

# Virtual Reality and the Future of Anxiety Disorders Treatment

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## Abstract

Virtual Reality is a recent innovation that has made preliminary forays into many different fields including medicine. Recent research on VR indicates that it is an effective and accessible treatment for anxiety disorders. The literature demonstrates that compared to standard en-vivo therapy it is as effective, more accessible and provides therapists with a significantly greater degree of control and analysis. In this opinion article, we discuss VR used for treating phobia, generalized anxiety disorder, and social anxiety disorder. We expect that VR will play a significant role in addressing the dramatic rise in anxiety disorders in recent years.

## Short commentary

When new technological innovations enter the public domain, our initial perception of what may be possible is often limited. Such is the case for virtual reality, which has caught the public eye with promises of dramatically revolutionizing what may be possible in the domain of entertainment. Virtual reality (VR) is a three-dimensional computer-generated simulation of an immersive environment. The level of immersion depends on the equipment, with the highest level of immersion requiring a headset with a screen and sensors that detect movement. With the goal of making the user feel that they are physically present in the simulated environment, there are wide-ranging applications for VR beyond just entertainment [1]. VR is in the initial stages of exploring its utility in medicine and has found great promise in mental health, particularly in the treatment of anxiety disorders that have dramatically increased in recent years [2]. We believe that there is enough evidence to show that Virtual Reality Exposure Therapy (VRET) is an effective and highly accessible treatment for anxiety disorders.

An anxiety disorder is a mental health condition that consists of a state of anxiety or panic that is out of proportion to a particular stressor or situation. This can significantly impair an individual's functionality in their daily life as well as their overall quality of life. These disorders include generalized anxiety disorder, social anxiety disorder, panic disorder, and phobias [3]. An estimate of 31% of adults will experience an anxiety disorder at some point in their life [4]. Anxiety disorders are also prevalent among adolescents as high as 31.9% among those between the ages of 13-18 [5]. However, this number may be even higher as preliminary estimates from the World Health Organization suggest a 26-28% increase in anxiety in 2019 alone as a result of the COVID-19 Pandemic [2].

For individuals with phobias, realistic VR simulations can generate highly accurate and immersive representations of a particular stimulus. A study by Rothbaum et al. compared patients with Fear of Flying who underwent exposure therapy through the simulation of an airplane in VR to those who were exposed to a real airplane at an airport. The results showed that both methods were effective and equally so, with 93% in both

groups willing to fly post-treatment [6]. This suggests that virtual reality is comparable to standard in vivo treatment for phobias. However, VRET can reach a higher level of complexity than simple exposure to a single stimulus, particularly for treating generalized anxiety disorder. VR can be used to simulate realistic scenarios of an individual's worst fears or situations that are highly anxiety-inducing [7]. A similar method can be used for social anxiety disorders by recreating particular social scenarios whether it be a job interview or general social situations. A recent study found that this was efficacious particularly in young to middle-aged adults [8]. Compared to in vivo exposure-based therapy, there is a greater degree of control over the simulation. The degree of exposure as well as its frequency can be tightly controlled. It also allows the exposure to end immediately if needed. Furthermore, a biofeedback system can be incorporated into the VRET through the use of finger sensors that measure heart rate and electrodermal activity [7]. Compared to in vivo exposure this allows for a significantly greater degree of analysis, as the data collected during the simulation can allow the therapist to see the level of response to every aspect of the experience.

Although standard therapy is very effective, less than 15-20% of individuals with phobias seek treatment. A study that involved individuals with arachnophobia when offered to choose between virtual reality vs standard therapy in the form of multiple sessions, 81% chose VR [9]. Although VRET may not be superior to standard therapy in effectiveness, it may encourage more individuals to seek treatment. Furthermore, VRET is significantly more cost-effective compared to standard therapy, where the stimulus only needs to be virtually simulated compared to standard therapy where the real stimulus must be acquired. This can be incredibly difficult and costly depending on the type of anxiety. Individuals can easily use their own virtual reality device any time at home rather than have to set up a real simulation with their therapist. In a study by Cherestal et al., VRET equipment was used with the participants' smartphones that allowed them to simulate flying without having to leave their homes [10]. This can help individuals with anxiety disorders that lack access to traditional therapy due to costs or lack of availability in their community. Thus, the accessibility of VRET can address the gap in the treatment of anxiety disorders.

Overall, virtual reality exposure therapy is an effective and highly accessible treatment for anxiety disorders. The degree of control and the use of biofeedback has decreased the limi-

tations faced by therapists in understanding and treating the sources of anxiety in their patients. Thus, we advocate for the use of virtual reality exposure therapy to help address the rise in anxiety disorders in the United States and abroad.

### Declarations

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