

# The Use of Interventions Based on Virtual Reality in the Treatment of Anxiety

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**Abstract:-** With the development of virtual reality (VR) technology has come the advent of virtual reality (VR) therapy for anxiety disorders. Because it is more effective than waitlist therapy and has an efficacy that is comparable to that of in vivo exposure therapy, virtual reality therapy can be considered a viable psychological intervention. Those individuals who are less likely to participate in face-to-face therapy, as well as those with mild-to-moderate and/or subclinical levels of anxiety who may not reach the threshold for clinical referral, may benefit from the accessibility offered by virtual reality therapy. This can encourage them to seek help from a professional. The purpose of this special issue was to gain an understanding of the benefits and limitations of VR therapy in terms of alleviating the symptoms of anxiety. Anxiety is caused by the perception of an impending danger. The symptoms of anxiety include "muscle tension and vigilance in preparation for future danger and cautious avoidance behaviour". Anxiety can also manifest as a physical sensation in the body. Anxiety consists of both a mental component, such as the fear that the worst-case scenario will occur, and a physiological component, such as increased arousal, sweating, and the feeling that one might pass out. Understanding the theoretical significance of virtual reality therapy for clinical and sub-clinical levels of anxiety, the efficacy of virtual reality therapy for reducing anxiety, the mechanisms of response to virtual reality therapy for reducing anxiety, and the technological limits of VR therapy were the goals of this special issue.

**Keywords:-** Attention Training, Presence, Cybersickness, Relaxation, Pain.

## I. INTRODUCTION

With the development of virtual reality (VR) technology has come the introduction of virtual reality (VR) treatment for anxiety disorders. The fact that its effectiveness is greater to that of a waitlist and similar to that of in vivo exposure therapy (Carl et al., 2019) makes virtual reality therapy a feasible option for psychiatric treatment. Those individuals who are less likely to participate in face-to-face therapy, as well as those with mild-to-moderate and/or subclinical levels of anxiety who may not reach the threshold for clinical

referral, may benefit from the accessibility offered by virtual reality therapy. This can encourage them to seek help from a professional. The purpose of this special issue was to get an understanding of the benefits and limitations of VR treatment in terms of alleviating the symptoms of anxiety. Anxiety is caused by the perception of an impending danger (Penninx et al., 2021; Hamm, 2020). Anxiety is defined as "muscle tension and attention in preparation for potential danger and careful avoidance behaviour," and both of these characteristics are seen in anxious people (American Psychiatric Association, 2013). Anxiety consists of both a mental component, such as the dread that the worst-case scenario may occur, and a physiological component, such as heightened arousal, perspiration, and the sense that one could pass out (Creamer et al., 1995). The following are some of the questions that were intended to be answered by this special issue:

- In terms of theory, virtual reality treatment has been shown to be effective for both severe and mild cases of anxiety.
- The effectiveness of virtual reality treatment in alleviating stress,
- The mechanisms of responsiveness to virtual reality treatment for anxiety reduction, and
- The technical boundaries of VR treatment.

## II. THEORETICAL FOUNDATIONS FOR THE PRACTICE OF VIRTUAL-REALITY THERAPY IN THE TREATMENT OF ANXIETY

The "wow" element of the technology may encourage individuals to construct virtual worlds for therapeutic applications in a way that is not contextualised, hence it is imperative that research on virtual reality for anxiety disorders be led by theory. An early randomised clinical trial used virtual reality for the treatment of a fear of heights (Rothbaum et al., 1995). This trial relied on emotional processing theory (Foa and Kozak, 1986), which suggests that exposure therapy modulates a dysfunctional fear structure and provides information that is incompatible with the fear-associated memory. In this issue, Jerath and Beveridge rely on theories of the philosophy of mind and theories of global and spatial cognition to inspire future research on how virtual reality might reduce anxiety through the development of

enormous virtual landscapes, such as gazing up at a bright sky at night. The authors argue that anxiety is characterised by vicious loops that may be broken by transcendent experiences produced in wide virtual settings, such as the universe, employing slow deep breathing and biofeedback. [Citation needed] [Citation needed] Exciting new avenues for research into the advantages of transcending virtual experiences may be opened up if virtual reality technology were to advance to the point where it could generate enormous areas using testable assumptions.

### III. VIRTUAL-REALITY THERAPY'S EFFICACY

In the absence of a therapist, VR technology shows potential for self-guided VR treatment in which the user has complete control over increasing their exposure to danger (Zainal et al., 2021; Premkumar et al.). Over two sessions of self-guided VR treatment, participants with significant self-reported public-speaking anxiety increased their exposure to changeable virtual hazards (Premkumar et al.). This exploratory study's findings of persistent improvement in public-speaking anxiety and social anxiety 1 month after the intervention show the long-term effects of self-guided VR treatment. Where persistent physical sickness, such as cancer, causes anxiety, VR treatment may create pleasant virtual settings. According to MIND (2021), "spending time in green space or incorporating nature into your daily life may help both your mental and physical welfare" (Naor and Maysel, 2021). Wilson and Scorsone investigated the advantages of bringing patients closer to nature via immersive VR treatment, as well as creating happy emotions and lowering pain levels, in this context. Participants getting intravenous chemotherapy felt more peaceful, relaxed, and satisfied, as well as less tense, after choosing from a broad choice of nature-inspired immersive audio-visual experiences to encourage relaxation during treatment. This anxiety-reducing effect of VR therapy during physical condition treatment is also true for other associated disorders, such as stroke rehabilitation (Standen et al., 2017).

### IV. THE WORKINGS OF THE VIRTUAL-REALITY THERAPY MECHANISM

There is a pressing need to acquire a deeper and more comprehensive understanding of the processes of anxiety reduction that are applicable to VR therapy. Pfaller et al. focused their attention on the function that social presence plays in triggering emotional reactions during certain agent social interactions in order to achieve this goal. As a result, changing one's social presence might result in therapies that are more successful in increasing one's ability to engage with others. Another method that virtual reality treatment uses is attention training, which helps patients acquire control over worried thoughts and feelings. Participants with high levels of public speaking anxiety were used in an experiment by Wechsler and colleagues to investigate the impact of training with an external focus on attention. When participants were trained to pay attention to members of the audience in a virtual setting, the amount of time they spent gazing at the virtual audience during a public speech after the training rose, as did their positive affect. As a result, one of the most

important components of VR exposure treatment is paying attention to a virtual core danger.

Additionally, there are physiological factors that might change how one reacts to anxiety. In a virtual reality (VR)-based relaxation training programme, Joeng et al. investigated the effects that practising diaphragmatic breathing (DB, increasing breathing volume and allowing more air to the body) and progressive muscle relaxation (PMR, sequentially alternating muscle tension and relaxation) exercises had on participants. When compared to a control group, individuals who trained in VR had significantly reduced levels of stress following PMR. In the VR group, DB was shown to reduce stress, especially when the participants were practising in potentially anxious virtual outdoor surroundings. DB has a primary effect of enhancing the parasympathetic response, in addition to enhancing sustained concentration and reducing negative emotion (Ma et al., 2017). Therefore, the use of physiological procedures as well as training aspects to promote extra coping mechanisms might be beneficial to VR-based anxiety exposure treatments.

### V. TECHNOLOGICAL BASES FOR VIRTUAL-REALITY THERAPY

Cybersickness, such as dizziness and motion sickness, has an impact on VR therapeutic participation and experience. Controlling for cybersickness in VR treatment research is essential, and this necessitates the use of a validated measure of cybersickness that separates cybersickness from the target psychological symptoms of the planned intervention. Bouchard et al. discovered that anxiety during stress exposure (the Trier Social Stress Test, study 2) was confounded by cybersickness in addition to verifying the two-factor structure of the simulation-sickness questionnaire (SSQ, study 1). They discovered that the majority of SSQ items (11 out of 16) linked with state anxiety following stress exposure, and that these relationships were distributed equally among the two SSQ variables. The SSQ score rose after stress exposure and before immersion in a virtual world. Thus, during the administration of VR treatment, cybersickness may be misinterpreted with anxiety, and such symptoms must be accounted for when evaluating the effectiveness of VR therapy.

This special issue has highlighted the possibility for potentially significant VR therapeutic advances. The potential for revolutionary VR treatments to merge virtual wide open spaces, self-guided exposure and relaxation, while improving social presence via attention training and resolving cybersickness, illustrates virtual reality's great potential.

### VI. CONCLUSION

Twenty years have passed since the first research paper on the use of virtual reality to treat a psychological disorder was published in 1995<sup>10</sup>, and here we are. Virtual reality has emerged as a practical tool that can assist in the treatment of a variety of disorders. The use of virtual reality has been shown to be most effective in the treatment of patients

undergoing exposure therapy for anxiety disorders, cue exposure therapy for patients undergoing treatment for substance use disorders, and distraction for patients undergoing treatment for acute pain that requires painful procedures. In general, meta-analyses have shown that virtual reality (VR) is a useful tool, that it performs well when compared to control conditions, and that it has long-lasting effects that are transferable to the real world. However, there are some issues that have been brought to light, such as the lack of comparison groups, the lack of methodological rigour, and the small sample sizes. It is likely that the number of virtual reality applications will increase in the near future as the price of head-mounted displays continues to drop and smaller applications for smart phones continue to be developed. It will be essential that these be regarded as tools, and that therapists receive adequate training in the appropriate uses of these tools.

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