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Role of Virtual Reality Therapy in Psychology

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ABSTRACT

The advent of technology has given rise to several inventions over the years and one amongst such is Virtual Reality (VR). Virtual Reality creates a controlled simulated computer generated environment that creates an experience which mimics the real world to form a Virtual Environment which helps users to interact with the virtual world. It simulates a believable, immersive and 3 dimensional world. VR has now emerged as a promising tool in the branch of clinical studies, Psychology is one such field where VR is implemented.

This review paper is conducted to study the Role of Virtual Reality Therapy (VRT) to treat Psychological distress by using VR headset or a head mounted system and the user views a specialized tailored visual content, where the user can move within a limit and it relies on sensory aspects such visual cues, sound effects, touch and smell to elicit a reaction from the user to overcome fears or address various therapeutic needs. It's used to reduce triggers to a stimulus by gradually exposing the user, distract users from chronic pain, addiction, and cognitive rehabilitation to improve cognitive skills after a brain injury. The opportunities and challenges of VR are important to understand as researchers and clinicians look to incorporate this technology to improve mental health outcomes. This paper examines the current applications, benefits, limitations, and future directions of VR therapy, highlighting its transformative potential in psychological practice and its expanding role in mental health care.

Keywords: Virtual Reality, therapy, psychology, mental disorders

1. INTRODUCTION

Clinical psychology integrates the science of psychology with treating complex human problems. In addition to directly treating people for mental health concerns, the field of clinical psychology also supports communities, conducts research, and offers training to promote mental health. Clinical psychology, is the scientific study in relation to the diagnosis and treatment of mental illness, atypical behaviors, and psychiatric problems. As a clinical field, it focuses on improving individuals in distress, using the best available knowledge and techniques, while striving to increase the intellectual, emotional, biological, social and behavioral aspects of human functioning across lifespan in varying cultures and in all socio-economic levels, through research and sharpen the techniques needed for further interventions in the future. VR is enthralling due to the almost endless possibilities for the creation of stimuli and this has led to spread of VR into domains such as clinical and developmental psychology.

Therapy is a form of medical treatment which aims to provide relief on the emotional and psychological distress and refers to techniques that help people change behaviors, thoughts, and emotions that cause problems or distress through verbal and psychological techniques. In this process, one of the skilled psychotherapists guides the client in overcoming specific or general issues like psychological disorders or a source of life stressful situations. Almost every psychotherapeutic method has the same essentials: the

formation of a therapeutic bond, the interaction, and the work aimed at resolving mental or behavioral issues.

The intervention of Psychology via electronics in clinical practice is getting wide. Computer-Assisted Therapy (CAT) is any form of psychological therapy that uses computer technology to enhance psychological treatment. Principally, it means using software programs via smartphones and online service channels to deliver demanded remedial interventions and education services from one position to a case in another position.

Types of computer-assisted therapy include Internet-based Cognitive Behavioral Therapy (iCBT) which involves reading instructions, watching videos, or performing exercises, VRT where patients facing phobias/ PTSD difficult topics are gradually exposed to VR contents in a controlled room, Computerized Cognitive Training (CCT) that is focused on improving specific cognitive skills such as memory and attention with the help of various activities. Besides, there are available mobile apps for therapy that include stress-relieving techniques like mindfulness practices and mood/behavior journaling. Patients could also get teletherapy through the phone calls and Gamified Therapy, where people address game generated tasks which often includes various games for therapeutic purposes like treating ADHD, autism, or emotional regulation.

The significance of learning about the role of VRT in psychology is essential to explore VRT's potential and can lead to breakthroughs in mental health treatment and further integration of technology in therapeutic practices.

Virtual Reality (VR)

Virtual reality (VR) refers to artificial, computer-generated environments to provide an immersive experience for users in which they're able to interact with a digital environment in much the same way that they do with the external, "real" world. VR equipment like headsets, hand-held controllers, and body sensors allow users to interact with digital environments, providing a means to see, hear, traverse, and "touch" or even smell the environment and its elements. While VR is most often used to play video games, it also has a wide range of applications namely in training simulations, remotely controlling robots, designing products and prototypes, even helps in visualizing a crime scene

Here's a brief history of the emergence of VR:-

Virtual reality (VR) has its roots in Renaissance European art and the stereoscope invented by Sir Charles Wheatstone. The first concept of VR has ties to the early exploration of immersive visual experiences, which can be traced back to panoramic paintings in the 19th century. These large, cylindrical artworks were designed to surround the viewer, offering a 360-degree perspective of landscapes or historical events. One famous example is Robert Barker's Panorama (1787).

Then in the 1960s VR started forming with Morton Heilig who created Sensorama, a multi sensory device that simulates the feeling of riding a motorcycle. In 1968 scientist Ivan Sutherland developed the first head-mounted display (HMD) known as the "Sword of Damocles".

In 1987, Jaron Lanier founded the Visual Programming Lab (VPL) and introduced the term "virtual reality.". He developed a range of VR gear including the Data glove and the Eye Phone head mounted display and goggles. VR gained popularity in the 90's with devices like the Sega VR and Nintendo Virtual Boy, but limitations in technology (low-quality visuals, high costs) led to limited success. Google (2007) introduced Street View- a service that shows panoramic views of an increasing number of worldwide

positions and features a stereoscopic 3D mode. Luckey Palmer– founder of Oculus VR, designed the first prototype of the Oculus Rift . This Sparked a VR revolution in gaming and later healthcare, education, and psychology.

VR now has evolved into a sophisticated technology across various industries like in Education for training for complex jobs and getting hands-on experience like in medical procedures or flight simulators, VR is used to simulate hazardous environments in corporations for worker safety training, and in architecture and automotive design to visualize prototypes before physical production. Platforms like VRChat and AltspaceVR allow users to interact in virtual environments.

Virtual Reality Therapy (VRT)

Virtual reality therapy (VRT), also known as virtual reality immersion therapy (VRIT), virtual reality exposure therapy (VRET) and computerized CBT (CCBT), is a method of psychotherapy that uses VR technology to treat patients with anxiety disorders and phobias and has proven to be very effective therapy. They use VR to provide a new human-computer interaction archetype in which users are active participants within a computer generated three-dimensional virtual world.

In many different kinds of anxiety disorders, a person is alarmed when they are triggered by a specific thing or situation. It's a type of CBT that is used to reduce the fear associated with these triggers. There are two different kinds of Exposure Therapy, the first one is Flooding where the subject is exposed all at once quickly to their triggers. The other type is Systematic Desensitization or Progressive Exposure which involves gradually exposing to these triggers with relaxation exercises when anxiety is getting the subject uncomfortable.

Virtual Reality Exposure Based Therapy (VR-EBT) is a great alternative when the subjects dread the In Vivo Therapy. VR-EBT has a much less intimidating setting where the exposure task takes place within the confinement of the therapist's office.

A lot of conclusions from research convey that patients are more likely to accept it than traditional approaches. An early study on VRE was conducted on patients suffering from PTSD due to motor vehicle crashes showed that patients were satisfied with VRE more than a traditional approach.

Out of 150 test subjects, 16 people with certain phobias, the refusal rate for trying VR exposure (3%) was lower than for in-vivo exposure (27%),17 providing preliminary evidence that VR-based exposure may be more acceptable to patients. One study in a PTSD sample found equal satisfaction between VRE and imaginal exposure, while another found increased satisfaction for VRE.In a sample of 352, post 9/11 US soldiers, majority reported that they would be willing to use most of the technology-based approaches for mental health care included in the survey (e.g., VR), 19% of those stated that they will be more comfortable to get help using VR rather than consulting with a therapist. The ability to control the exposure limit makes VR more acceptable among the patients.

The visuals in VR doesn't always look real which is apparent to the users that its computer generated. However, that does not matter. When something triggers a fear, the brain is in a fight, flight or freeze mode and can't comprehend that it's not real. Mostly it does help people when they have a conscience and they know there is no threat associated. These simulations allow a person to try things that they would be wary of in real life and step out of their comfort zone.

The use of VR in cyberpsychology comes from Watson who demonstrated, opposed to the dominant Freudian theories of psychology, that it was possible to stimulate phobias in a laboratory environment.

Since the 1990s, Hodges and others have shown that virtual environments could allow acrophobic patients to feel heights safely. A few of the recent studies also report that VR therapy is more effective than imaginal exposure therapy and as effective as in vivo exposure therapy. This also helps some avoid or imagine the in vivo treatment by having anxiety, and VR may be helpful for just that. More than 80% of the population has trouble visualizing.

Through hypothetical scenarios and self-report measurements, altruism studies examine motivations and intentions. Hypothetical scenarios are imaginary situations that prompt subjects to tell the researchers how they would behave in the given situation, thus simulating real contexts for prosocial behavior. This requires the participant to rate or even measure his prosocial behaviors, intentions, or beliefs through questionnaires. VR enables them to experience firsthand how others in hardship feel by producing feelings of empathy that can be transferred into self-sacrifice in a risk-free setting. An example is the Darley and Latane (1968) Bystander Effect Study.

VR is a safe virtual environment offering patients the opportunity to explore "new realities" that are required for therapy and enable the patient to have a sense of acting without fear of real-life repercussions. Also, the information provided by VR is introduced gradually, hence making it easier for them to move from easier to more complex exercises. Thirdly, as VR breaks the barriers of space and time, practitioners can use the event simulation for the patient and therapy at any given time without having to wait for the processes to naturally occur.

2. LITERATURE REVIEW

The role of virtual reality in therapy becomes understood quite comprehensively within the sphere of psychology only if technological development and discovery up to now are analyzed. Virtual Reality Exposure Therapy is one of the first applications of virtual reality in the field of psychology. It was devised as a virtual parallel counterpart to the traditional exposure therapy where the patient is exposed to a controlled and tailored situation of fear-inducing stimuli.

Rothbaum et al. (1995) who pioneered the use of VRET for treatment of acrophobia or the fear of heights was quite a significant discovery. Subsequent research in the late 1990s found that VRET was an effective treatment for other phobias, including fear of flying and fear of spiders. Garcia-Palacios et al. (2002), also examined the use of VR as a treatment tool for social anxiety. Here the participants in the treatment program were given VR scenarios simulating public speaking and social interactions and they were slowly exposed to these scenarios.

Among the technological innovations in VR therapy in the realm of PTSD is Virtual Iraq/Afghanistan, a VR system designed to help combat veterans with PTSD by Rizzo et al., later supported in a randomized controlled trial by Reger et al., which found that VR exposure therapy significantly reduced PTSD symptoms compared to standard care but had a more enduring impact. Research in VR therapy for depression is still emerging; however, preliminary findings show promise in the field where VR is useful in improving mood and regulating emotions. Falconer et al. (2016) have developed a VR-based intervention to promote self-compassion among depressed individuals. Results indicated improvements in self-compassion as well as reductions in depression. Gega et al. (2019) conducted a pilot study to investigate the usability of VR environments for mindfulness intervention, which found that participants showed increased feelings of relaxation and reduced depressive symptoms.

In the context of pain management, VR is used as distraction therapy; Hoffman et al. (2000) carried out a study to understand the mechanisms of VR in the alleviation of burn patients' pain. Patients engaged with

VR experienced significant reductions in pain during the wound caring phase. VR is now widely used for managing acute pain, such as during chemotherapy or surgeries, and for chronic pain conditions. Studies such as Garrett et al. (2017) have shown that cancer patients experience reduced pain and anxiety during treatment when exposed to VR environments. Rose et al. (2005) and Weiss et al. (2004) demonstrated VR's potential for cognitive rehabilitation in patients with neurological disorders.

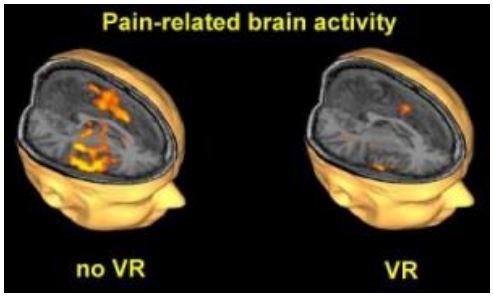
Additionally, Maskey et al. (2014) explored VR for autism to help improve social skills. Perpiñá et al. (1999) and Gorini et al. (2010) used VR to address eating disorders and substance addiction. Recent innovations like biofeedback-integrated VR, explored by Riva et al. (2014), have further enhanced therapeutic outcomes to monitor physiological responses during therapy.

3. METHODOLOGY

VRT utilizes diverse methods in establishing psychological comfort, though it uses Virtual environments for creating an immersive environment to improve the patients' mental wellbeing.

Here are some overview of the techniques:

1. **Virtual Reality Exposure therapy (VRET):-** It operates under the supervision of a qualified and certified therapist, with the objective of diminishing fear associated with a specific feared scenario. The exposure is precisely tailored to align with the individual patient's comfort level.
2. **Cognitive Behavioral Therapy (CBT):-** It involves creating a situation where the person is encouraged to identify and change undesirable or disturbing thought patterns that negatively affect emotional well-being and behavior.
3. **Immersive Distraction for Pain and Anxiety Management:-** Immersive Distraction can help in the pain and anxiety management. Due to chronic illness and various medical treatments, a patient can use VR in pain management.



4. **Virtual Role-Playing:-** It is often thought to be a way of simulating social interactions or confrontations. Thus, real-world skills can be developed through it, which can be well beneficial for those having Autism or Anxiety.
5. **Biofeedback and VR Integration:-** Integration of the biofeedback mechanisms, such as heart rate monitors and skin conductance sensors, is an essential activity toward assessing physiological responses through therapeutic intervention. The virtual reality framework allows adaptation based on real-time information so that stimuli can be varied to control emotional reaction.
6. **Virtual Reality Rehabilitation (VRR):-** VR is applied for motor and cognitive rehabilitation in the patients during stroke or TBI recovery or cognitive impairments. The virtual environment gives the tasks required for enhancement of coordination, memory, and attention.
7. **Exposure and Response Prevention (ERP):-** Exposure to compulsive triggers with the prevention of their usual compulsive response is used for the treatment of Obsessive-Compulsive Disorder (OCD). This is used to be firm and build up resilience.

Technology used in VR Therapy

There are various technologies that make up the contribution of VRT. Some of them are as follows: Starting off with VR Headsets they enable patients to be able to view and interact with the virtual world and gives patients that sense of presence within the simulated environment. Motion Controllers, which allow patients to interact with tasks, manipulate objects and engage with the virtual world, are very important where exercises relate to motor skills, coordination, or behavioral therapy. Haptic Feedback Devices gives patients the sense that they are touching objects in the virtual environment eg. Haptic vests- these wearables give haptic feedback on the user's body, simulating feelings of impact, temperature, or texture. Eye-Tracking Devices can be used as a tool during therapy to assess attention, focus, and emotional responses to certain catalysts. Treadmills and Locomotion Devices are present in therapy for rehabilitation purposes, for physical therapy, or to simulate real movement in the absence of actual space, which aids in reaching out to patients who have mobility issues. Biosensors and Wearable Sensors, which can provide real-time biofeedback to enable the therapist to alter the virtual environment or modify the therapy session based on the patient's physiological responses.Some Therapeutic Software Platforms are intended for specific simulation of certain therapeutic scenarios, the tracking of patient progress, and guidance in the therapy process, most of which have customizations adapted according to the needs of the patient. Such as: Bravemind, Psious, VRHealth. Computers and Workstations are also used to compute the VR simulations and render the immersive environments. In clinic settings, therapists use computers to monitor, control, and even fine-tune the VR experience to patients.

4. CASE STUDIES AND CLINICAL TRIALS

1. In Social Anxiety Disorder

Case Study: Virtual Public Speaking (Anderson et al., 2005)

This case study describes the treatment of a young adult diagnosed with social anxiety disorder: in front of others. The patient underwent several sessions of virtual public speaking that differed in terms of size of audience and type of received feedback which was strictly positive as well as neutral and negative.

After 8 weeks of treatment, the patient significantly decreased an impressive amount of anxiety in real-life public speaking situations. The use of virtual reality provided the opportunity to practice again and again in a safe and controlled environment that nurtured self-confidence while decreasing the fear of actual injuries.

Clinical Trial: Bouchard et al., Virtual Reality Therapy for Social Anxiety 2017

A clinical study was undertaken to determine how Virtual Reality Therapy differed from in vivo exposure therapy for social anxiety disorder. To carry out the study, 58 adult patients were involved. Findings of this research showed that VRT and in vivo treatment were both successful in alleviating symptoms of social anxiety, but the individual in the latter was comfortable with VRT and was more engaging with the treatment, and VRT allowed for more flexibility in the generation of different social situations.

2. In Phobias

Case Study: Treatment of Acrophobia using Emmelkamp et al. (2002)

This case report of a 35-year-old male treated for acrophobia (fear of height) using VRET illustrates gradual exposure of the patient to more elevated virtual environments, such as balconies or climbing virtual towers, under the guidance of a therapist. The patient after 10 sessions showed marked diminution of acrophobia. Follow-up post-treatment assessments showed maintenance of improvement and the patient could easily cope with heights in real life.

Clinical Trial: VRET for Phobias (Botella et al., 2007)

This included assessment of 83 subjects, and the study illustrated the effectiveness of VRET in treating symptoms for several phobias, such as acrophobia, aerophobia, and claustrophobia and that these effects were maintained during the six months of follow-up. Among the advantages mentioned in Virtual Reality Therapy was that exposure could be constructed gradually in a simulated environment under control.

3. Pain Management

Case Report: Burn Pain Management Through Virtual Reality (Hoffman et al., 2000)

A case of a burn patient who experienced acute pain during wound management was studied. The distraction intervention utilized virtual reality. The patient was placed in a virtual world game called SnowWorld where they threw snowballs at targets during winter while receiving painful wound treatment. She reported that while in VR, there was an alleviation of pain to a great extent that was not present when no VR was applied. This case thus demonstrated the feasibility of VR for pain management.

Clinical Trial: Virtual Reality in Pain Management during Cancer Treatment: Garrett et al., 2017.

Pilot study: pain relief in chemotherapy-treated cancer patients by non-pharmacological tools of VR. The subjects under the study were 65 oncology patients. The treatment with VR during chemotherapy sessions demonstrated a 30% drop in the level of pain compared to the control group. Moreover, VR resulted in the reduction of levels of anxiety and improvement of the mood.

4. Cognitive Rehabilitation

Case Study: Cognitive Rehabilitation for Stroke Patients (Rose et al., 2005)

A stroke patient with cognitive impairments, such as memory loss and deficits in attention, is treated with virtual reality-based cognitive rehabilitation. The intervention included the performance of virtual tasks by the patient, especially those designed to enhance memory and problem-solving abilities, like navigation and challenges in virtual environments needing memory-based functions. At the end of therapy, there was clear evidence of improvement in cognitive function, wherein the patient retrieved his memory better, both in virtual and real-life challenges, and improved focus over time.

Clinical Trial: VR in Cognitive Rehabilitation for TBI Patients (Weiss et al., 2004)

The objective of the trail was to study the effectiveness of VR in the cognitive rehabilitation of patients with TBI. Sample size was 42 TBI patients. There was a group that was treated with VR and enhancement of cognitive improvement was noted through memory, attention, and executive functioning. Operations of VR help make the patient perform tasks with considerable challenges of the real world, thus having an effect on improvement in daily functioning.

5. Autism Spectrum Disorder (ASD)

Case Study: Social Skills Training for Children with ASD (Maskey et al., 2014)

During this research study, children who were diagnosed with Autism Spectrum Disorder received virtual reality-based social skills training in which these children practiced interactions with virtual avatars of various social scenarios, such as first conversations, turn-taking, and social cue recognition. Therefore, after 10 weeks of interaction, children's social relations within and outside the virtual world are highly improved by both parents and teachers who monitored the process and came to a conclusion about improving their social skills to a great extent.

Clinical Trial: VR for Improving Social Cognition in Adolescents with ASD (Kandalaft et al., 2013)

A pilot clinical study was conducted to evaluate the effect of social skills training via VR in adolescents with ASD. The participant sample consisted of 30 adolescents with ASD. Adolescents who received training through the VR interface scored higher on social cognition, better emotion recognition, and improved conversational skills.

6. Obsessive Compulsive Disorder (OCD)

Case Study:

Emma is a 28-year-old patient diagnosed with contamination-related OCD. Virtual Reality Exposure Therapy was the therapeutic intervention used for Emma. She was thus constantly exposed, in a simulated virtual reality, to stimuli of contamination, such as touching virtual dirty surfaces, before she carried out her compulsive cleaning rituals until she performed response prevention against such obsessions. Ten weeks of VRET were enough for the symptoms of OCD in Emma to gain significant improvement with drastic reductions in obsessions and anxiety.

Clinical Trial: VRT for OCD Study by Gutiérrez-Maldonado et al. (2019)

The comparative effectiveness of VRET versus traditional exposure therapy of OCD patients. Forty patients were recruited to participate in this study where half received VRET, whereas the other half received conventional in vivo exposure therapy. Both groups exposed them to triggers such as contamination and practiced response prevention; the results were similar in both cases in that the scores related to OCD symptoms improved significantly for those in the VRET group, just as they did for the traditional treatment group. However, the VRET group respondents reported feeling more comfortable and engaging during the sessions, so VR may be less intimidating in a medium for exposure therapy.

On top of this, gameChange is a Virtual Reality (VR) cognitive therapy which was granted permission to use from the National Health Service (NHS). Such therapy was developed for the betterment of those patients whose mental condition was critical, especially for psychotic people who were undergoing anxiety. This virtual reality device introduces subjects to everyday environments, like cafés or public transport, where they have to encounter and overcome their fear in a completely safe and simulated environment. Subjects have rated that it lessens the tension and discomfort of an individual by giving him

confidence in going out into real-life social situations. This virtual medicine has now been added to the NHS treatments.

5. CHALLENGES AND LIMITATIONS

Despite that VRT has provided a novel therapeutic approach to treating diverse psychological disorders, the current treatment still contains several disadvantages and challenges.

- One major concern is the expenses associated with utilizing the VR equipment, which includes the cost of purchasing and maintaining the software and hardware.
- Another challenge is the potential side effects or cybersickness users may have after using VR some individuals may experience nausea, dizziness, and disorientation while wearing VR technology.
- There are certain technical issues that the devices may face or some bugs in the software. It requires high maintenance which must be fulfilled from time to time.
- Ethical considerations, concerns like data privacy regarding patients' treatment progress. While the patients are engaging in virtual environments, they may reveal information, such as preferences, emotions, and stress levels. Technical companies that developed the VR equipment may collect and store these extensive amounts of sensitive data in their systems. All the more so since this system is intended to be an aid for people with certain psychological problems such as phobia and PTSD, which one can presume, makes the data even more precious.
- VRT is also more researched for Anxiety, PTSD and phobias but not much research has been made on complex conditions like Bipolar disorder or Schizophrenia so we can't justify its use in a broader therapeutic context.
- Another limitation is that during the earlier stages of development of VRT, it wasn't that accepted by the consumers and it was met with skepticism as it was perceived to be unreliable for entrusting it with clinical treatments. While VR can simulate anxiety-provoking scenarios, there is a fine ethical line in how much realism is too much. Overly realistic or intense exposure could risk retraumatizing patients, especially in cases like PTSD. Therapists must carefully calibrate the experience to balance exposure without causing harm.

6. FUTURE DEVELOPMENT OF VR IN MENTAL HEALTH

VR and AR therapy is anticipated to encompass an extensive range of disorders in the future. The submission process of providing patients with VR services at home by a therapist has already begun, but it has not been fully incorporated into this practice yet.

Adding real digitized images and showing some personal pictures or their own smartphone pictures to increase the sense of presence in the social virtual world.

Advanced Algorithms and AI could be used in designing VE's even more aligned with the patient's preferences, attuned to fears. The use of real-time physiological data during VR scenarios could increase the effectiveness of therapy as the virtual environment may change under the stress level, heart rate, or brain activity of a patient and can be done by integrating Neurofeedback and Biofeedback. Real-time VE allows for dynamic, responsive therapeutic experience, in which it responds to the user's input. Patients may easily feel connected with other individuals undergoing similar therapy by interacting with avatars in VR environments. This is especially important for people who have social anxiety or feel isolated.

Integration of VR therapy with mobile apps or wearable devices can allow for a far more seamless therapeutic experience outside of the confines of the headset where exercises or tracking of progress may take place on many other devices. The hybrid model that combines aspects of VR and AR in some way is

sure to bring new, innovative methods by which to approach therapy and treatment. This means there can be real-time facilitation and interaction of the therapists with the patients inside the VR environment, which would bring about improvement in the therapeutic relationship and provide feedback more promptly.

7. CONCLUSION

In conclusion, VRT has paved an innovative way for psychological therapies.VR can be described as an advanced imaginal system, that is as effective as reality at inducing emotional responses. Numerous studies have found that VR helps patients receive effective treatments by simulating real-life situations linked to their mental diseases that are difficult to replicate in an office setting. VR therapy sessions can also be delivered with little human interaction, which provides treatment opportunities for patients unable to attend in-person therapy. Also Patients have total control over the kinds of interactions and stimulation levels in the VE, with self-guided VR-based therapies in particular. The integration of VRT with other therapeutic approaches, such as CBT, and the incorporation of neurofeedback and physiological data have opened new avenues for personalized and adaptive treatment.

Moreover, the advancement of VR technology continues to drive innovation, with future applications promising greater accessibility, enhanced patient engagement, and the potential to address even more complex psychological issues. This may encourage patients to increase their exposure to perceived threats. However, concerns like expensive costs, cybersickness after using VR, and data privacy still exist. Future studies can focus on resolving the current shortcoming .

As VRT continues to evolve, it holds the potential to revolutionize mental health care by making therapy more engaging, accessible, and catering to individual needs. The continued exploration of its effectiveness, especially in real-world settings and diverse populations, will be crucial for fully realizing its impact on the future of psychological therapy.

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