Effects of Additional Information, Musical Context and Virtual Reality on the Emotional Affect Induced by Art

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Introduction

"Every great artist gives birth to a new universe, in which the familiar things look the way they have never before looked to anyone."
Rudolf Arnheim, 1954

The subjective experience of art is not well-understood. It is known that the processing of visual information is influenced by both bottom-up and top-down effects. **Bottom-up** effects pertain to processes that build visual experience using the retinal information alone. In visual arts, these include simple features like brightness, hue, and color as well as more complex ones such as the use of gestalt principles and image composition (Özger and Choudhury, 2023). **Top-down** processing is the internal guidance of attention based on prior knowledge to modify the experience through learned information. Examples of these elements include recognition of patterns and objects along with more complex ones like emotional state and memory (Hansen,et. al., 2006). Meta-analyses show that there is no overpowering brain area or function that is pivotal to artistic experience. Instead, the aesthetic experience encompasses a broad distributed network of visual, emotional, cognitive, and attentional regions (Boccia et al., 2016; Vartanian & Skov, 2014). This is why information given about uniform stimuli from a single artist can create a story that increases self-relevance by changing the experience to become more influential. Music may serve as an emotionally salient accompaniment. It has a rich relationship with visual mediums, as it can be associated with colors and share the same emotional qualities as them. Finally, the physical setting might also have an influence. Virtual reality (VR) is an immersive technology that employs simulation mechanisms very close to those used by our mind. VR systems can provide insight into the ways, in which the environment may contribute to the affect, induced by art (Caponnetto, et. al., 2021).

Objective

We utilize virtual reality (VR) technology to study potential top-down effects on art perception and emotion by changing the auditory stimuli to manipulate both the informative context and the emotional setting. Our hypothesis is that schema congruence, the physical environment, as well as the interaction between visual arts, narration and music, all modulate the aesthetic experience, considered as a particular emotion, which can be measured by implicit and explicit affect tests.

Methods

Participants

47 participants with no report of visual or auditory processing disorder.
Age: 18 to 25

Stimuli and presentation

The experiment is conducted in a VR room (512cm x 338cm). A VR headset model HTC Vive Pro is used. Participants are walking in a museum room simulation viewing an exhibition of The Black Paintings by Francisco Goya (15 paintings total, including a self-portrait), while being presented with auditory stimuli for a 25-minute experience. The paintings are displayed at different lengths to accommodate the narration specific to each one. There are four randomly assigned groups:

a) a narration about the artist's life and his paintings (group N)
b) music, the first movement of Shostakovich Symphony №10, (group M)
c) both music and narration (group NM)
d) a baseline background noise (group B)

Affect state analysis

The evoked affects are assessed using The Implicit Positive and Negative Affect Test (IPANAT) and the Positive and Negative Affect Schedule (PANAS). Participant's art knowledge is assessed, as determined by the Vienna Art Interest and Art Knowledge Questionnaire (VAIAK). A linear regression (ANOVA) is conducted to assess if the knowledge and interest scores predicted the reported affect scores and to to test the hypothesis that the group with both narration and music (MN) would have the lowest affect score. The data from Özger and Choudhury(2023) will be compared to assess the effect of the VR setting.

Virtual reality museum of *The Black Paintings* collection, interior and exterior.

Findings & Expectations

In the original study (Özger and Choudhury, 2023), group NM reported significantly lower affect scores, indicating more intense emotional experiences as opposed to the other two groups (N =47, F(2)= 4.099, p=.023). There was no significant effect shown from the knowledge (F=.194, p=.824, η2p =.009) and interest scores (F=1.305, p=.281, η2p =.056). A possible explanation for this might be the lack of variance in the art knowledge scores.

Mean Affect Score Across Groups

Results from the narration condition showed the highest affect scores, indicating lesser effect on the emotional experience. However, no auditory control was used, which limited the data analysis. We seeked to improve the experimental design by implementing the background noise baseline condition, which represents the natural noise in a museum environment. Furthermore, we implemented the same affect measurement questionnaires prior to the museum experience, in order to calculate the change in affect for each participant. The addition of another scale to measure affective states, PANAS, is also a tool that aims to further improve our analysis of the results. Finally, the VR environment provides a more realistic setting which is expected to also influence the experience, as well as make our findings more applicable to artistic venues.

This study seeks to understand the effects of information about