

Virtual Reality Art Therapy and Trauma: A Pilot Study

Renáta Cserjési¹, Zsuzsanna Geréb Valachine¹, Anastasiia Lukoshyna¹, Ádám Salamon²,
Bálint Vörös² & Cecilia Sik-Lányi²

¹*Institute of Psychology, Eötvös Loránd University (ELTE), Izabella str. 46, 1064 Budapest, Hungary*

²*Department of Electrical Engineering and Information Systems, University of Pannonia, Egyetem str. 10. 8230 Veszprém, Hungary*

DOI: [10.54337/aau.icdvrat26.23](https://doi.org/10.54337/aau.icdvrat26.23)

Abstract

This pilot study examined a novel, non-exposure-based intervention combining art therapy with a virtual reality (VR) immersive environment among Ukrainian adults displaced by war (N = 13). Using a within-subject design, participants completed both VR and paper-based tasks. Results indicated that VR reduced PTSD symptoms similarly to the traditional paper-based art therapy condition. Although slightly greater reductions in PTSD and disturbances in self-organization (DSO) were observed in the VR condition, these differences were not statistically significant. Findings may reflect high baseline symptom severity and the brief intervention. Nevertheless, results support the feasibility and potential of immersive art-based approaches for trauma intervention.

1. Introduction

The global burden of trauma-related mental health conditions remains high, underscoring the urgent need for scalable and accessible interventions. Exposure to potentially traumatic events – such as war, natural disasters, accidents, and violence – is widespread, affecting approximately 70% of individuals worldwide (1). Although many people recover naturally, a substantial proportion develop persistent psychological conditions, including post-traumatic stress disorder (PTSD). It is estimated that 5.6% of trauma-exposed individuals develop PTSD, with a lifetime prevalence of 3.9%, rising to over 15% among those exposed to war and violent conflict. Importantly, beyond formal diagnoses, many individuals experience subclinical yet significant psychological distress that can impair daily functioning and well-being (2, 3). Despite growing awareness, access to mental health care remains limited, particularly among vulnerable and displaced populations, highlighting the need for innovative and culturally sensitive treatment approaches.

Virtual reality (VR) has emerged as a promising tool in trauma-focused psychological interventions. Early applications, particularly in military contexts, have primarily relied on exposure-based approaches, using immersive simulations to facilitate controlled re-experiencing of traumatic events and support emotional processing (4,5). More recently, research has expanded beyond exposure paradigms to include integrative approaches such as VR-assisted art therapy, which leverages the immersive, interactive, and expressive capacities of VR environments (6). These environments offer unique affordances – including enhanced presence, creative flexibility, and user engagement – that may support therapeutic processes.

Emerging evidence suggests that VR-based art therapy can reduce anxiety, improve emotional regulation, and enhance engagement, particularly among younger populations (7, 8). Pilot studies further indicate its potential for stress reduction and creative expression, while also highlighting challenges related to usability and technological accessibility (9). Despite these promising findings, most existing VR interventions remain grounded in exposure-based frameworks, and comparatively little research has examined non-exposure, art-based VR interventions for trauma.

The present study addresses this gap by integrating a traditional art therapy framework with a VR-based immersive environment. Specifically, we developed a novel intervention that combines 3D virtual art-making with a non-exposure-based, “inner child” therapeutic task commonly used in clinical and art therapy settings. This approach shifts the focus from direct trauma re-exposure to symbolic expression, emotional regulation, and the creation of a safe, supportive internal environment.

The aim of this study is to evaluate the effectiveness of this art therapy-based intervention delivered in both traditional paper-based and VR formats among Ukrainian adults displaced by war and currently residing in Hungary. The study examines the impact of these interventions on trauma-related symptoms and compares the relative effectiveness of VR-based versus paper-based delivery. It is hypothesized that both modalities will lead to symptom reduction, with VR offering additional benefits due to its immersive and interactive properties.

2. Methods

2.1. Participants

Participants (N = 13; mean age = 28.6, 12 female) were recruited from Ukrainian communities in Budapest. Using a within-subject design, each participant completed two sessions – one paper-based and one VR-based – one week apart in randomized order. Reported stressors included war-related trauma, interpersonal conflict, and chronic psychosocial stress. The study was approved by the ELTE Faculty of Education and Psychology Ethics Committee. Participation was voluntary, with informed consent obtained and data handled in accordance with data protection regulations.

2.2. Measures

Questionnaire: The Ukrainian version of the International Trauma Questionnaire (ITQ; 10) used in this study. The ITQ assesses trauma-related symptoms and their severity across 18 items, divided into two subscales: posttraumatic stress disorder (PTSD) and disturbances in self-organization (DSO), a core component of complex PTSD (CPTSD). Items are rated on a 5-point Likert scale ranging from 0 (not at all) to 4 (extremely).

Task: For the paper-based task, participants were provided with an A4 white sheet featuring a centrally printed black-and-white outline of either a boy or a girl. They were given a set of drawing materials and an eraser, and were instructed to complete the background and surrounding environment of the figure in line with the art therapy task. The VR condition was delivered using the custom-developed VRDrawing3D.exe application, created through collaboration between psychologists and art therapists from ELTE and engineers and programmers from the University of Pannonia. The simulation was run on a Meta Oculus Quest 2 standalone VR headset connected

to a ROG Strix G15 (2022) G513 laptop operating on Windows. In both conditions, participants received identical instructions.

2.3. Procedure

At the first session, participants provided written informed consent and completed a Google Forms battery including demographics and the ITQ. Participants then completed a randomized crossover art therapy intervention in either paper-based or VR format, with the alternate condition administered one week later. Time reminders were given during both conditions, and brief post-task questions were recorded by the researcher.

3. Results

3.1. Analysis Post Paper vs Post VR

In the VR condition, 8 participants (62%) demonstrated a reduction in PTSD severity category, compared to 6 participants (46%) in the paper-based condition. No participants showed worsening PTSD severity following VR, whereas one participant (8%) worsened in the paper condition. For DSO symptoms, both conditions showed an identical pattern: 6 participants (46%) improved, 5 (38%) showed no change, and 2 (15%) exhibited increased severity (see Table 1).

	Paper condition			VR condition		
	Improved n (%)	No change n (%)	Worsened n (%)	Improved n (%)	No change n (%)	Worsened n (%)
PTSD	6 (46%)	6 (46%)	1 (8%)	8 (62%)	5 (38%)	0 (0%)
DSO	6 (46%)	5 (38%)	2 (15%)	6 (46%)	5 (38%)	2 (15%)

Table 1: Changes after VR and Paper conditions in %Note. Improvement/worsening defined as movement of at least one severity category from baseline.

Figure 1 indicates that both the paper-based and VR interventions were associated with significant reductions in PTSD and DSO scores compared to baseline. A significant main effect of Time was observed, $F(2, 24) = 8.100$, $p = 0.002$, confirming that ITQ scores decreased across the three time points. However, neither the main effect of Subscale, $F(1, 12) = 0.228$, $p = 0.642$, nor the Time $\times$ Subscale interaction, $F(2, 24) = 0.536$, $p = 0.592$, reached significance. These findings suggest that both PTSD and DSO symptoms improved similarly over time. Although the reduction appeared more pronounced following the VR condition, the difference between VR and paper-based interventions was not statistically significant.

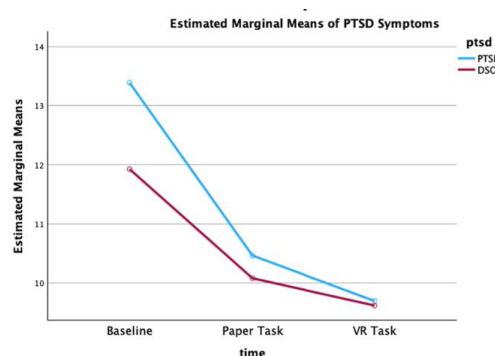


Figure 1. Changes in PTSD and DSO level by tasks.

4. Discussion

The results of this pilot study, based on a limited sample, did not support the hypothesis that VR would produce greater symptom reduction than the paper-based condition. Although the VR condition was associated with slightly greater reductions in PTSD and DSO scores, these effects were small and not statistically significant. Improvements in PTSD were consistent across conditions, suggesting that participants who benefited from one modality also tended to benefit from the other. This pattern may be explained by the high baseline severity of trauma-related symptoms (84% severe or extremely severe PTSD; 61% severe or extremely severe DSO), as well as the brief nature of the intervention, which included only two sessions.

Participant feedback provides important context for these findings, particularly given that most individuals were first-time VR users. The majority (10 out of 13) reported a reduced sense of control in the VR condition, while eight described the task as more difficult and seven as more stressful or anxiety-provoking. Difficulties in operating VR controllers and managing the cognitive demands of the environment appeared to interfere with engagement in the therapeutic process. Only three participants described the VR experience as equally or more calming than the paper-based task, highlighting its immersive and, at times, meditative qualities despite reduced perceived control.

Notably, despite these challenges and initial discomfort with the technology, reductions in PTSD severity were still observed in the VR condition. This suggests that immersive 3D environments may offer added value in trauma processing, even when usability barriers are present.

Although limited by the small sample size ($N = 13$), this study highlights several key considerations. Initial unfamiliarity with VR and usability challenges may reduce its short-term effectiveness; however, its immersive properties appear to hold therapeutic potential. Additionally, the findings reinforce the value of art-making itself – even through simple tasks – as an effective means of reducing psychological distress.

Future research with larger samples and repeated sessions is needed to better understand the role of immersion in therapeutic outcomes and to improve the usability of VR-based tools. With further development, VR interventions may serve as a valuable complement to traditional therapy or as an accessible alternative in contexts where mental health services are limited.

References

- World Health Organization. (2024, May 27). *Post-traumatic stress disorder*. <https://www.who.int/news-room/fact-sheets/detail/post-traumatic-stress-disorder>
- Charlson F, van Ommeren M, Flaxman A, Cornett J, Whiteford H, Saxena S. New WHO prevalence estimates of mental disorders in conflict settings: a systematic review and meta-analysis. *Lancet*. 2019 Jul 20;394(10194):240–248. [http://doi.org/10.1016/S0140-6736\(19\)30934-1](http://doi.org/10.1016/S0140-6736(19)30934-1). Epub 2019 Jun 12. PMID: 31200992; PMCID: PMC6657025.
- Kessler RC, Aguilar-Gaxiola S, Alonso J, Benjet C, Bromet EJ, Cardoso G, et al. Trauma and PTSD in the WHO world mental health surveys. *Eur J Psychotraumatol*. 2017;8(sup5):1353383. <http://doi.org/10.1080/20008198.2017.1353383>

- Rizzo, A., Reger, G., Gahm, G., Difede, J., & Rothbaum, B. O. (2009). Virtual reality exposure therapy for combat-related PTSD. In P. J. Shiromani, T. M. Keane, & J. E. LeDoux (Eds.), *Post-traumatic stress disorder: Basic science and clinical practice* (pp. 375–399). Humana Press/Springer Nature. https://doi.org/10.1007/978-1-60327-329-9_18
- Rizzo A, Shilling R. Clinical Virtual Reality tools to advance the prevention, assessment, and treatment of PTSD. *Eur J Psychotraumatol*. 2017 Jan 16;8(sup5):1414560. <http://doi.org/10.1080/20008198.2017.1414560>. PMID: 29372007; PMCID: PMC5774399.
- Hadjipanayi C, Banakou D and Michael-Grigoriou D (2023) Art as therapy in virtual reality: A scoping review. *Front. Virtual Real*. 4:1065863. <http://doi.org/10.3389/frvir.2023.1065863>
- Shamri Zeevi L. Making Art Therapy Virtual: Integrating Virtual Reality Into Art Therapy With Adolescents. *Front Psychol*. 2021 Feb 4;12:584943. <https://doi.org/10.3389/fpsyg.2021.584943>. PMID: 33613377; PMCID: PMC7889518.
- Prieto, M., Alcántara-López, M., Castro Sáez, M., Martínez Pérez, A., Fernández Fernández, V., & López-Soler, C. (2025). Psychological treatment in childhood trauma with support in virtual reality. *Ansiedad y Estrés*, 31(2), 60–70. <https://doi.org/10.5093/anyes2025a9>
- Yap, Y. R., & Lee, Y. L. (2024, November). *Break Times: Virtual reality art therapy*. arXiv. <https://doi.org/10.48550/arXiv.2411.05146>
- Cloitre M, Shevlin M, Brewin CR, Bisson JI, Roberts NP, Maercker A, Karatzias T, Hyland P. The International Trauma Questionnaire: development of a self-report measure of ICD-11 PTSD and complex PTSD. *Acta Psychiatr Scand*. 2018 Dec;138(6):536–546. <http://doi.org/10.1111/acps.12956>. Epub 2018 Sep 3. PMID: 30178492.