ANIMA x UMCA

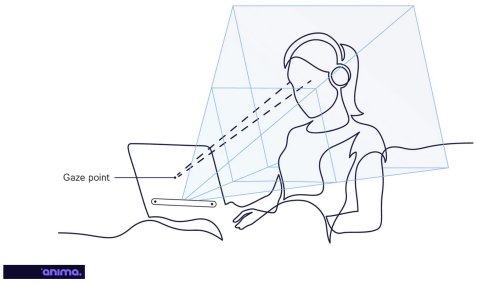
Art's Healing Touch

Neuroscientific Analysis of Mental Health Among 'How are you' Art Exhibition Attendees in Kyiv, June 2023

Recent research indicates that the arts can significantly contribute to enhancing mental well-being, acting as a therapeutic medium for various demographics including adolescents, the elderly, and vulnerable populations[1][2][3]. This effect becomes particularly complex in the context of ongoing conflicts, such as the one affecting Ukraine. Artwork and exhibitions that prompt reflections on wartime experiences can deeply impact the psychological state of those affected by the conflict.

Study Framework

Visitors to the exhibition titled "How Are You?" were given the option to participate in pre- and post-visit screenings for anxiety and depression. These screenings consisted of taking psychological questionnaires and undergoing an attention bias assessment, facilitated by Anima's neurotechnology that employs webcam-based eye tracking.



[1] Daykin, N., Byrne, E., Soteriou, T., and O'Connor, S. (2008). e impact of art, design and environment in mental healthcare: a systematic review of the literature. J. R. Soc. Promot. Heal. 128, 85–94. doi: 10.1177/1466424007087806;

[2] Todd, C., Camic, P. M., Lockyer, B., omson, L. J. M., and Chatterjee, H. J. (2017). Museum-based programs for socially isolated older adults: understanding what works. Health Place 48, 47–55. doi: 10.1016/j.healthplace.2017.08.005;

[3] Thomson, L. J., Lockyer, B., Camic, P. M., and Chatterjee, H. J. (2018). Effects of a museum-based social prescription intervention on quantitative measures of psychological wellbeing in older adults. Perspect. Public Health 138, 28–38. doi: 10.1177/1757913917737563

What Anima Testing looks like

A total of more than 2000 individuals participated in the study, 1,449 of whom qualified for the research, representing approximately 10% of the overall exhibition attendees. Out of these, 513 (~35%) underwent screenings both before and after attending the exhibition. Among these, 384 were screened for anxiety and 129 for depression.

Key Findings from the Study

Depression

The majority of participants (42%) exhibited no depressive symptoms, while 17.7% displayed signs of clinical depression according to the tests. This rate is 11% higher than what the World Health Organization (WHO) estimates[4], raising the possibility that either accepted screening methods may overestimate risk levels, or individuals might be over-assessing their own depressive states.

Additionally, 5.5% of participants demonstrated severely high depressive symptoms based on the PHQ-9 test. This is 2% higher than the prevalence of such symptoms according to standard research in the United States[5] (fig. 1). After the exhibition, 68% of all visitors reported feeling less depressed compared to their state before attending the exhibition.

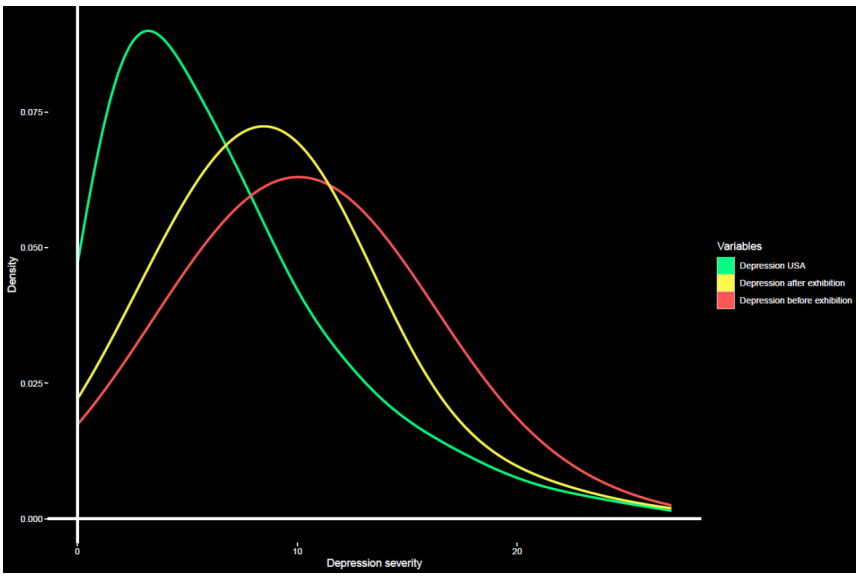


Fig. 1: Comparison of the distribution of depressive symptoms according to the PHQ-9 among attendees of the "How Are You?" exhibition (Red - assessment before the exhibition, Yellow - after) with reference research data from the United States (Green)

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[4] https://worldpopulationreview.com/country-rankings/depression-rates-by-country

[5] The prevalence of depressive and anxiety symptoms in student-athletes and the relationship with resilience and help-seeking behavior. *Journal of Clinical Sport Psychology, 13*(3), 421–439. https://doi.org/10.1123/jcsp.2017-0043

Considering that the PHQ-9 test assesses individuals' conditions over the last two weeks, these changes suggest that people who are prone to catastrophizing their condition tend to evaluate it based on their current feelings. Those who initially assessed their depressive symptoms as severe felt better after attending the exhibition. Interestingly, the groups with high and low initial assessments exhibited opposite trends (see Fig. 2).

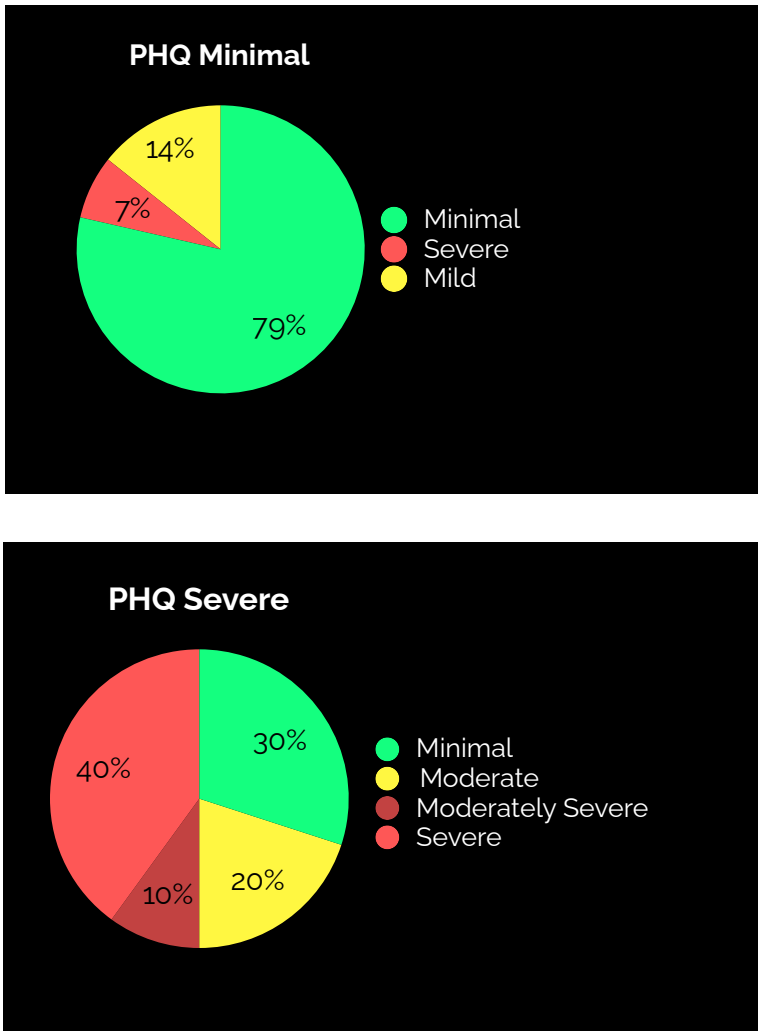

Fig. 2. Comparison of the percentage of changes for visitors with varying levels of depressive symptoms after attending the exhibition, segmented into groups with minimal symptoms (top - PHQ minimal) and severe symptoms (bottom - PHQ severe).

It's evident that in the group with minimal symptoms, ratings slightly increased by 21%, whereas in the group with severe symptoms, they decreased by 60%. At the same time, a high symptom score (>50) for attention bias (AB) related to depression was only 3.16%.

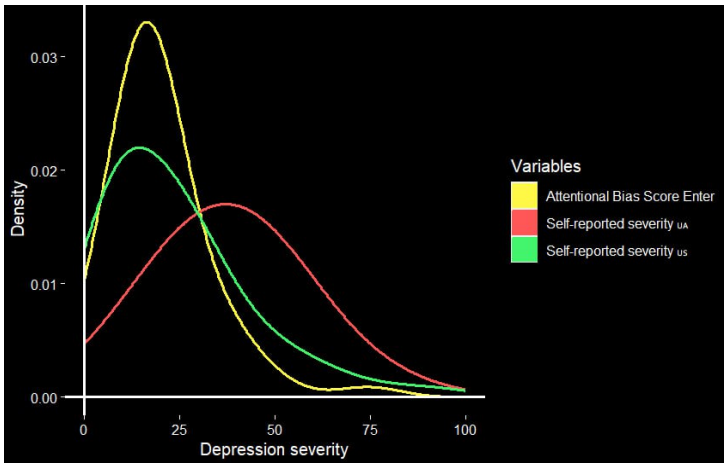

Fig. 3. Comparison of the distribution of depressive symptom indicators according to self-assessment by PHQ-9 (red - assessment before the exhibition, green - after) and attention bias score (yellow) before visiting the exhibition "How Are You?"

While 17.7% showed a clinical level of depression based on self-assessment, this figure decreased to just 3.16% when measured by attention bias scores (AB). Moreover, the AB score aligned much better with self-assessments obtained after visiting the exhibition (Fig. 3). Therefore, we can conclude that art encourages self-honesty: visitors who might have been catastrophizing their condition before seeing the exhibition reported feeling better afterward, and this better-matched attention bias scores recorded before the visit. These findings are also reflected in the distribution data for attention bias and groups with varying levels of depressive symptoms according to the more situational BDI-2 test (Fig. 4-5).

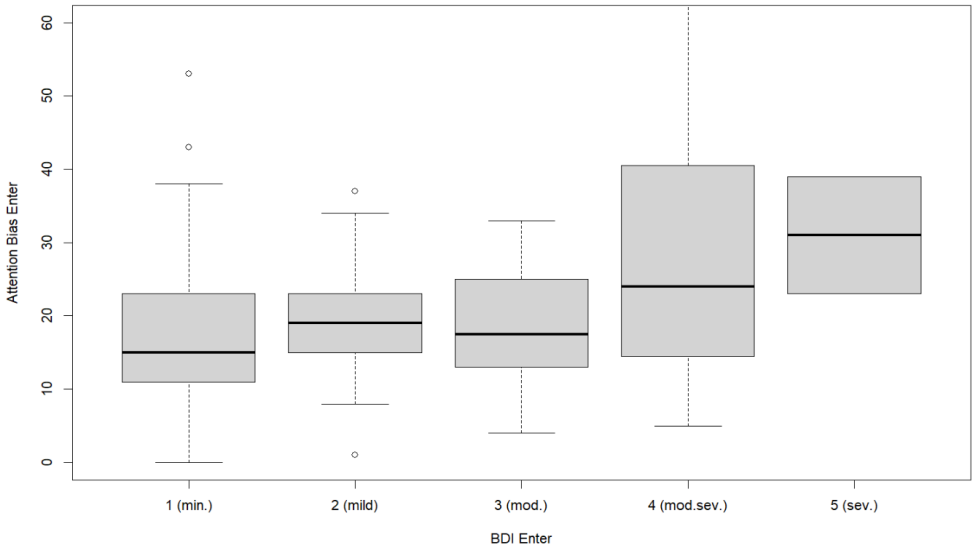

Fig. 4: Distribution of attention bias scores and depressive symptoms according to the BDI-2 questionnaire before visiting the "How Are You?" exhibition

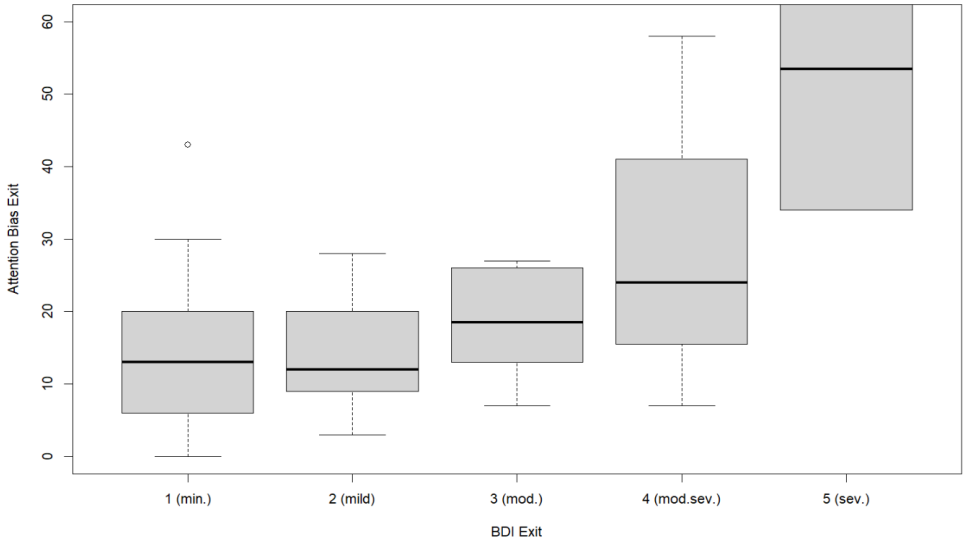

Fig. 5: Distribution of attention bias scores and depressive symptoms according to the BDI-2 questionnaire after visiting the "How Are You?" exhibition

The synchronization between Attention Bias (AB) scores and self-assessments post-exhibition is noteworthy. This harmony suggests that the art experience fosters a heightened level of self-awareness, reflected in individuals' attention settings. This synchronization is a positive factor, as it allows for better self-management. It helps people timely adjust their behavior to mitigate negative emotional symptoms, thereby preventing the onset of disorders. Before the exhibition, only 50% of individuals in the high-risk zone for depressive symptoms accurately assessed their state. Post-exhibition, that number increased by 10%. There was also a noticeable recalibration in the subjective assessments of depressive symptoms towards a decrease.

Besides the overall Attention Bias (AB) score, it's crucial to consider its components - anhedonic[6] and dysphoric biases[7] to understand which specific mental aspects are affected by the art experience. According to our research[8], dysphoric bias correlates with signs of tension, negative emotions, sadness, depression, irritability, and loss of interest in people, and even suicidal thoughts. Anhedonic bias is additionally linked with a decrease in appetite and interest or pleasure in almost all activities. It signifies not just a loss of joy but also a lack of motivation to do anything - in the worst cases, including the desire to live.

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[6] Indicator of reduced attention to images associated with hedonistic emotions (pleasure emotions) is determined as a percentage of the total number of image pairs where such a perception strategy was observed during test viewing

[7] The indicator of excessive attention to sad and negative images is determined as a percentage of the total number of image pairs in which such a perception strategy was observed during test viewing.

[8] https://blog.anima.help/pdf/whitepaper_depression_in_Ukrainians_Q12023_en.pdf

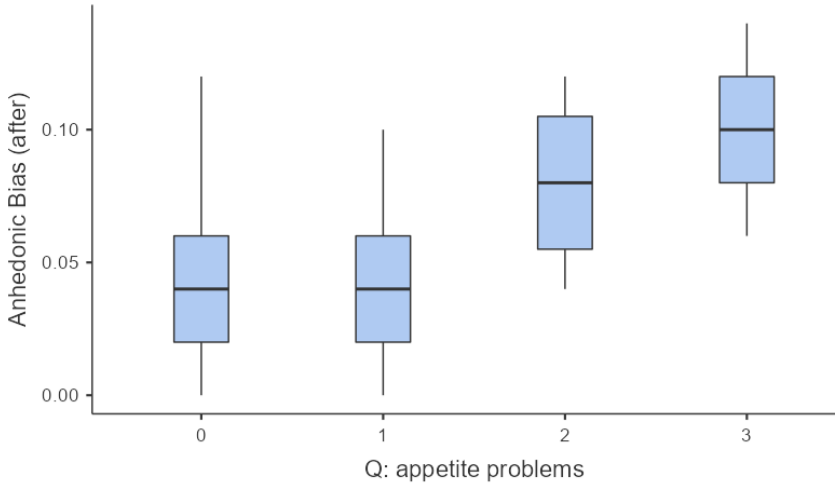


Fig. 6: Distribution of anhedonic attention bias and answers to questions about appetite problems after visiting the exhibition.

The link between anhedonic attention bias,associated with a lack of pleasure and appetite, and corresponding questionnaire responses became stronger after the exhibition (See Fig. 6).

A decrease in anhedonia as a result of visiting the exhibition is indicative of a new perspective on the future. Visitors who were previously viewing their future negatively started focusing on aspects that bring them joy (See Fig. 7).

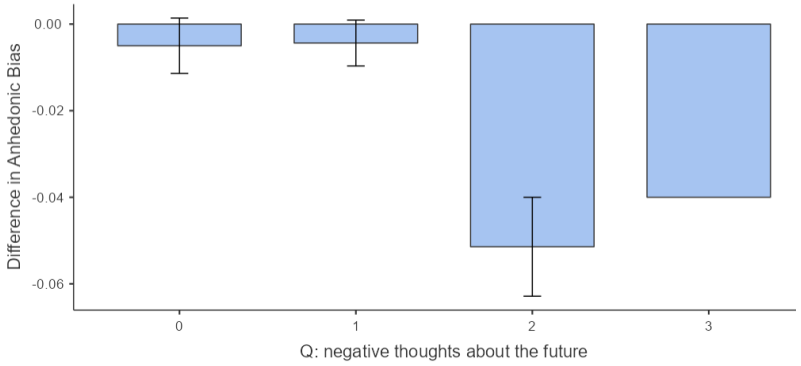


Fig. 7: Distribution of responses concerning negative thoughts about the future and anhedonic attention bias indicators. (Response levels:
0 - I'm not worried about my future.
1 - I'm concerned about the future.
2 - I feel that nothing awaits me in the future.
3 - My future is hopeless, and nothing can change for the better.)

The intensity of dysphoric bias was associated with questions about feeling deserving of punishment (Fig. 8). This shift in emotional intensity suggests that the aesthetic experience during the exhibition encouraged visitors to see the world from a new perspective. Those who initially felt they deserved punishment began to reorient their views towards the more positive aspects of life, resulting in a decrease in dysphoric bias. This transformative power of art has historically been linked to the concept of catharsis, a phenomenon that transitions individuals from a state of emotional burden to one of positive enlightenment. Even when rooted in tragic circumstances, this aesthetic catharsis brings about a sense of harmony and

ethical reevaluation, fostering more humane feelings and attitudes. In its broader understanding, catharsis also serves as a remedy for overcoming feelings of loneliness and alienation.

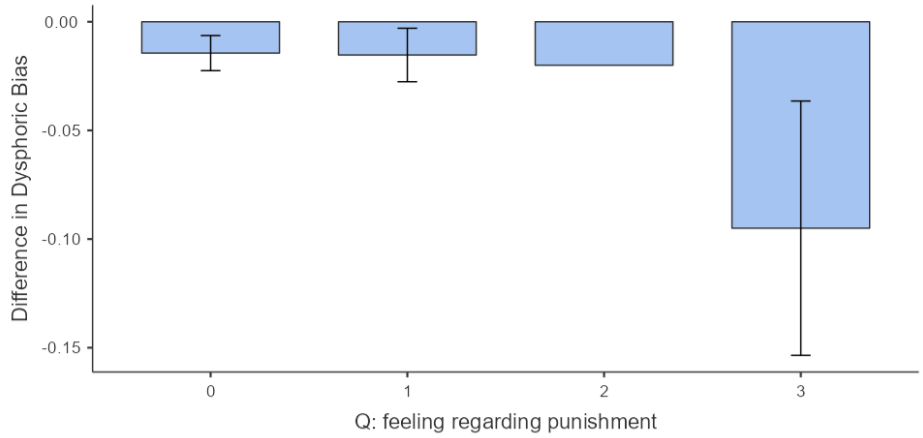


Fig 8. Distribution of responses regarding punishment and the indicator of dysphoric bias.
(Response levels:
0 - I don't feel I am being punished.
1 - I feel I may be punished.
2 - I expect to be punished.
3 - I feel I am being punished.)

Anxiety

Mood can fluctuate and is often influenced by various external factors, such as the aesthetic and ethical aspects experienced during an exhibition. In contrast, anxiety is generally a more constant state, primarily driven by internal fears and self-assessments. As a result, we observed a minimal impact of exhibition visits on situational anxiety levels (as shown in Fig.9). Specifically, post-visit self-assessment scores (measured by the STAI) tended to improve mainly among visitors who initially displayed high levels of anxiety. The data on attention bias showed a rise in lower scores, suggesting that the exhibition experience enhanced focus in visitors who were initially less attentive, and conversely, reduced tension among those who started off feeling overly stressed.

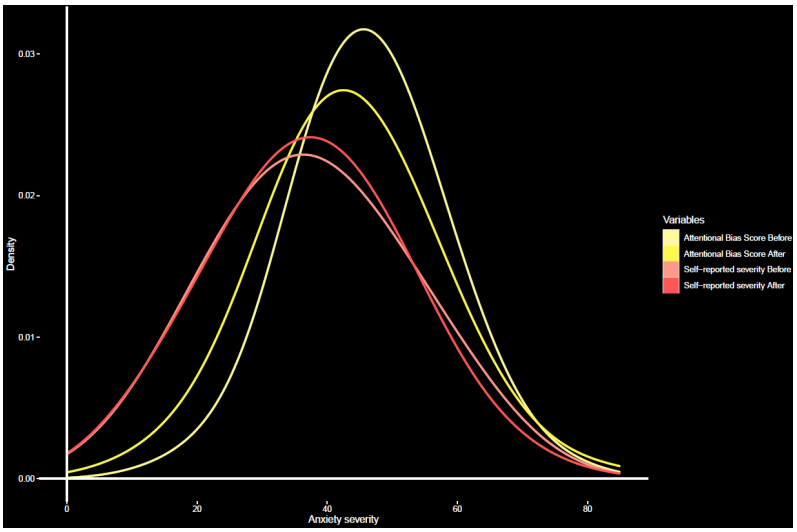
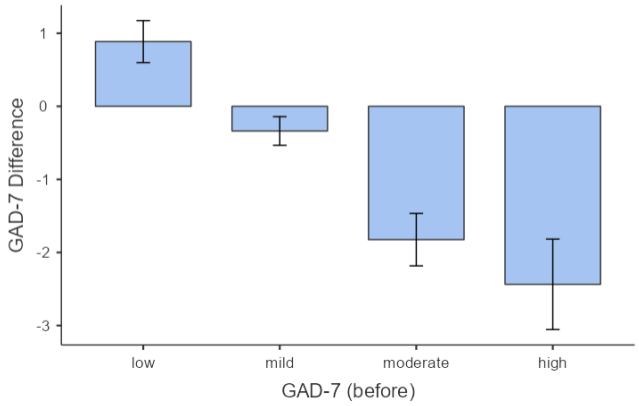


Fig. 9: Comparison of anxiety indicators as measured by the STAI-S test (light red for pre-exhibition and dark red for post-exhibition) and attentional bias towards threatening stimuli (AB) (light yellow for pre-exhibition and dark yellow for post-exhibition).

Approximately 10% of the visitors were highly anxious according to self-assessment via the GAD-7 test. Most visitors had low to moderate anxiety levels. However, this rate is significantly higher than the World Health Organization's estimate for Ukraine, which stands at 3.2%[9]. It aligns more closely with findings from other studies conducted during times of war[10].

Post-exhibition, anxiety levels decreased in 50% of the visitors. Notably, the most significant changes were observed among those who were highly anxious prior to viewing the exhibition. Those who were initially less anxious became more attentive and focused (see Fig. 10).

Fig. 10: Changes in GAD-7 score in groups with low and high anxiety



Attention bias indicators, which reflect states of tension such as hypervigilance[11] and avoidance[12], are viewed as stress-coping strategies and suggest a lack of mental resources. These indicators are also associated with the risk of anxiety disorders. For example, hypervigilance tends to increase in individuals who are experiencing high levels of arousal (Fig. 11).

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9 https://www.who.int/publications/i/item/depression-global-health-estimates

10 Kurapov Anton, Danyliuk Ivan, Loboda and al. Six months into the war: a first-wave study of stress, anxiety, and depression among in Ukraine}, Frontiers in Psychiatry, 14, 2023}, 10.3389/fpsyt.2023.1190465

11 The indicator of excessive attention to danger is determined as a percentage of the total number of image pairs where such a perception strategy was observed during test viewing.

12 Indicator of distraction from emotionally unpleasant situations or danger is determined as a percentage of the number of image pairs where such perception strategy was observed during test viewing.

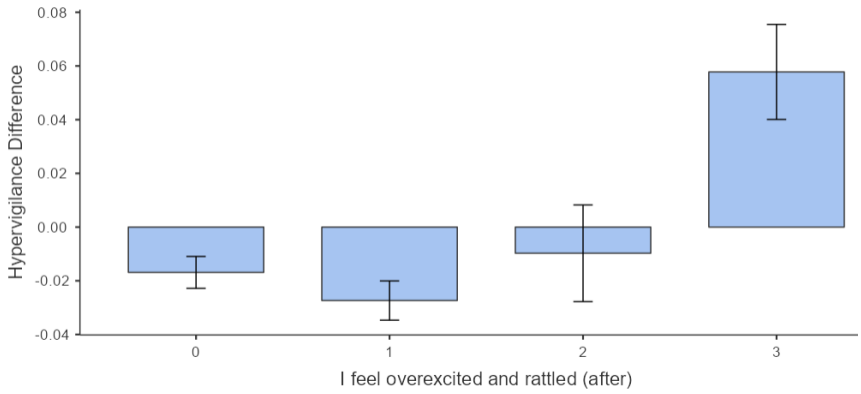

Fig. 11: Distribution of changes in hypervigilance and self-assessment of arousal levels after viewing the exhibition.

Similarly, avoidance is correlated with subjective levels of satisfaction. Visitors who left the exhibition feeling most satisfied were more likely to avoid negative emotions and shift their focus away from distressing images, suggesting that they were able to detach from the tragic context of the events.

Conclusion

This study confirms that art exhibitions have a profound impact on visitors' depressive symptoms. They can elevate positive mood, alleviate anxiety, and offer a new perspective on the world. This serves as an important support mechanism for those facing emotional challenges, especially in the context of military conflict. Art has the potential to be not just an aesthetic source of pleasure but also a tool for emotional well-being and perception change.