcare are discussed. Second, a case study in which an implementation plan for the introduction of the VR-application of CleVR in forensic outpatient care is presented. Third, the main outcomes of an implementation study in which the VR-game DEEP is used in two forensic inpatient settings are provided.

Results. The scoping review emphasized the importance of not merely identifying implementation barriers, but also systematically developing multi-level implementation interventions, using these barriers and connecting them to evidence-based strategies. In the first case study, we show how we used implementation barriers on different levels (healthcare professionals, patients, the organization, the wider context, and the technology) to identify suitable implementation strategies. In the second case study, we show how we systematically developed a comprehensive implementation intervention based on the Consolidated Framework for Implementation Research (CFIR) and how this was evaluated in clinical practice. The importance of individual 'project champions' that take accountability for the implementation of a VR-application became especially apparent in this study.

Discussion. While the importance of implementation of VR is widely acknowledged, there are not many studies that focus specifically on implementation. As a field, we can use frameworks and methods from implementation science to ensure that evidence-based VR-applications are integrated and evaluated in clinical practice. All three studies have shown the importance and complexity of behaviour change in intended adopters, emphasizing the importance of developing multi-level implementation interventions with a focus on behaviour change.

Symposium Forensic Psychiatry, november 10, 2023, 14:15 - 15:15

Oral

VR for child sex offenders

Fedde Sappelli

In this project, a new VR- treatment for child sex offenders is investigated. Child sex offenders form an important population within forensic psychiatry, and is a sensitive and controversial topic in society. Effective psychological treatment is crucial for safe and successful resocialization. Most treatment is based on avoiding children within society, however in practice complete avoidance is nearby impossible. Treatment for inpatients is complicated because participants have no possibilities to encounter children within the clinic for obvious reasons. Therapy is therefore mainly based on experiences of the past or hypothetical situation. This makes it difficult to understand how a child offender will react and cope in those situations. We think that Virtual Reality can offer an important in-between-step by offering practice environments in preparation of resocialization.

The treatment involves gradual exposure of every-day social interactions with child avatars using the scenarios of Social Worlds (CleVR). For example, meeting a child in a grocery store. The patient and therapist discuss the feelings, thoughts, interests and behaviour directly afterwards those VR-experiences in an open conversation. The aim of this treatment is to increase self-insight and awareness for the patients, which is thought to be a crucial base for effective further treatment and resocialization to society. This project is funded by the Dutch government (KFZ), and is currently conducted within three psychiatric institutes: the Pompestiching, Rooijse Wissel and GGZ Drenthe. The pilot study (n=24) uses questionnaires and a semi-structured interview to explore the added value of Virtual Reality for treatment and to explore further improvements and optimalisations of the treatment. We will present preliminary results and our first impressions of the study.

Symposium Forensic Psychiatry, november 10, 2023, 14:15 - 15:15

Pinpointing change in virtual reality assisted treatment for violent offenders: a pilot study of Virtual Reality Aggression Prevention Training (VRAPT).

David Ivarsson

Introduction

Offenders in forensic institutions is a group with multifaceted problems of crime, substance abuse, psychiatric difficulties and aggression (Fazel et al., 2016; Ståhlberg O et al., 2010; Wallinius et al., 2012). Aggression is associated with deficits in social problem-solving skills (Kelty, 2013) and emotion dysregulation (Calvete & Orue, 2012; Gagnon et al., 2015; Helmsen et al., 2012) and key components of effective treatment are skills training through role-plays based on social problem-solving (Jolliffe & Farringdon, 2009; Papalia et al., 2019). For practical and safety reasons, it is difficult to tailor individual practice situations within the forensic context, affecting the offenders' rehabilitation back to society. Virtual Reality (VR) in treatment programs creates opportunities for both adapted treatment (Ticknor, 2019) and controlled research (Ticknor & Tillinghast, 2011), where Virtual Reality Aggression Prevention Training (VRAPT) is a VR-facilitated treatment (Klein Tuente et al., 2018, 2020), with several evaluations ongoing.

Method:

The study focuses on offenders (N~14) who meet inclusion criteria: 1) sentenced to prison, 2) increased risk of recidivism in crime, 3) need for treatment of aggression. Exclusion criteria for participation: 1) inability to provide informed consent, 2) major deficits in understanding Swedish preventing active participation, 3) epilepsy, 4) indications of acute psychotic state, 5) intellectual disabilities (IQ < 70), 6) suicide risk, 7) security risks that prevent participation, 8) less than 10 weeks remaining time in prison. The study aims to answer questions on how emotion regulation abilities and strategies, aggression, and anger change over time in violent offenders participating in VRAPT and what factors (e.g., pro criminal cognitions) may impact the observed change over time?

Results

Result from Bayesian linear mixed effects models showed a high probability of change from pre-treatment to post-treatment and to follow-up on all outcome measures. All outcome measures demonstrated a low probability of change from post-treatment to follow-up. Analysis of reliable change showed that participants' results ranged from recovery to deterioration.

Discussion

The discussion highlights implications of the study for VRAPT's impact on the target group, those who might benefit, and suggested foci for future studies in the field of VR-assisted offender treatment.

Symposium Forensic Psychiatry, november 10, 2023, 14:15 - 15:15

Patients' experiences from VR-assisted aggression treatment in forensic psychiatry.

Fernando González Moraga

Forensic psychiatric patients have been described as a heterogeneous, challenging, and vulnerable group in both society and clinical settings; their behaviors and clinical status can be traced to a complex constellation of mental disorders, antisocial lifestyle, substance use, and a high degree of impulsivity, and / or lack of empathy. Patient aggression is a known problem in forensic psychiatry and is considered central to patient management, yet there is a scarcity of evidence-based treatments for aggression. There is a strong need for more research to develop and evaluate aggression treatments with all the challenges this implies. Recently, immersive virtual reality (VR) has been identified as a potential tool in assessment and treatment interventions in forensic settings, also with possibilities for treatment of aggression. Improvements in Virtual Reality (VR) have made it possible to create realistic, virtual settings for behavioral assessment and skills training that cannot otherwise be accessed in a safe way in forensic psychiatry settings. VR interventions are under development but little is known how forensic psychiatric patients experience VR-assisted assessments or treatments. The present study aimed to help fill this knowledge gap via qualitative interviews with seven patients at a high-security forensic psychiatry clinic who had completed the newly revised Virtual Reality Aggression Prevention Therapy (VRAPT). All participants were interviewed 12 weeks after the VRAPT intervention, and interview data analysed with inductive content analysis. Six manifest content categories were identified: 1. Therapeutic process, 2. VRAPT method, 3. VR technology, 4. Previous treatment experiences, 5. Challenges to treatment of aggression, and 6. Unexpected experiences. The participants had diverse experiences related to both the VRAPT intervention and forensic psychiatric care. Participants described a mixture of positive experiences in relation to VR-assisted role-plays, and less positive in relation to motivation for aggression-focused treatment and technological limitations with VRAPT. The present findings suggest further studies are needed on how to best implement VR-assisted treatments for aggression in forensic settings, and potentially further modification of treatment content in interventions like VRAPT

Symposium Forensic Psychiatry, november 10, 2023, 14:15 - 15:15

Symposium Innovations 2

Ready Exerciser One: Effects of Virtual Reality and Music on Cycle Ergometer Exercise

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Introduction. Physical activity has a positive impact on mental and physical health. However, physical inactivity remains a major global health concern. Accordingly, researchers have been encouraged to explore the role of technology in the promotion of physical activity. Technologies that deliver audio-visual stimuli are frequently applied in the exercise domain. However, there is a paucity of research that examines the efficacy of modern virtual reality (VR) technology in this context. We investigated the effects of VR and music on affective, perceptual, enjoyment, and cardiac responses to aerobic-type exercise.
Methods. A fully counterbalanced, within-subjects design was employed, and participants (N = 24) completed a 12-min protocol during which they exercised under music, VR, VR-with-music, and control conditions.
Results. Analyses indicated a Condition × Time interaction for affective valence and perceived activation. Moreover, a main effect of condition emerged for state attention and perceived enjoyment. The VR and VR-with-music conditions elicited the most positive affective valence, highest levels of perceived activation, greatest number of dissociative thoughts, and most exercise enjoyment.
Discussion. The present findings illustrate the efficacy of modern VR technology in the exercise context, applied both with and without musical accompaniment. Additional research is required to assess the degree to which the findings are replicable among those with worsened mental health. Given the emerging support pertaining to a positive relationship between physical activity and mental health, VR technology should be considered as a means by which to promote an enjoyable exercise experience.

Oral

Improving cognition to alleviate low mood Symptoms in Post-COVID-19 patients: A Multimodal Immersive Virtual Reality Study.

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Introduction: Adults with post-COVID-19 condition (PCC) may show impairments in several cognitive functions. These cognitive impairments are associated with a higher risk of developing depressive symptoms. Multimodal programs that combine cognitive training, physical activity and emotional tasks, such as mindfulness-based interventions (MBIs), may be a suitable alternative for improving PCC treatments and targeting the bidirectional relationship between cognition and depressive symptoms. Immersive virtual reality (IVR) is a promising technology that can enhance traditional cognitive training, physical activity, and MBIs.

The current study aims to assess the relationship between cognitive gains and mood symptoms following a multimodal IVR intervention. Specifically, we examined whether cognitive gains displayed by patients with PCC significantly predicted greater mood improvement following the intervention.

Methods: Fifteen participants with PCC symptoms underwent a multimodal IVR intervention consisting of MBI, cognitive training and physical exercise, delivered in a 60-min group session of 5 participants, twice a week for 8 weeks (16 sessions). Measures of global cognition, attention, processing speed, verbal episodic memory and subjective memory complaints and mood symptoms were assessed at baseline and after 8 weeks (post-intervention). Cognitive gains were calculated by subtracting post- to pre-intervention scores on all cognitive measures, while mood improvement was calculated by subtracting pre- to post-intervention scores on a mood-related questionnaire (PHQ-9).

Results: Paired sample t-tests showed significant improvements in global cognition, processing speed, verbal episodic memory and mood after the intervention. Pearson correlation analyses showed moderately to highly significant positive correlations between cognitive and mood gains. Lastly, linear regression analyses showed that short-term and long-term verbal memory gains significantly predicted greater levels of mood improvement after the intervention.

Discussion: To our knowledge, no research has integrated cognitive training, physical exercise and MBI using an IVR paradigm in adults with PCC. The use of IVR technology may increase engagement and the individual benefits of these interventions. Despite inherent limitations, our findings represent a pioneering step towards improving cognition and mood outcomes in PCC and understanding their relationship through innovative use of technology and multimodal methods.

Symposium Innovations 2, november 10, 2023, 14:15 - 15:15

Oral

Virtual reality-assisted assessment of paranoid ideation in forensic psychiatric inpatients – a mixed-methods pilot study

Dr. Chris Geraets[1,2,3], Richard Hedström[2,3], dr Kristina Sygel[2], dr Märta Wallinius[2,3]
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Introduction: Reliable and valid assessment of paranoia is important in forensic psychiatry for providing adequate care. VR technology may add to current assessment procedures, as it enables observation within realistic (social) situations resembling the complexity of everyday life. VR constitutes a promising tool within forensics, due to the restricted nature of forensic psychiatric hospitals and ethical challenges arising from observing potentially dangerous behaviors in real life.

Objective: To investigate the feasibility of VR assessment for paranoid ideation in forensic psychiatric inpatients qualitatively by assessing the experiences of patients and a clinician, and to explore how the VR measures relate to established clinical measures.

Methods: One clinician (experienced psychiatrist) and 10 forensic psychiatric inpatients with a history or suspicion of paranoid ideation were included. Patients participated in two immersive VR scenarios (bus and supermarket) during which paranoia was assessed by the clinician. Qualitative interviews were performed with patients and the clinician performing the assessment to investigate experiences and feasibility. Further, measures of paranoia, social anxiety, and positive symptoms were obtained.

Results: Nine out of 10 participants with varying levels of paranoid ideation completed the assessment. Manifest inductive content analyses of the interviews revealed general experiences, advantages such as enabling observing participants from a different perspective, and challenges of the VR assessment, such as a lack of objectivity and the laboriousness of the assessment for the clinician. Although more paranoia was experienced during the supermarket scenario, correlates with classical measures were only significant for the bus scenario.

Symposium Innovations 2, november 10, 2023, 14:15 - 15:15

The Dialogue Study: A randomized clinical trial evaluating the effectiveness of a virtual reality-based treatment for eating disorders.

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Aim:
The majority (94%) of patients with an eating disorder (ED) report experiencing a critical internal voice commenting on weight and self-worth, often referred to as the "eating disorder voice". A more powerful eating disorder voice is related to more serious compensatory behavior and longer illness duration. Within psychotic disorders, a virtual reality-based therapy termed "avatar therapy" has proven highly effective in reducing the power of the psychotic voice and consequently alleviating the associated distress. Building on this evidence we have developed a modified version of the treatment protocol targeting patients with an ED. The aim of the study is to identify whether this VR-based therapy can reduce symptoms, improve quality of life, and be cost-effective in patients with an ED.

Method:
The study is a RCT, enrolling 96 patients with an ED. The patients will be allocated to 7 sessions of virtual reality-(VR)assisted therapy + standard treatment or standard treatment (individual or group therapy and dietary guidance). In the initial stage of the VR-intervention, participants create a computer-generated avatar embodying their eating disorder voice. This enables the person to engage in real time face to face dialogue with the eating disorder voice. The participant is encouraged to stand up to the voice to gain increased control over it. The study will use a mixed methods design. Feasibility and acceptability will be explored by qualitative analysis based on feedback from patients on their experience with the therapy. The effect of the intervention will be assessed by evaluating differences in clinical symptoms and quality of life pre- and post-treatment.

Results:
A pilot study (N=10) is ongoing investigating feasibility and preliminary treatment efficacy. Baseline characteristics and qualitative results from the pilot-study will be presented at VR Mental Health Conference 2023. Results from the RCT are expected in the beginning of 2026.

Discussion:
The pilot-study will provide initial evidence on the feasibility and preliminary treatment efficacy of a VR-based intervention that may be appealing to the target group. If the results of the RCT are positive, it may motivate scalability and potential implementation in the clinics treating adults with an eating disorder.

Symposium Innovations 2, november 10, 2023, 14:15 - 15:15

Posters

EYEdentify - Investigating Unique Eye Gaze Patterns in Adults with Autism Spectrum Disorders Using Virtual Reality

Lars Clemmensen[1], Rizwan Parvaiz[2], Teresa Hirzle[3], Jens Richardt Møllegaard Jepsen[4], Louise Birkedal Glenthøj[1,5]

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Introduction: Individuals with autism spectrum disorders (ASD) often display distinct eye gaze patterns during social interactions, potentially serving as characteristic identifiers for this group. These gaze patterns are typically tracked through eye-tracking devices linked to computer screens exhibiting diverse stimuli. A novel avenue that holds significant promise is the utilization of virtual reality (VR), which offers a host of advantages, including adaptable environments and enhanced control. In this study, our objective is to delve into the eye gaze patterns of adults with ASD within virtual social scenarios. Specifically, we intend to ascertain if VR-based eye gaze patterns can effectively differentiate between:

A. Individuals with ASD and their healthy counterparts.

B. Individuals with ASD dominated by restrictive/repetitive behaviors versus those dominated by deficits in social communication/interaction.

Methods: Constituting a case-control design, this study encompasses 140 participants with ASD and a control group of 50 healthy individuals. Participants will immerse themselves in a VR environment, and their gaze patterns will be meticulously recorded during exposure. The VR scenario will encompass a computer-generated film mimicking a pedestrian street, replete with both social and non-social distractions. Various aspects of participants' gaze behavior will be examined, comparing the two groups on parameters such as:

- Areas Of Interest (AOI): Predetermined zones encompassing individuals, including their eyes and mouth.
- Saccades: Swift gaze shifts from one point to another.
- Gaze point: Focal point of visual attention.
- Fixation: Sequential gaze points in close temporal and/or spatial proximity, indicative of sustained focus on an object.
- Dwell time: Cumulative duration of fixations and saccades within a specific AOI over the total stimulus duration.

Results: The study is presently underway, with patient recruitment commencing in December 2023. We anticipate the presentation of findings by December 2025.

Discussion: Positive outcomes from this investigation have the potential to significantly contribute to expediting and objectifying ASD screening procedures.

Posters, november 9, 2023, 12:20 - 13:40

The Impact of Breath Regulation in an Immersive Environment on Anxiety Reduction

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Introduction: Anxiety is a prevalent mental health concern affecting millions of individuals worldwide (Borwin Bandelow et al. 2015). Various therapeutic techniques have been explored to alleviate anxiety levels, with breath regulation emerging as a promising approach (Amit Rosenberg et al. 2021). This study aims to investigate the potential benefits of using an immersive environment and synchronized breathing with the opening and closing of a lotus flower to reduce anxiety levels in participants (Valentin Magnon et al. 2021).

Methods: 50 participants were recruited for this explorative study and randomly assigned to two groups, each composed of n. 25: an experimental group that engaged in immersive breathing exercises synchronized with the virtual lotus flower, and a control group that experienced an immersive environment without any specific breath regulation instruction. The mmersive environment was created using a technology to provide a visually captivating and realistic experience. Self-report questionnaires were utilized to assess anxiety levels before and after the intervention.

Results: The study found significant differences between the experimental and control groups regarding anxiety levels before and after the intervention. Participants in the experimental group demonstrated a statistically significant reduction in anxiety levels following the immersive experience, whereas no significant change was observed in the control group.

Discussion: The findings of this study highlight the potential of immersive environments combined with breath regulation techniques as a novel approach to reducing anxiety. The use of immersive technology has promising implications for therapeutic interventions, particularly in individuals who may have difficulty accessing traditional therapeutic interventions. Limitations of this study include the relatively small sample size and the lack of long-term follow-up to assess the durability of the anxiety reduction effects. Future research should explore the mechanisms underlying the observed effects and investigate the generalizability of these findings to clinical populations. Nonetheless, this study opens promising avenues for leveraging immersive technologies and breath regulation practices in anxiety management and mental well-being.

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RESTORE: a prospective repeated measures cohort study of the impact of resilience to stress on recovery from depression

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Introduction: High anxiety levels are a common and significant feature of eating disorders (EDs). One contributing factor to this association is the presence of emotion regulation difficulties. Individuals with EDs often employ maladaptive emotion regulation strategies, such as expressive suppression, while relying less on adaptive strategies, like cognitive reappraisal. Training reappraisal abilities might be effective in reducing anxiety levels. Virtual reality (VR) creates realistic and controlled environment where patients can safely confront and process their fears (Clus et al., 2018; Colombo et al., 2021). Therefore, the main goal of the current study was to induce anxiety in people with EDs by exposure to a VR restaurant setting and to examine whether training reappraisal leads to changes in anxiety levels.
Method: The present sample consisted of N=34 (total goal N=46) individuals with an ED diagnosis. Participants were randomly assigned to a cognitive reappraisal or an expressive suppression condition. All participants firstly entered a neutral setting (i.e. a park) followed by the anxiety inducing restaurant. Before, during and after exposure to the restaurant, self-reported anxiety, heart rate and skin conductance were measured. Additionally, ED psychopathology, emotion regulation strategies and ED subtype were investigated to explore for which individuals the intervention was effective.
Results: Our preliminary findings demonstrated that a VR restaurant could effectively induce self-reported and physical anxiety among individuals with EDs (p <.001). Contrary to our expectations, anxiety levels did not decrease more in the reappraisal condition compared to the suppression condition (p =.289). ED subtype and prior emotion regulation strategies did not moderate these effects. However, a higher level of ED psychopathology increased levels of anxiety.
Discussion: Although VR appears to be an effective tool to increase anxiety in individuals with an ED, cognitive reappraisal was not superior to expressive suppression in reducing anxiety. This could be due to the fact that suppression is effective in the short term (Larsen et al., 2013), implicating that multiple sessions might be needed to effectively employ cognitive reappraisal and decrease the use of suppression to reduce anxiety levels for individuals with EDs. Final results will be discussed at the VR symposium

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The influence of near-misses on persistent gambling behaviour in virtual reality environments

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Introduction
Within-game constructs, such as near-misses (NMs), have been established as a key component in the development and maintenance of gambling disorder (GD). Although our understanding of the influence of these constructs on behaviour has increased through substantial experimental research, the context in which these tasks are delivered, and the ecological validity of this research is rarely examined. In this study, we used virtual reality (VR) to increase the ecological validity of the environments in which the behaviour is performed, whilst maintaining the experimental control afforded in traditional paradigms. Furthermore, previous research has indicated that NMs drive persistent gambling most when occurring on 30% of spins. The current study sought to replicate this finding using a more ecologically valid gambling task.

Methods
Participants completed the Problem Gambling Severity Index, the Gambling Craving Scale, Simulator Sickness Questionnaire, a Presence Questionnaire and were assigned to one of three conditions: Computer Generated VR (CGVR), Naturalistic VR (360VR) or a control condition. Participants were invited to complete a minimum of 50 spins, experiencing NMs on either 15%, 30% or 45% of spins. Following the 50-spin experimental phase, participants could continue to spin the reels in the extinction phase, where they experienced only loss outcomes. Persistent gambling, in the extinction phase, was also recorded.

Results
Overall, there was no difference between the 15%, 30% and 45% NMs spin conditions (p=.72). Looking only within each VR type, the 360VR group had most persistent spins on 45% of NMs, and least persistent on 30% of NMs (p= .02), however the other two groups did not show significant effects (CGVR, p = .11 and PC, p = .38). Regarding the sense of presence for each VR type, the overall main effect of condition was significant (p= .002). The CGVR group created a greater sense of presence than the other two conditions (both p <.005).

Discussion
These findings contribute to the validation of VR as an experimental tool in gambling research, and lead to a greater understanding of NMs constructs, which is fundamental to improve the way in which gambling is understood, legislated and regulated.

Paranoid Behaviour & Threat Evaluation in Asylum Seekers with a Psychotic Disorder and Paranoid Delusions: A Phenomenological Qualitative Virtual Reality Study

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Introduction

Asylum seekers have an increased risk of psychosis compared with people from their host country. Among people experiencing psychosis, paranoid delusions are a common symptom. Diagnostic assessments of asylum seekers are challenging due to language differences and potential sociocultural differences in interpersonal social behaviour and communication. The study aims to discover how asylum seekers who experience paranoid delusions behave and evaluate threat in a virtual reality (VR) environment. Improved understanding of the concept of paranoia is expected to contribute to ways of developing non-verbal methods of assessment. Results will also be used to assess the feasibility of a follow-up RCT-study with the same population.

Methods

The study uses a mixed-methods design, combining qualitative phenomenological data and descriptive quantitative data. The study is conducted in the Netherlands and includes patients with a DSM-5 classification of a psychotic disorder with specific delusional symptoms of the paranoid type. Participants are immersed in four VR-scenarios during which their behaviour is monitored, after which their experiences are explored. Using a phenomenological interview approach, we aim to investigate how participants experience the various scenarios, to what extent it arouses their paranoia, and how they react to their environment on a non-verbal level. To further explore non-verbal aspects of paranoid behaviour in this population, psychiatrists working in the field of transcultural psychiatry will be interviewed about their assessment of the paranoid behaviour of participants based on video recordings of the VR-session.

Results
The protocol of this paper will be presented, currently this protocol is being reviewed by the Medical Ethics Assessment Committee (METC). After approval data gathering will start, which is estimated to begin in December 2023 of January 2024. The study sample is based on when data saturation takes place, whereby the maximum of participants is set at fifteen.

Discussion
Due to the (partial) non-verbal nature of VR, it has a clear potential in terms of a transcultural application among refugees. We expect that by using VR new insights will be gathered concerning this specific patient group. Results are expected to provide new insight into the experiences of paranoid delusions among asylum seekers.

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Poster

Virtual reality-based social cognitive- and social functional training in adults with autism: the STEPS randomizd clinical trial

Alberte Jeppesen

Introduction: The majority (80%) of adults with Autism Spectrum Disorders (ASD) experience social cognitive deficits causing functional impairments, distress, and poor quality of life. Limited evidence exists on interventions addressing social cognitive and functional deficits. Hence, there is a need to develop effective interventions for this population.

Methods: STEPS is a randomized clinical trial (RCT) enrolling 140 adults with autism and allocating them to either 12-sessions of a virtual reality (VR)-based intervention + treatment as usual (TAU) or TAU. The VR-intervention utilizes the VR-program Social Worlds and is conducted within a cognitive behavioral framework. It addresses cores social cognitive areas such as emotion recognition, theory of mind and social interaction. Primary outcome of the trial is real life social functioning as measured with the Social Responsiveness Scale (SRS-A). Secondary outcomes are emotion recognition, social functioning, theory of mind, and cognitive flexibility along with health economic analyses to elucidate the cost-effectiveness of the intervention.

Results: A panel of service-users (N=8) have been involved in the development of the therapy manual and provided feedback on therapy targets and the VR-program. A pilot phase is currently taking place in which participants will give feedback on the full therapy course to enhance feasibility and tolerability of the intervention prior to commencing the RCT in January 2024. Initial feedback from service-users on the VR-intervention will be presented at the conference.

Discussion: The trial will provide important information on the efficacy and cost-effectiveness of a short-term targeted intervention aimed at producing real-life benefits for adults with autism. This may guide potential dissemination and implementation of the VR-intervention into clinical settings.

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The Virtual Leisure pilot Study: Virtual reality delivered stress reduction, entertainment, and distraction at a closed psychiatric intensive care unit

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Introduction: Challenges in closed psychiatric intensive care unit (PICU) environments, such as emotional distress, can lead to coercive actions and the use of need-based medication. This highlights the need for innovative approaches aimed at reducing stress in in-patient psychiatric settings. Traditional interventions have limitations impeding on their usability and scalability in daily clinical practice. Virtual Reality (VR) may, however, present a promising alternative. This study investigates the potential of VR interventions within a PICU to alleviate emotional distress, diminish coercive measures, use of need-based medication, and enhance patient satisfaction with treatment.

Methods: This study employs a mixed-methods design and enrolls patients from a PICU in Denmark. Outcomes from a 12- month period with VR experiences available are compared to a 12-month period without. Feasibility and acceptability are evaluated through qualitative interviews, non-participant observations, and focus group interviews with clinical staff. Efficacy analyses are conducted on measures of coercion (physical retention, mechanical restraint, forced sedation), need-based medication (benzodiazepines, antipsychotics, sedative hypnotics), patient satisfaction, and perceived stress.

Results: Initial patient feedback from the ongoing recruitment phase, initiated in December 2022, indicate a positive reception of the VR experiences. Testimonials from the qualitative interviews suggests that VR can help reduce stress levels and manage distress, even during psychotic episodes. The virtual access to extended environments that transcends the physical limitations of the closed ward, can provide a mental break from either one's own mental state or just the physical setting as well as stimulating enjoyable feelings for patients.

Discussion: The introduction of VR for psychiatric inpatients shows preliminary relevance and potential benefits in reducing emotional distress but requires further ongoing investigation. Should the study validate the feasibility, acceptability, and efficacy of Virtual Reality (VR) experiences, they could potentially serve as a promising automated intervention for use in PICUs characterized by limited staffing resources, with the potential for broader applications within psychiatric treatment facilities.

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VR poster presentation

Ivo Meins

Background
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. Current treatments have only moderate effects on social functioning and often target one specific domain. We developed and piloted a modular VR treatment for social functioning and participation (VR-SOAP). Presently, we are conducting a randomized controlled trial (RCT) to investigate effectiveness.

Methods
Using an iterative scrum method with software engineers, clinicians, researchers, and individuals with lived experience of psychosis, we developed a treatment protocol along with a software prototype. Subsequently, three therapists and five patients with a psychotic disorder aged 18-40 piloted VR-SOAP. Patients and therapists were interviewed to assess the acceptability of the intervention along the seven domains of the theoretical framework of acceptability. Feasibility was assessed by means of interviews and session forms.

To investigate effectiveness, a total of 116 participants (age 18-40) with a DSM-5 diagnosis of schizophrenia spectrum or other psychotic disorder and problems with social functioning are recruited from mental healthcare institutes in the Netherlands. Participants will be randomized to the experimental condition (VR-SOAP) or active VR control condition (VRelax). Primary outcome is social functioning measured with the experience sampling method (ESM). Secondary outcomes are psychiatric symptoms, social behavior, social cognition, self-esteem, self-stigma and paranoid thoughts. Treatment effects will be compared at pre-treatment (baseline), post-treatment, and at 6-month follow-up.

Results
Both participants and therapists found the therapy acceptable. Participants and therapists found the intervention simple to comprehend, beneficial, and aligned with their values. Participants expressed increased confidence in their social interactions and reported improvements in skills such as initiating conversations and maintaining a positive outlook. No dropouts occurred during the pilot phase.
The RCT is ongoing.

Discussion
The intervention showed a high degree of acceptability on all seven dimensions of the acceptability framework. VR-SOAP is well tolerable and perceived as effective. Currently the RCT is ongoing to investigate effectiveness.

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The use of three different stress levels in the Trier social stress test in VR

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Background
The Trier Social Stress Test (TSST) is a gold standard for inducing psychosocial stress. However, the TSST is labor-intensive and it is difficult to maintain the same experimental conditions. A virtual reality TSST (TSST-VR) is easy-to-use and remains exactly the same with repetition. A classic version of the TSST-VR exists, however, differentiation between the effects of different levels of stress is missing.

Aim
The aim is to investigate whether there is a statistically significantly greater increase directly after the TSST-VR in psychological and physiological stress parameters in the moderate and high-stress levels compared to the no-stress condition (control).

Method
A three-arm single-blind randomized placebo-controlled trial is conducted in healthy adults. A no-stress condition with friendly avatars and easy tasks, a neutral condition (as in the traditional-TSST) and a high-stress condition with unfriendly avatars was used.
Measurements on anxiety (6 item-State Anxiety Inventory, STAI-6), perceived physical arousal (Physical Activity Questionnaire, PAQ) and cortisol response (salivary cortisol) were measured at the end of a 20-minute resting baseline period, directly after the tasks and after 20- and 40-minutes recovery. Heart rate variability is measured continuously and adverse events are recorded during the experiment and at one-week follow-up.

Results
A statistically significant difference in STAI-6 scores between the three conditions directly post-TSST (F9.59, $p < 0.001$) was seen (N=34). With a mean score of 9.33 (SD 2.37) in the friendly condition, 13.45 (SD 3.86) in the neutral condition and 14.18 (SD 2.14) in the unfriendly condition. A trend was seen the average change of saliva cortisol before and after the TSST of 0.509 in the friendly condition, 1.332 in the neutral condition and 0.907 in the unfriendly condition. There was a trend in the average change in PAQ-scores before and after the TSST of -1.00 points (friendly condition), 5.55 (neutral condition) and 12.23 (unfriendly condition).
Physiological data (HRV) is also collected and will be analyzed soon.

Conclusion
This study focused on the effect of the TSST-VR on psychological and physiological stress. The TSST-VR provides an accessible way to include incremental stress-responsiveness measures in diagnosis, prognosis and treatment.

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The Dark-Light box in mixed reality: research on a novel behavioral assay to study human anxiety-related behavior

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Introduction
The Dark-Light Box (DLB) is an approach-avoidance task developed in rodents, consisting of a two-part box with an aversive (light) and safe (dark) compartment. The time spent in the aversive part represents a measure of anxiety. While the DLB is common practice in animal anxiety research, human anxiety-related behavior is primarily assessed via less reliable self-report instead of objective, standardized observations. Using virtual reality (VR), the DLB is translated to humans to establish phenotyping of authentic anxiety-related behavior for psychiatric research.

Methods
60 healthy participants underwent 5-minute DLB-testing, with the aversive part being darkness. Behavioral parameters were collected via tracking, while video analysis assessed behavioral patterns and poses. Heart rate, skin conductance level, and respiratory rate were measured wirelessly, and subjective anxiety ratings were obtained.

Preliminary Results
Based on anxiety ratings, participants were categorized into high-anxiety (HA) and low-anxiety (LA) groups. HA participants showed trends of less and slower movement. They maintained greater distance from the darkest areas, and less distance from the bright area than LA participants. Descriptively, HA took more time to approach the dark, middle and end areas of the DLB and spent more time in the bright area and slightly less in the dark area. HA individuals' poses and movement patterns indicated less looking upward, fewer reexaminations of visited areas, and less vocalization than LA. HA participants displayed more behaviors involving arms before the body and leg movements. All participants showed a significant initial increase in heart rate, skin conductance, and respiratory rate within the first minute of DLB exposure. Subjective anxiety ratings exhibited a gradual increase from bright to dark areas within the DLB.

Discussion
Participants exhibited behavioral and psychophysiological responses that suggest authentic anxiety-related behavior. Although, traditional parameters from animal models, such as transitions into the aversive part, seem less powerful in the DLB paradigm, the differences in movement and distances within the DLB show tendencies supporting the notion of avoidance behavior in HA participants. Behavioral poses and patterns showing repetitive exploration, possibly defensive postures, or displacement activities, provide valuable information that could enhance the test's sensitivity. DLB-testing with patients is currently conducted.

VR-Moodboost: An innovative Virtual Reality intervention for treating depression

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Introduction
Major depressive disorder (MDD) is a prevalent and disabling mental health condition, and currently only 43% of all depressive patients fully recover from MDD with psychotherapy. Therefore, there is a strong need for innovative interventions with better treatment outcomes. Most traditional psychotherapies for depression focus on reducing negative affect. However, patients with MDD are strongly hindered by a loss of positive affect. Recent studies show promising results for psychotherapies with a focus on enhancing positive affect (Bockting 2009; Craske 2019). Experimental studies indicate that non-verbal stimuli have a stronger impact on activation of positive affect than verbal stimuli, which makes Virtual reality (VR) a promising tool to enhance positive affect. The aim of the current project was to develop an innovative VR treatment protocol to enhance positive affect and reduce depressive symptoms in patients with MDD.

Method
This treatment model, which is called VR-Moodboost, was developed in a stepped process. First, we conducted a literature review to identify target points and select specific interventions. Second, we worked together with experienced therapists and VR-developers to design a VR environment. Third, we developed an initial treatment manual. Fourth, this manual was presented and discussed in a focus group composed of both specialists in mental healthcare and participants who have previously suffered from depression. Finally, we piloted our new VR-Moodboost treatment protocol with two patients.

Results & discussion
In this poster presentation, the design of the VR-Moodboost treatment protocol is discussed. Based on the literature review the following targets were selected: 1) behavioral activation, 2) focus on positive affect, 3) labelling of affect, 4) positive imagery, 5) personalization. In the treatment manual, every session is structured with both VR and non-VR interventions.
The next step is to provide first evidence for the VR-Moodboost in treating depression, which we are currently studying using a non-concurrent multiple baseline single case design amongst adolescents. This study might provide new insights to improve treatment for MDD using VR. Since this is on ongoing trial, the daily diary data from one participant will be shown on the poster, to illustrate the therapy process.

<div align="right">Posters, november 9, 2023, 12:20 - 13:40</div>

"It's not everybody's snapshot. It's just an insight into that world": A qualitative study of multiple perspectives towards understanding the mental health experience and addressing stigma in healthcare students through VR

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Introduction: Many healthcare professionals and students hold stigmatising attitudes towards mental illness and patients with mental health conditions (MHCs). These attitudes can negatively affect the quality of care provided and contribute to the poor physical health outcomes of this population. Increasingly used in healthcare education and practice, VR presents a novel insight into the experiences of patients with MHCs and can potentially reduce stigma among those studying to become healthcare professionals. However, little is known about what those impacted by, or involved in, the education of healthcare students think about using VR in this way.

Methods: A qualitative study was carried out to capture the perspectives of lived experience experts (n=5), healthcare educators (n=6), and healthcare students (n=7). One individual interview and five focus groups were conducted. Before sharing their perspectives, participants were given the opportunity to familiarise themselves with the VR equipment and watch materials designed to simulate the experiences of individuals living with MHCs. The constant comparative method and thematic analysis were used to analyse the transcribed and anonymised data.

Results: Participants recognised the acceptability and utility of VR for addressing mental health stigma in healthcare students, emphasising the immersive nature of this novel technology which could complement more traditional approaches ("As an educator and educating nurses of the future, it's definitely gonna have its place"). However, some participants raised concerns about the limited insight VR could provide into the experiences of patients with the same MHCs ("It's not everybody's snapshot. It's just an insight into that world") and its potential emotional impact on users, as well as logistical challenges. Participants recommended the incorporation of interactive, realistic environments with a person-centred focus into future VR-based stigma reduction interventions while emphasising the importance of providing healthcare students with opportunities for reflection and support.

Discussion: These qualitative findings offer valuable learnings for research and practice. Lived experience experts, healthcare educators, and healthcare students highlighted both advantages and barriers associated with using VR to understand the experience of patients with MHCs. Furthermore, the recommendations put forward can inform the design, content, and delivery of VR-based stigma reduction interventions in healthcare education.

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Reducing aggression of forensic inpatients with Virtual Reality Aggression Prevention Training - Intellectual Disability (VRAPT-ID)

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Introduction: Patients with mild intellectual disability (MID) are overrepresented in forensic settings compared to the general population. This can be explained by the fact that people with MID have more risk factors for violent delinquent behaviour than people without MID. Psychotherapies for reducing aggression in forensic patients with MID are usually ineffective, as these are often not adapted to their limited cognitive skills, specific needs, learning style and IQ. Moreover, patients in forensic psychiatric settings are often less motivated for and sometimes even resistant to therapy, decreasing responsivity and increasing the risk of dropout and no-show.
Objective: The main objective of this pilot study was to examine whether Virtual Reality Aggression Prevention Training - Intellectual Disability (VRAPT-ID) was effective in reducing aggressive behaviour and stress over time among inpatient forensic psychiatric patients, specifically those with MID. The second objective was to examine whether VRAPT-ID improves therapy compliance in forensic psychiatric patients in comparison to other therapies.
Methods: A single case experimental non-concurrent multiple baseline design was used, in which 12 patients were randomly assigned to five different baseline lengths. Three phases were defined: baseline phase (A) - experimental phase (B) - follow up phase. Five patients completed all three phases. The primary outcome variables was aggressive behaviour (i.e. staff-reported (Social Dysfunction and Aggression Scale), aggression incidents and coercion measures). The secondary outcome variables were participant's individual changes in stress over time (i.e. self-reported (Outcome Rating Scale) and Empatica 4 biomarker data) and therapy compliance (i.e. self-report (Session Rating Scale) and number of dropouts).
Results: Preliminary analyses demonstrated a positive attitude towards VRAPT-ID of the participants who completed therapy intervention, indicating a positive compliance trend. In addition, no significant effects on stress were found within these preliminary analyses. (All data is collected and further results on aggressive behaviour, stress and therapy compliance are expected momentarily and will be presented in detail during our poster session.)
Discussion: All results will be discussed on our poster and during our poster session.

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Virtual Reality Aggression Prevention Treatment in a Dutch prison-based population: a pilot study

Kasja Woicik, Dr. Chris Geraets, Stéphanie Klein Tuente, Erik Masthoff, Prof. Wim Veling

Background: Treating violent behavior in prisons comes with challenges, such as the inability to practice safely with triggering situations and motivational issues. A solution may be the use of Virtual Reality (VR). With VR, specific conditions or needs can be tailored for individual practice, it can enhance motivation and VR has proven to be a safe and effective tool in mental health treatment.
Objective: A pilot study was conducted to test the acceptability, feasibility, and preliminary effects of VR Aggression Prevention Treatment (VRAPT) in a prison-based population.
Methods: In total 17 detainees with aggressive behavior were included in this single-group pilot study. Acceptability and feasibility were assessed using qualitative measures for participants and therapists. Preliminary treatment effects were measured with self-report and observational measures on aggression, anger, emotion regulation, and impulsiveness.
Results: Participants and therapists were predominantly positive about VRAPT. Participants rated the sessions with an average satisfaction score of 9.2 out of 10 (SD = 0.3). Qualitative data showed that participants reported having learned to respond more adequately to aggressive behavior and gained insights into their own and others' triggers and tension. The combination of VR and theory was experienced as a strength of the treatment, as well as the ability to trigger aggression in VR which provided insights into aggression. However, the theoretical framework was found to be too complex, and more aggressive and personal scenarios should be incorporated the sessions. Self-reported aggression, anger, provocation, emotion regulation, and observed verbal aggression decreased and seemed to stabilize after the treatment ended, with small to medium effect sizes.
Conclusion: VRAPT proved feasible and acceptable for most participants and therapists. An adapted treatment protocol called Virtual Reality Treatment for Aggression Control (VR-TrAC), will be used in a future RCT to investigate the effects of the treatment in a prison-based population.

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