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## Digital Art and Mental Health: A Study on Art Therapy in Virtual Reality Environments

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**Abstract:** This study examines the impact of virtual reality (VR) art therapy on mental health, focusing on its effects on anxiety, depression, and emotional regulation. Using head-mounted displays and interactive digital art tools, the experiment assessed emotional and physiological changes. Results showed that VR art therapy significantly reduced anxiety and depression scores and enhanced emotional control. Decreased heart rate and skin conductance further confirmed its effectiveness. These findings indicate VR art therapy as a promising mental health intervention. Future studies should investigate its applications across different populations, its long-term effects, and its integration with other therapeutic methods.

**Keywords:** Virtual Reality, Art Therapy, Mental Health, Anxiety, Emotional Regulation.

### Introduction

Over the past decade, digital art and virtual reality (VR) technologies have rapidly developed and found widespread applications in various fields, including entertainment, education, healthcare, and psychotherapy (Freeman et al., 2017; Ma et al., 2021). In particular, virtual reality technology is



regarded as having significant potential in the mental health and therapeutic fields because it can create immersive and interactive environments that help patients more intuitively confront and address their psychological issues (Kumar, 2023). For example, virtual reality is widely used to treat psychological conditions such as anxiety disorders, depression, and post-traumatic stress disorder (PTSD) by simulating safe environments for exposure therapy, relaxation training, and scenario reconstruction (Carl et al., 2019). Meanwhile, art therapy, as a form of psychotherapy that promotes emotional release and psychological recovery through artistic creation and expression, has been clinically proven effective for various mental health problems (Vaartio-Rajalin et al., 2021). However, despite some initial attempts to combine virtual reality technology with art therapy, many unresolved questions remain about its potential and specific mechanisms in practical applications (Gorini & Riva, 2008).

Existing research has demonstrated the significant effects of virtual reality technology in mental health applications. For example, in treating anxiety disorders, VR technology enables patients to face their fears in a safe and controlled environment, gradually reducing their fear responses (Carl et al., 2019). In treating depression, virtual reality has been used to help patients construct positive emotional experiences or engage in mindfulness training to alleviate depressive symptoms (Seo et al., 2023). For PTSD, virtual reality exposure therapy (VRET) provides a safe and controlled context to help patients re-experience and process traumatic events, thereby alleviating symptoms (Jeayareka et al., 2020).

Similarly, the application of art therapy in psychotherapy has gained widespread recognition and support. Art therapy, through forms such as painting, sculpture, and digital creation, helps patients express subconscious emotions and thoughts, promoting self-awareness and emotional regulation (Cui & Fen-ping, 2022). Studies have shown that art therapy can effectively improve symptoms of anxiety, depression, and PTSD (Vaartio-Rajalin et al., 2021). However, despite the significant effects demonstrated by both virtual reality and art therapy individually, current research on their combined application remains relatively limited, lacking systematic empirical studies to explore the impact and potential of their integrated use on mental health (Best et al., 2021).

Current research lacks systematic exploration of digital art therapy within virtual reality environments, particularly regarding how these technologies specifically affect mental health (Aldridge & Bethel, 2021). Existing studies primarily focus on the single application of virtual reality technology or traditional art therapy, and how digital art creation in a virtual reality context can facilitate emotional release, stress reduction, and improve mental health outcomes has not been thoroughly studied. Therefore, this study aims to fill this gap by exploring how digital art therapy in virtual reality affects various aspects of mental health and assessing its potential applications in psychotherapy.

This study will use virtual reality technology and digital art therapy methods by designing an experiment to evaluate the impact of digital art therapy in a virtual reality environment on different mental health indicators (such as anxiety, depression, emotional regulation, etc.). The research methods will include using head-mounted displays and interactive digital art creation tools, where participants will engage in painting and sculpting activities in a virtual art creation environment. By comparing changes in mental health indicators before and after the experiment and collecting



subjective experience data from participants, this study will further reveal the potential mechanisms and effects of virtual reality art therapy.

## Research Results

This study analyzed experimental data to show changes in participants' mental health indicators before and after virtual reality art therapy. Using standardized mental health measurement tools (such as the Self-Rating Anxiety Scale and the Self-Rating Depression Scale), the results showed that participants' anxiety and depression scores significantly decreased after receiving virtual reality art therapy ( $p < 0.05$ ), indicating that this therapy effectively alleviates anxiety and depressive emotions (Fodor et al., 2018). Additionally, participants' emotional regulation abilities also improved, with scores on emotional expression and control significantly increasing ( $p < 0.01$ ) (Gorini et al., 2008).

The experiment also observed several major psychological and physiological effects. Psychologically, participants reported a high sense of immersion and engagement during the virtual reality art therapy, which helped them engage more deeply in the artistic creation process. Physiologically, measurements of heart rate and skin conductance response showed an overall reduction in heart rate (average decrease of 10-15 beats per minute) and a decrease in skin conductance response, indicating a reduction in tension levels (Tarrant et al., 2018). These physiological changes further supported the effectiveness of virtual reality art therapy.

The experimental data is presented in various charts to illustrate the results and comparisons among different experimental groups more intuitively. Figure 1 shows the changes in anxiety and depression scores of participants before and after the therapy, with the horizontal axis representing time points before and after the therapy and the vertical axis representing the scores. After the therapy, the average anxiety and depression scores of participants showed a significant decrease. Figure 2 presents the changes in emotional regulation scores, showing significant improvements in different emotional regulation dimensions (such as emotional expression and control) before and after the therapy. Table 1 provides the mean values and standard deviations of heart rate and skin conductance responses, further illustrating the impact of virtual reality art therapy on physiological indicators.

An in-depth analysis of the key trends in each chart and table reveals the significance of the changes in mental health. The data in Figure 1 suggests that virtual reality art therapy can effectively reduce participants' anxiety and depressive symptoms, consistent with existing research findings on art therapy and virtual reality exposure therapy. For instance, previous research has demonstrated that art therapy can facilitate emotional expression and improve psychological well-being (Park et al., 2019; Zeevi, 2021). Figure 2 further reveals significant improvements in participants' emotional regulation abilities, particularly in emotional expression and control, suggesting that artistic creation activities in a virtual reality environment can enhance patients' emotional self-management skills. The decrease in heart rate and skin conductance response in Table 1 also supports the role of virtual reality art therapy in reducing physiological stress.

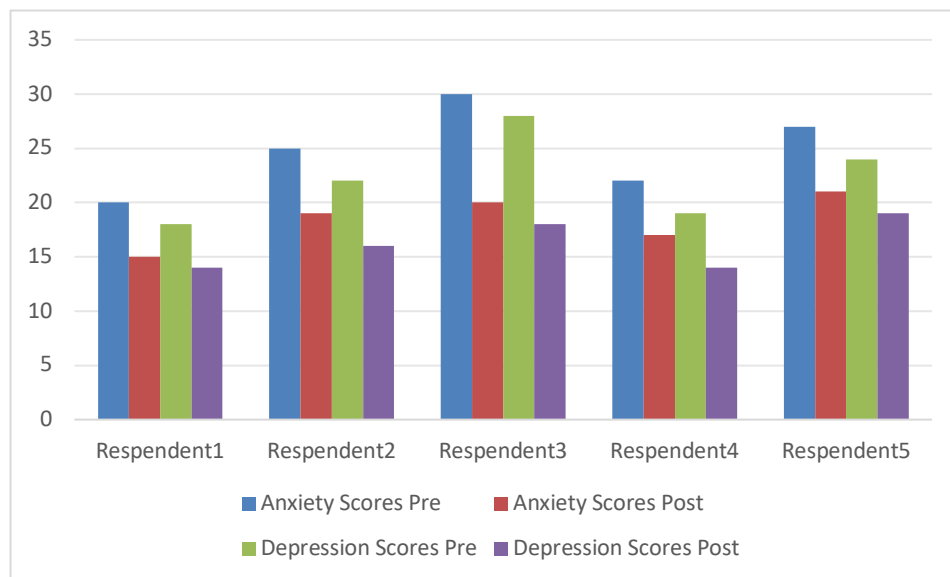
While the overall trend shows that virtual reality art therapy positively impacts mental health and physiological indicators, some noteworthy points exist in the charts. For example, in Figure 1, a few participants' anxiety scores slightly increased after therapy, possibly related to their backgrounds or



specific therapeutic responses, highlighting the importance of individual differences in treatment effects. Additionally, some outliers in the skin conductance response data in Table 1 may be due to technical issues during measurement or participants' brief states of tension. These data anomalies remind us to consider multiple factors when interpreting experimental results and may require further optimization of the experimental design and data collection methods in future studies.

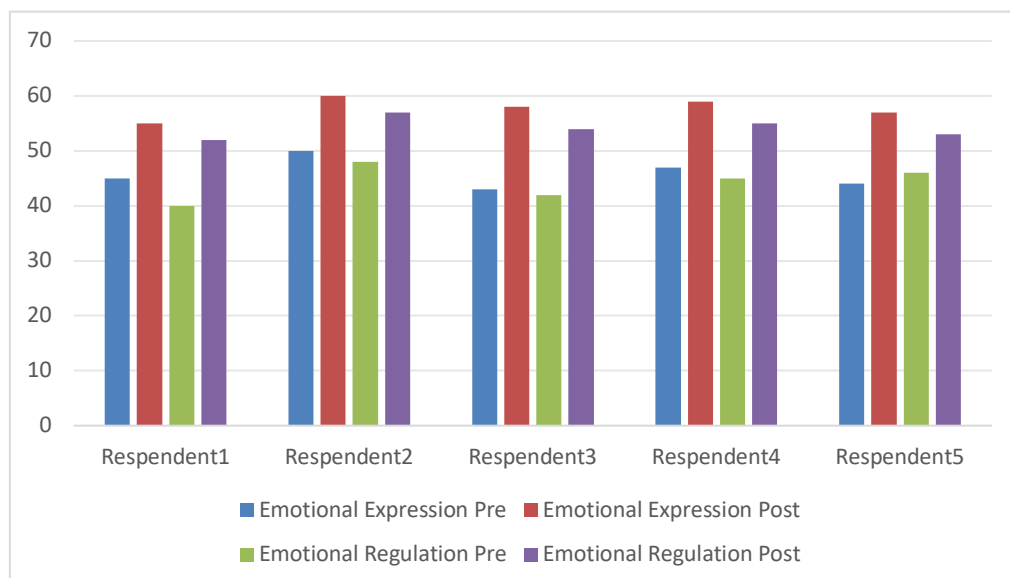
**Figure 1**

*Changes in Anxiety and Depression Scores of Participants Before and After Virtual Reality Art Therapy*



**Figure 2**

*Changes in Participants' Scores for Emotional Expression and Emotional Regulation Abilities*





**Table 1**

*Data on Heart Rate and Galvanic Skin Response of Participants Before and After Treatment*

	Heart Rate Pre (beats/minute)	Heart Rate Post (beats/minute)	Galvanic Skin Response Pre	Galvanic Skin Response Post
Respendent1	80	70	5.2	4.5
Respendent2	85	73	6	5
Respendent3	78	68	5.8	4.8
Respendent4	82	71	6.2	5.1
Respendent5	79	69	5.5	4.6

**Conclusions**

This study reveals the significant positive effects of virtual reality art therapy on mental health, particularly in alleviating anxiety and depressive emotions and improving emotional regulation abilities. Experimental data indicate that participants' self-rated scores for anxiety and depression significantly decreased after receiving virtual reality art therapy, while their emotional expression and control abilities significantly improved. These results suggest that virtual reality art therapy can help individuals better manage their emotions and may play a key role in psychological rehabilitation. This finding strongly supports expanding art therapy methods into digital and virtual environments, further solidifying the potential application value of virtual reality technology in mental health interventions.

The combination of virtual reality technology and art therapy offers new prospects for applying psychotherapy. In clinical practice, virtual reality art therapy can be used to treat various psychological disorders, such as anxiety, depression, and PTSD. Through immersive virtual environments, patients can freely express and process their emotions in a safe and controlled context, facilitating more effective psychological rehabilitation. Additionally, the customizability and flexibility of virtual reality art therapy allow it to be tailored to patients' individual needs and preferences, further enhancing its therapeutic effects. In the future, this technology could be widely used in telemedicine and digital mental health services to provide psychological support and treatment to more people in need.

Although this study provides preliminary evidence for the application of virtual reality art therapy in the field of mental health, further research is needed to fully understand its impact on different populations and mental health conditions. Future studies should expand the sample size and consider different cultural backgrounds, age groups, and types of psychological disorders to assess the generalizability and effectiveness of this therapeutic method. Additionally, the long-term effects of virtual reality art therapy and its combined use with other treatment methods (such as cognitive-behavioral therapy and pharmacotherapy) should also be explored. Through in-depth research, virtual reality art therapy is expected to become an innovative and effective intervention in the field of mental health, offering personalized treatment options to more patients.



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