

Summary

A Systematic Review of Virtual Reality Exposure Therapy for Social Anxiety Disorder

Battal Göktürk Gök¹

Hacettepe University

Zehra Uçanok

Hacettepe University

Social anxiety disorder (SAD) is characterized by an intense fear of social situations in which the individual could strictly scrutinized or evaluated by others. Individuals with SAD often avoid social situations or interacting with others because they are afraid of being examined and evaluated (positively or negatively) by others. Considering the epidemiological findings, SAD was seen to be one of the most common psychological disorders (Kessler et al., 2005). Research findings also indicate that the most common social fear is public speaking (Furmark, 2002). Other examples of social fears include performing in front of others, going to parties or social gatherings, writing while someone is watching, and speaking to an authority figure. Individuals with SAD often avoid seeking professional help unless there is a comorbid disorder (Leichsenring & Leweke, 2017). A possible explanation for this may be that the person wants to avoid new unwanted social interaction situations while seeking professional help.

From a historical perspective, the term virtual reality (VR) began to attract the attention of researchers in the 1980s, and with 1993 researchers suggested that VR could be used to treat test anxiety in university students (Knox et al., 1993). Soon after, by 1995 the first clinical trials were carried out using VR (Rothbaum et al., 1995). Since then, there have been remarkable advances in VR technologies with the rapidly developing technology. These rapid technological developments have led to an increase in the use of VR in psychology and related disciplines. Virtual reality exposure therapy (VRET) has enhanced the effects of traditional therapies and made possible new treatment approaches that were previously seen as impossible. The decrease in the prices of VR devices has made them more accessible. At the same time, its development in compatibility with smartphones provides more space and physical freedom. As a result, patients have become able to use VR technology not only in therapy rooms but also at home.

Despite all these developments summarized, there are many challenges that need to be overcome in order for VR to become a well-established treatment option in the diagnosis and treatment of psychological disorders. More specifically, it is necessary to confirm how effective, harmful or safe VRET is compared to traditional therapy. To date, clinical trials of VRET have had several limitations, including small sample, lack of adequate control conditions, and lack of double-blinded studies. At the same time, the efficacy of VRET treatment should be compared and analyzed with current gold standard treatments.

The aim of this study was to examine studies using VRET as an intervention tool and to comprehensively evaluate the effectiveness of VRET. To achieve this goal, this systematic review focuses on five points: (1) How does SAD symptomatology change with the use of VRET? (2) Is there a difference in the effectiveness level of VRET compared to the waiting list? (3) Is there a difference in the level of effectiveness of VRET compared to standard treatments? (4) What are the long-term effects of VRET? (5) Is there a difference between in vivo exposure and VRET in terms of dropout rates?

Method

Web of Science (Web of Science Core Collection), PubMed, Scopus and EBSCOhost electronic databases were searched on May 29, 2022. Boolean operators were used to link search terms and phrases [(‘virtual reality therapy’ OR ‘VRT’ OR ‘virtual reality exposure therapy’ OR ‘VRET’) AND (‘social anxiety’ OR ‘social phobia’)]. Due to the nature of the subject, studies published between 2001 and 2022 were displayed in all databases. On the other hand, studies were published in a peer-reviewed journal and required to be in English only. More studies were reached out from the bibliography lists of the articles. A total of 379 sources retrieved from the

Address for Correspondence: ¹Res. Asst. Battal Göktürk Gök, Kırşehir Ahi Evran University, Faculty of Arts and Sciences, Department of Psychology, Merkez / Kırşehir.
E-mail: bgokturkgok@gmail.com

databases were initially considered for inclusion in the review, and 14 were satisfied inclusion and exclusion criteria.

Results

Study Characteristics

The design of these studies were randomized controlled trial (RCT; $N = 11$) and controlled clinical trial ($N = 3$). All of the studies included data on a comparison condition (such as waiting list and group therapies). Studies appear to have been published in a wide variety of journals ($N = 11$). All studies included data on a comparison condition (such as waiting list or group therapy).

Sample Characteristics of Studies

Gender data were available in thirteen of the fourteen studies, but the gender of the participants was not reported in one study (Harris et al., 2002). It was observed that the participants in all studies were predominantly female. The ages of the participants ranged from 21.4 to 43.5. However, the mean age of participants was not reported in two studies (Harris et al. 2002; Kim et al., 2020). Sample sizes ranged from 14 to 112.

Discussion

In this systematic review, the efficacy of VRET in the treatment of SAD was evaluated in line with data obtained from 707 participants in 14 studies. According to the pre-test and post-test findings, in all studies, participants who received VRET showed a reduction in symptoms after treatment.

The findings of the studies showed that VRET was superior to waiting list or control conditions in reducing symptoms of social anxiety. These results were also consistent with previous meta-analysis studies (Chesham et al., 2018; Horigome et al., 2020; Kampmann et al., 2016b). Moreover, scores from self-report measures and improvements in different aspects of speech (such as content and duration) after treatment also indicated that VRET was superior to the control or waiting list conditions (Anderson et al., 2013; Harris et al., 2002; Kampmann et al., 2016a; Kim et al., 2017; Kim et al., 2020; Reeves et al., 2021; Robillard et al., 2010; Zainal et al. 2021). In addition, it was observed that the treatment gains are maintained after one year (Anderson et al., 2013; Klinger et al., 2005). At the same time, it was seen that long-term follow-up studies have started to be carried out after the intervention. Anderson et al. (2017) found that six years after treatment completion, participants in the VRET condition retained their treatment gains, along with participants in exposure group therapy,

which is considered the gold standard of treatment for SAD. From this point of view, VRET is considered to be a promising treatment for SAD, considering the long-term permanent effects.

Although VRET appears to have better treatment outcomes versus waiting list or control conditions, statistically significant differences in improvement were not detected when compared to standard treatment (Anderson et al., 2013; Anderson et al., 2017; Denizci-Nazligul et al., 2019; Klinger et al., 2005). In other words, in terms of treatment outcomes, the findings suggest that one treatment approach does not have a significant advantage over the other. The nonsignificant difference between these two conditions can be explained by the “dodo bird verdict” (Rosenzweig, 1936), which assumes that bona fide psychotherapies produce equivalent results when compared. The dodo bird verdict comes from Saul Rosenzweig’s quote from Alice in Wonderland: “Everybody has won and all must have prizes”, it was the “dodo bird’s verdict” to judge the outcome of the race. Rosenzweig assumed that the common factors between psychotherapies were quite common and that only minor differences would result when comparing different forms of psychotherapy. However, there are also findings in recent studies that VRET is more effective than in vivo exposure (Bouchard et al., 2017). There are studies showing that in comparison to existing forms of VRET the effects of standard treatment become better as time progresses after interventions are implemented. On the other hand, speaking time can be considered as an alternative way of indexing clinically significant behavioral change. Anderson et al (2013) reported that participants spoke for a longer period of time after VRET treatment. In the continuation of the same study, Anderson et al. (2017) found that while the average anxiety levels of the participants were high in long-term follow-up, the participants who received VRET treatment spoke for two minutes longer. Results from these studies show that exposure in the virtual world also changes behavior in the real world. In addition, these behavioral data reinforce the core principle of exposure therapy “feel the fear and do it anyway”.

Looking at treatment dropout rates, no significant differences were found between VRET and in vivo exposure therapy. In more detail, although the difference in the treatment dropout rates was not statistically significant, it was observed that the dropout rates were higher for in vivo exposure (Anderson et al., 2013; Bouchard et al., 2017). Choy et al. (2007) reported dropout rates ranging from 0% to 45% for in vivo exposure therapy in adults. A possible explanation for these high dropout rates may be that patients find confrontation with the feared object or situation highly threatening. In other

words, it is conceivable that people receiving treatment for anxiety disorders would be less likely to stop treatment early if the treatment involved confronting fears in a virtual rather than real world. Moreover, VRET can help increase the likelihood that a person will be willing to begin and complete exposure therapy. On the other hand, it is possible that more people in the population will choose VRET over in vivo exposure therapy when they have a choice, and people who choose VRET are also more likely to complete treatment than those who are not given the option. In studies to evaluate treatment choices, when choosing between VRET and in vivo exposure, the majority of respondents preferred VRET (Benbow & Anderson, 2019). Given that clients are more likely to stay on a treatment of their choice (Benbow & Anderson, 2019), treatment seekers may be more likely to choose and remain on VRET treatment compared to in vivo exposure.

Although the diversity of VR tools has some positive effect on reducing anxiety, it is still very important to consider confounding variables such as the characteristics of individuals and the way therapists control the virtual environment. Some participants may also feel anxious during VRET due to the presence and monitoring of the therapist during the session. In addition, therapists should maximize the patient's sense of presence in the virtual environment, as better focus of attention leads to better treatment outcomes (Anderson et al., 2013). Therefore, a strong sense of presence and immersion in the virtual environment is necessary to make the experience real and increase the effectiveness of interventions.

In conclusion, VRET is considered to be an effective treatment option in the treatment of SAD, as the significant positive change in symptomatology was consistent across studies. Using VRET could be a possible solution to the problem of treatment avoidance and may be advantageous over standard CBT as an effective, cost-effective, and practical exposure tool. However, considering VR therapies as a relatively new and developing field, it is clear that more research is needed on the effectiveness of the use of VRET before it can be accepted as a standard of clinical practice. Specifically, as longitudinal studies and practices increase, it will be more possible to understand what makes VRET effective and when and under what circumstances VRET is appropriate for clinical services.