

The Aesthetic Experience of Contemporary Installations in an Art Gallery and a Laboratory Setting: The Issue of Interactivity

Magdalena Szubielska¹ and Kamil Imbir²

¹ The John Paul II Catholic University of Lublin, Institute of Psychology

² University of Warsaw, Faculty of Psychology

ABSTRACT

Recent research on empirical aesthetics conducted in a laboratory setting has shown that the beauty felt in response to an artwork depends on its interactivity and suggested that interactivity might shape aesthetic experience. The current study tested the role of availability of interacting with installations on naïve viewers' understanding, liking, and affect. Participants were presented with contemporary installations alongside differing levels/degrees of interactions with them: (a) own-interaction, that is, own interactions and optional observing other viewers when interacting (in an art gallery), (b) other-interaction, that is, observing the viewer when interacting (in a laboratory setting), and (c) no-interaction, that is, interaction unavailable at all (control condition—in a laboratory setting). In Conditions B and C, artwork reproductions were presented. The results showed that in the own-interaction condition, participants liked the artworks more than in the laboratory setting conditions (when data from other-interaction and no-interaction conditions were combined). However, this result should be explained by the gallery effect rather than the degree of interactions. At the same time, subjective understanding and affective state did not differ depending on the level of interaction. Moreover, we tested what kind of affective state correlates with a greater tendency to interact with installations when viewing them in the art gallery. The variance of engagement in interaction with installations was statistically significantly positively explained (overall 42%) by valence (more positive states), subjective significance (more significant) and origin of affective states (metaphorically originating more from reasons of the mind, i.e., more deliberated upon and rational).

KEYWORDS

contemporary art
installation art
affect
aesthetic judgement
interactivity

INTRODUCTION

The Interactivity of Installation Art

Installations are one of the most significant phenomena in contemporary art. Recently, researchers on experimental aesthetics have devoted increasing attention to them (Gulhan et al., 2021; Lee & Choi, 2016; Pelowski, Leder, et al., 2018; Pelowski, Specker, et al., 2018; Savaş et al., 2021; Szubielska, Imbir, & Szymańska, 2021; Szubielska & Sztorc, 2021; see also Marin-Morales et al., 2019; Szubielska & Imbir, 2021; Szubielska & Niestorowicz, 2020; Szubielska & Sztorc, 2019). Installations are often site-specific works of art designed for a specific location or space (Kapoula et al., 2011; Pelowski, Leder, et al., 2018; Tröndle et al., 2014). Another typical feature of installations is that they are designed so that viewers interact with them (for example, by touching them, clicking, manipulating, or moving parts), which is possible not only for new media installations (e.g., Savaş et al., 2021) but also for analog installations (Szubielska, Imbir, & Szymańska, 2021). In consequence, bodily explorations in space are typical for viewers of installations (Jacucci et al., 2009). Using the metaphor of the ventriloquist, we

may state that the installation art acts as a puppet¹. Just as actors move puppets, installation art needs a spectator who, through physical activity, makes the work of art "come alive." In other words, its reception requires the viewer to take action in relation to the installation, thus engaging in a kind of conversation with the work of art.

Some recent conceptualizations of the aesthetic experience of visual arts have emphasized that art-making and art-viewing processes are related in the sense that, thanks to their own activity during perception and cognitive effort, the viewer, in a mirror-like manner, discovers the process of creation taken by an artist, from a superficial perception of the work's appearance to attempts to "read" the artist's concept (Tinio, 2013). Although Tinio (2013), in the mirror model, focused on drawings and paintings, at the same time, he stated that this model could be applied to the study of the experience of other artistic media (even non-

Corresponding author: Magdalena Szubielska, The John Paul II Catholic University of Lublin, Institute of Psychology, Al. Raclawickie 14, 20-950 Lublin.

E-mail: magdasz@kul.pl

visual media like writing or music). Therefore, in our view, this model is also suitable for explaining the experience of creating (the artist's perspective) and receiving (the spectator's perspective) installation art. For painting and installation, artists initially explore an idea that they consider interesting, important, and viable (the so-called initialization stage of the mirror model, the first stage from the artist's perspective). The next stage of artwork creation, that is, expansion and adaptation, involves the development of the initial idea. In the case of an installation, this can be the creation of a series of sketches, the selection of construction materials or component objects and their colors, the design and execution of the initial construction, and the testing of moving mechanisms (if any). In the case of the exhibition considered in the current study, we did not have access to these two stages in creating the artworks. However, we had the opportunity to look at the final stage, the finalizing process. These were not the last brushstrokes in the atelier (as in the case of paintings). Instead, fine-tuned refinements occurred during the exhibition assembly and consisted mainly of setting up installations in a specific space (which also hosted other works of art). Significantly, the artists themselves were involved in the final stage, for example, by moving the installation, rearranging its elements, or testing how their bodies experience a given work of art in a particular exhibition space. Similar movements were then made by the viewers. But for the viewers (unlike the artists), this was the first stage of the artwork's reception (early and automatic). These movements might initiate higher cognitive processes (e.g., memory-based) at the second stage of the viewer's processing of the installation, which then led to the final stage of assigning meaning, that is, the attempt to figure out the artist's idea. A similar view on the role of embodied cognition in art experience was presented by Brinck (2018). Namely, he underlined that the viewer's physical activity and body movement is a crucial element in discovering the artist's intentions and in the emerging aesthetic experience.

Although perception–action and motion loops focused on discovering affordances (Gibson, 1979) suggested by Brinck (2018) may refer to different genres of art, including paintings, in our opinion, the activity of such a mechanism may be of particular importance during the reception of installation art. We agree with Savaş et al. (2021) that when viewing other genres, audiences also tend to be active and move their bodies: switching viewpoints, viewing the work alternately from a distance (to get the big picture) and up close (to look at the details). For instance, in the case of paintings, they can be viewed from different angles and also from different distances (e.g., Kapoula et al., 2011), which may sometimes significantly alter the interpretation of the work (this seems to be the case with Impressionist or Arcimboldo's Mannerist paintings, due to changes in the perceptual grouping and figure-ground organization). Still, these are exceptions rather than the rule. However, the need to discover affordances through action and physical interaction with the work of art seems to be stronger in the case of installation art, which by definition demands the presence or activity of the viewer as a co-creator of the work (Dezeuze, 2010; Reiss, 1999). In other words, when it comes to installation art, discovering a particular affordance is clearly related to the specific action and motion of the viewers. In the case of the Night Life of Household Appliances

installation (used in our study, see Supplementary Materials, Video 4), the viewers' action was not limited to approaching the objects that made up the installation (the converted fridge and washing machines) or viewing them from different perspectives. Having realized that pressing, turning, or moving certain parts (e.g., buttons) of these devices changes the moving pictures projected onto the wall in the background, they took various actions to check which buttons were active and what changes in the image they caused.

In sum, we may differentiate between different kinds of interaction. First, in line with some approaches (e.g., affordance theory, Gibson, 1979; the idea of enactivism and sensorimotor contingencies, Stewart et al., 2014; Varela et al., 1991; see also the neurocognitive theory of image, Francuz, 2013), perception and cognition are interactive. Second, art experience can generally be said to unfold during the engagement with the work. Third, this is even more evident in installation art. Due to the possibility of the multisensory experience of the installation (e.g., visual, haptic, auditory) and manipulation of the elements composing the installation (in the case of interactive installations), stimulations and even artwork appearances change significantly with viewers' motion and action. Hence, installation art provides ample room for various types of interaction, including physical ones.

To our knowledge, only one study to date tested the role of interactivity of installation art (i.e., availability of physically interacting with installations) in aesthetic experience (Savaş et al., 2021). That study was conducted in a laboratory setting and showed that participants rated the beauty of a genuine interactive video installation higher than a similar noninteractive work of video art. However, the authors stated that the study had several limitations. For instance, they used only one artwork in each experimental condition and did not provide an ecologically valid environment for testing aesthetic experience. Indeed, when comparing aesthetic emotions and judgements of interactive installations viewed in an art gallery (where own-interaction was also possible) and in a laboratory setting (where participants viewed recordings of a viewer interacting with installations), aesthetic experiences were enhanced in the gallery (Szubielska, Imbir, & Szymańska, 2021).

In our view, the issue of interaction/body engagement in the reception of art is relevant for empirical aesthetics since more and more artworks are being created that may be touched or manipulated. At the same time, research on haptic aesthetics of art (e.g., Sánchez Clemente, 2017; Szubielska & Niestorowicz, 2020) and the embodied experience of art (e.g., Ganczarek et al., 2015; Kapoula et al., 2011; see also eye-tracking study by Pelowski, Leder, et al., 2018) up to date is scarce, and the findings are not conclusive due to the variety of procedures and materials used. For example, Sánchez Clemente (2017) showed that the experience of perceiving art visuo-haptically was less appealing than just viewing artworks. On the other hand, in a recent study on touching artworks, Szubielska and Niestorowicz (2020) showed that aesthetic pleasure was higher when perceiving artworks by touch (when participants were blindfolded) than in the visuo-haptic perceptual condition. Furthermore, some studies on haptic aesthetics did not use artworks as stimuli (e.g., Gao & Soranzo, 2020; Muth et al., 2019). Others concentrated on body sways when viewing flat images (Ganczarek et al., 2015;

Kapoula et al., 2011). Whereas the consideration of haptic perception or embodied cognition seems particularly interesting in relation to the reception of installation art, it seems that the multisensory interactive experience is supportive of understanding art and elevating the aesthetic experience (due to viewers being more stimulated and emotionally engaged when having the opportunity to interact with objects in the museum, Vi et al., 2017).

The Importance of Giving Meaning In the Reception of Contemporary Art

Due to its ambiguity, contemporary art is often confusing and hard to interpret to naïve audiences. At the same time, viewers (also nonexperts) have a need to invest the work of art with meaning and discover the artist's intentions. In other words, they strive for a subjective sense of understanding (which is performed in the cognitive mastering phase of processing an aesthetic stimulus and is the effect of giving meaning/making sense of the work of art). If viewers manage to solve a cognitive puzzle, such as a work of art, they will appreciate it more and feel positive emotions connected with the task solution (Leder et al., 2004). Although modern and contemporary art is cognitively challenging, contextual information with interpretive prompts (like titles or extended descriptions) may increase its understanding and liking by nonexperts (Bubić et al., 2017; Russel, 2003; Russell & Milne, 1997; Swami, 2013; Szubielska, Imbir, & Szymańska, 2021; Szubielska & Imbir, 2021). These prompts may be critical in the case of making interpretations of ambiguous, non-figurative art (Szubielska, Szymańska, & Augustynowicz, 2021).

We argue that physical interaction with the installation may be considered as searching for clues to interpretation and acquiring knowledge about the work, as we have already mentioned when addressing the mirror model ideas (Tinio, 2013) in the context of the reception of installation art. Moreover, that interaction allows one to discover the complexity of the artwork, and a process of discovery might be rewarding. A recent study showed that liking increases when the touched aesthetic objects are more complex (Muth et al., 2019). Therefore, it can be hypothesized that the availability of interaction positively influences the understanding and appreciation of installation art. It is worth pointing out that (thanks to the predictive coding mechanism), even interoceptive experience may change the aesthetic experience, making it more enjoyable (Azevedo & Tsakiris, 2017). Therefore, it seems that the embodied cognition of installation art can, to some extent, be provided (simulated) by observing other viewers who come into physical contact with the artwork in question. However, the experience resulting from the simulation will not be as strong as own physical experience, although it may also depend on the person's capacity for perspective-taking or empathy (Ganczarek et al., 2018; Miller & Hübner, 2022; see also Pelowski, Specker, et al., 2018). Moreover, perhaps spectators with high imagery abilities can simulate interaction with a given installation even when they only view it (i.e., without observing any other viewer).

In a process referred to as cognitive mastering, the affective state conditions the viewer's actions, including the activity of their body

(Pelowski et al., 2017). This process is finished satisfactorily when a work of art is subjectively understandable (Leder et al., 2004). Thus, it can be speculated that certain affective states are more conducive to interactions with installations, thus contributing to the completion of cognitive mastery, than others.

A Dimensional Approach to Understanding Emotional Reactions

Emotions are complex and subjective experiences (Kagan, 2007), and thus are difficult to measure and compare. The most promising approach to understanding the nature of emotional reactions is to search for the dimensions underlying emotional processes (Lang, 1980; Russell, 2003). Classic dimensions ascribing emotional reactions (Bradley & Lang, 1999; Osgood et al., 1957) are valence (the degree of pleasantness vs. unpleasantness of feelings), arousal (level of energy or excitation accompanying emotional state: varying from sleep to extreme excitement), and dominance (the degree of control over the experienced emotional state: being dominated by the emotion or having control over it). Recently, two other dimensions were proposed in order to represent the number of cognitive processes needed for emotions to arise (Imbir, 2016; Jarymowicz & Imbir, 2015), namely, the origin of an affective state (automatic, with a little cognitive effort needed, vs. reflective, based on cognitive operations) and its subjective significance (per analogy to arousal: the degree of energy accessible to perform effort needed for cognitive operations). Both origin and subjective significance can be framed in the context of dual processes theories of emotion (Imbir, 2016; Jarymowicz & Imbir, 2015; Strack & Deutch, 2014).

Valence, arousal, dominance (Osgood, et al., 1957), origin, and subjective significance (Imbir, 2015) allow us to situate each emotional experience in a sort of affective space (e.g., Russell, 2003), thus, comparisons between emotional subjective experiences are possible. Obviously, a single dimension (i.e., valence) does not account for the whole diversity of emotional states, but a combination of dimensions can describe affect diversity in a quite precise way. In the context of art perception, which is in fact a reflective form of mental activity, the inclusion of origin and subjective significance scales into the analysis of affect may be beneficial for understanding of the mechanisms involved (Szubielska & Imbir, 2021). We may assume that emotions arise in two successive phases: (a) when reacting immediately to the visual stimulus (art), and (b) when a reflective interpretation of an art piece is concluding in the mind. The final measured reaction in art studies is the combination of both reactions (Szubielska & Imbir, 2021; Szubielska, Imbir, & Szymańska, 2021).

The Current Study

Agreeing with Savaş et al. (2021) that there is a knowledge gap concerning the impact of interactivity of art on aesthetic experience, we aimed to test the role of the level/degree of interactivity on viewers' affective states, understanding, and liking. Building on the above body of literature, we predicted that a higher degree of interactions positively influences subjective understanding (Hypothesis 1) and liking (Hypothesis 2). To this end, contemporary installations were presented in three different conditions characterized by varying levels of interac-

tivity: own-interaction, that is, own interactions and optional observing other viewers when interacting (the highest degree of interaction), other-interaction, that is, observing the viewer when interacting (the medium degree of interaction), and no-interaction, that is, no own interactions or observing another viewer when interacting (the lowest degree of interaction). Importantly, only in the own-interaction condition, participants were presented with genuine artworks since they were tested in an art gallery. In the other two conditions, participants viewed reproductions of artworks in a laboratory setting.

We also aimed to investigate whether the installation viewers' affective states depend on the degree of interactions, but this was treated as an exploratory question. Furthermore, also in an exploratory way, we intended to find out which affective states correlate with greater audience engagement in interaction with the installation art.

METHOD

Participants

A total of 100 undergraduate (mainly psychology) students participated in the study. These were nonexperts in the field of art (33 males, 67 females; initially, there was one additional male participant in the art gallery condition, but he was excluded since he was declared to have had a formal fine art education), were aged between 19 and 28 years. Participants were assigned to one of three experimental conditions. The first part of data collection took place in 2019 in a contemporary art gallery where the participants were asked to view the installations and were encouraged to interact physically with them (the own-interaction condition; $n = 40$, $M_{\text{age}} = 21.98$ years, $SD = 2.18$; 27 women). Groups of students who had not previously seen the exhibition were invited to participate in the research by the experimenter conducting the study. The second part of data collection took place in 2019 and 2020 (before the first lockdown due to the COVID-19 pandemic) in a laboratory setting where participants were randomly assigned to the following conditions: viewing the video recording of installations in which a child viewer² was interacting with them (the other-interaction condition, $n = 30$, $M_{\text{age}} = 21.13$ years, $SD = 1.38$; 18 women), and viewing a simple video recording of the installations alone (the no-interaction condition, $n = 30$, $M_{\text{age}} = 21.07$ years, $SD = 1.36$; 22 women). Since greater art expertise is associated with higher art appreciation (Leder et al., 2012; Pihko et al., 2011), we controlled participants' self-reported interest and expertise in contemporary art on 8-point scales with the ends of the scales described as follows: 0 = *not at all*, 7 = *extremely* ($M = 3.01$, $SD = 1.85$). Participants did not differ in their interest in contemporary art, $F(2, 97) = .82$, $p = .444$ or expertise, $F(2, 97) = 2.18$, $p = .119$ in the three experimental conditions.

Materials

The materials used in the study were six artworks shown in the *Ventriloquist and Silent Images* exhibition (original title: *Brzuchomówca i milczące obrazy*) curated by Agata Sztorc. This specific exhibition was chosen due to the exhibited artworks having the characteristics

of installation art, that is, they allowed for interaction and bodily exploration, and therefore, viewers might become part of the artwork. The exhibition was intentionally designed mainly for a young audience and for individuals with disabilities, but was eagerly visited by a regular adult audience. This temporary exhibition at the Galeria Labirynt contemporary art gallery in Lublin presenting interactive installations (overall nine) took place between 18 May 2019 and 14 July 2019. We excluded three artworks presented at the exhibition from the study since two installations were temporarily under repair after being damaged by the audience, and one artwork was exhibited outside the gallery. The following artworks were used as the research material: (a) *Stone Gloves* (Magdalena Franczak, 2015, see Video 1³), (b) *Touch#1* (original title: *Dotyk#1*; Krzysztof Topolski, 2019, see Video 2), (c) *Organ of King Pompilius* (original title: *Organy Króla Pompiliusza*; Yuliia Andriichuk and Patryk Lichota, 2019, see Video 3), (d) *Night Life of Household Appliances* (original title: *Nocne życie AGD*; Kacper Mutke and Michał Urbański, 2019, see Video 4), (e) *Method for Reaching Extreme Heights* (original title: *Metoda osiągnięcia ekstremalnych wysokości*; Maciej Polynko and Małgorzata Wasilek, 2019, see Video 5), and (f) *[alter] – resonance cone* (original title: *[alter] – stożek rezonansowy*, Alicja Panasiewicz and Adam Panasiewicz, 2019, see Video 6).

Two similar sets of video recordings presenting the artworks were prepared. The only difference was that the first set showed the child viewer interacting with the installations (see Video 1–Video 6), and the second set showed only the installations. The way of interacting with the artwork shown in the video reflected the way viewers behaved when they visited the exhibition. The first author of the current paper made observations of viewers' behavior in the natural situation of visiting the gallery and while participating in the study in the gallery situation. We used six short (about 30 s) videos to present each installation artwork within each set. The videos were prepared without an audio track since, in the exhibition hall, there was a kind of cacophony caused by the fact that the installations located in different parts of the space generated sounds simultaneously (while watching the video, one could get the wrong impression that the sounds were connected to the installation being recorded).

Procedure

Participants were tested in groups of about five in the gallery context and about ten in the laboratory setting. Participants were asked not to talk to each other during the entire experiment. The order of viewing the artworks was fixed (see the Materials section, Artworks 1 to 6, and the Supplementary Materials, Videos 1 to 6).

In the art gallery condition, participants viewed the exhibition when it was closed to other visitors. Before visiting the exhibition, participants were informed that they were permitted to touch and physically interact with all the installations. More specifically, the participants were told that they could approach the installations, freely explore the artworks by touch, manipulate them and, if their design allows, also enter inside the installations or touch them with their whole body (e.g., by lying down on them). The way (and level of intensity) of possible physical interactions depended on the particular artwork.

In the case of the *Stone Gloves* artwork, the participants had the opportunity not only to touch the object but to put their hands into it. The installation *Touch #1* allowed viewers to experience the vibration of the artwork with their whole body, for example, when they were lying on the installation. Similar whole-body experiencing was possible when participants hugged the *[alter] – resonance cone* installation. Both in the case of the installation *Organ of King Pompilius* and *Method for Reaching Extreme Heights*, viewers could enter the installation and manipulate the objects. Manipulation was also possible for the installation *Night Life of Household Appliances*. Titles and curatorial descriptions were hidden. Instead, the artworks in the study were labelled by sequentially assigned numbers (1 to 6). Participants were allowed to view and interact with the installations as long as they wanted (since the time spent on the exhibition was not limited). They also might have observed other participants when interacting with artworks. When participants decided that they were ready, they filled out a paper and pencil questionnaire (participants rated each artwork individually, not the exhibition as a whole). For measuring affective states, we used 1 to 9 nonverbal Self-Assessment Manikin (SAM) scales (Lang, 1980) of emotional dimensions such as valence, arousal, dominance, origin, and subjective significance (Imbir, 2016). The SAM scales were designed to measure affective reactions with the use of a schematic figure of a person expressing certain states in a symbolic way: smiling vs. sad face for valence, chills of energy for arousal, posture size for dominance, the heart vs. mind metaphor for origin, and the importance of the stimulus (the size of an exclamation mark on a warning road sign) for significance (c.f. Imbir, 2015, Figure 1). Following this, 8-point Likert scales were used to measure subjectively assessed aesthetic judgements (in terms of subjective understanding and liking) and engagement in interaction with the artwork (0 = *not at all*, 7 = *extremely*). For engagement ratings, participants were asked to respond to the following question: "To what extent did you engage in interaction with this artwork?" (0 = *did not interact at all*, 7 = *engaged with the interaction to an extreme degree*). Importantly, the experimenter observed the participants in the gallery and noticed that all of them were, to some extent, engaged in the interaction with installations (at least by walking from one installation to the other and moving close to or away from the particular one). In both laboratory setting conditions (i.e., other-interaction and no-interaction), video recordings of the installations were presented (with the child viewer interactions or just installations). Each of the six videos was presented via a multimedia projector in a loop (a similar procedure was used by Szubielska, Imbir, & Szymańska, 2021). When all the participants within a group had viewed the video and completed the questionnaire (that was almost the same as in the gallery condition⁴, the only difference being that in both laboratory setting conditions, participants were not asked about their engagement in interacting with the installations), the next video in the sequence was shown.

The whole procedure took about 30–40 minutes in the art gallery and about 20–30 minutes in the laboratory setting.

RESULTS

To analyze the data, we used IBM SPSS Statistics 27.0 software.

Descriptive Statistics

Descriptive statistics on affective states (in terms of valence, arousal, dominance, origin, and subjective significance), aesthetic judgements (in terms of understanding and liking), and engagement in interaction with installations are presented in Table 1. Engagement in interaction with installations was only measured in the art gallery context. Hence this data was unavailable (n/a) for both laboratory setting conditions.

Understanding Depending on the Degree of Interactions with Installations: Confirmatory Analysis

The analysis of variance (ANOVA) on understanding with the independent variable of degree of interacting with the installations (own-interaction, other-interaction, no-interaction) did not show statistically significant effects, $F(2, 97) = 1.30, p = .278, \eta_p^2 = .03, 95\% \text{ CI } [.00, .10]$ (see Figure 1).

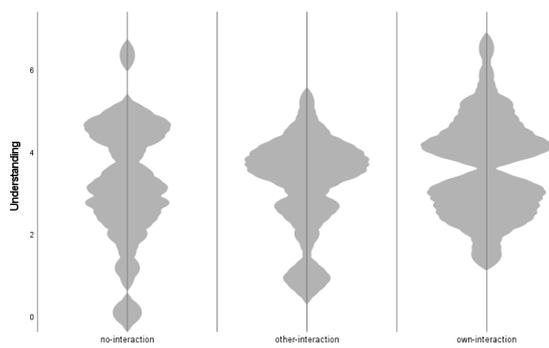
Liking Depending on the Degree of Interacting with Installations: Confirmatory Analysis

A similar ANOVA was conducted on liking scores with the independent variable of degree of interacting with installations. The analysis showed a statistically significant main effect of the degree of interacting with installations, $F(2, 97) = 4.11, p = .019, \eta_p^2 = .08, 95\% \text{ CI } [.001, .18]$ (see Figure 2). However, follow-up comparisons of this effect with Bonferroni adjustments did not show any significant differences between conditions (all $ps \geq .052$). Therefore, we also decided to compare the own-interaction condition (the gallery condition, and at the same time, the higher degree of interaction condition; $n = 40$) with the two

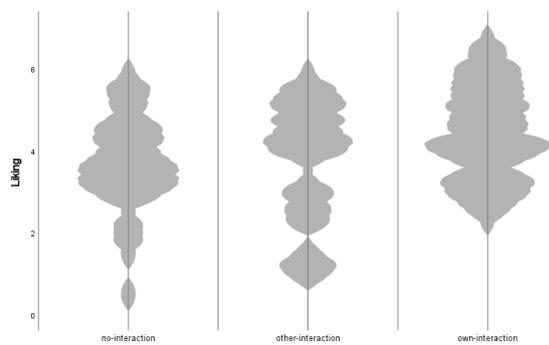
TABLE 1.

Mean Assessment of Valence, Arousal, Dominance, Origin, Subjective Significance, Understanding, Liking, and Engagement in Interaction with Installations in Three Experimental Conditions (as a Function of the Degree of Interactions). Standard Deviations are Presented in Parentheses

	Degree of interactions		
	Own-interaction	Other-interaction	No-interaction
Affective states			
Valence	6.00 (1.37)	5.54 (1.09)	5.62 (1.02)
Arousal	4.79 (1.10)	4.38 (1.41)	4.46 (1.41)
Dominance	5.12 (1.01)	4.60 (1.03)	5.05 (0.85)
Origin	4.83 (1.00)	5.17 (1.47)	4.89 (0.87)
Subjective significance	4.80 (1.09)	4.68 (1.27)	4.27 (1.26)
Aesthetic judgements			
Understanding	3.60 (1.18)	3.18 (1.17)	3.19 (1.47)
Liking	4.40 (1.16)	3.66 (1.48)	3.66 (1.22)
Engagement in interaction with installations	4.57 (1.32)	n/a	n/a

**FIGURE 1.**

Effect of degree of interactions with installations on installation understanding.

**FIGURE 2.**

Effect of degree of interactions with installations on installations' liking.

conditions where own-interaction was not possible (i.e., the two laboratory setting conditions: other-interaction and no-interaction, together constituting the lower degree of interaction condition; $n = 60$). The independent-samples t -test yielded a significant difference between these conditions, $t(98) = 2.88$, $p = .005$, $d = .59$, 95% CI [.017, .99]. Installations were assessed as being more liked in the own-interaction condition ($M = 4.40$, $SD = 1.16$) than when own-interaction was unavailable ($M = 3.66$, $SD = 1.34$).

Affective State Depending on the Degree of Interacting with Installations: Exploratory Analysis

The multilevel analysis of variance (MANOVA) on affective state (valence, arousal, dominance, origin, subjective significance) with the independent variable of degree of interacting with installations yielded a statistically significant effect, Wilks' $\Lambda = .82$, $F(10, 188) = 1.95$, $p = .041$, $\eta_p^2 = .10$, 95% CI [.00, .13]. However, follow-up ANOVAs showed no statistically significant effects, either for valence, $F(2, 97) = 1.52$, $p = .223$, $\eta_p^2 = .03$, 95% CI [.00, .10], arousal, $F(2, 97) = 1.00$, $p = .371$, $\eta_p^2 = .02$, 95% CI [.00, .09], dominance, $F(2, 97) = 2.69$, $p = .073$, $\eta_p^2 = .05$, 95% CI [.00, .15], origin, $F(2, 97) = 0.87$, $p = .421$, $\eta_p^2 = .02$, 95% CI [.00, .08], or subjective significance, $F(2, 97) = 1.81$, $p = .169$, $\eta_p^2 = .04$, 95% CI [.00, .12].

Engagement in Own Interaction with Installations by the Affective States: Exploratory Analysis

Based on the data collected in the art gallery condition, we used a multiple regression (MR) to analyze 1440 assessments (40 participants \times 6 installations \times 6 dimensions: valence, arousal, dominance, origin, subjective significance, engagement in interaction with installations). We considered five dimensions of affective states as possible predictors of engagement in interaction with installations. Table 2 presents results for all MR models.

The stepwise MR results showed that engagement in interaction with the installations could be positively predicted by valence alone (with an explained variance of 34%) but combined with subjective significance and origin, the model explained more variance (the variance was explained at respectively: 41%, 42%). Affective states in terms of valence, subjective significance, and origin positively correlated with engagement in interactions with installations. At the same time, average evaluations of engagement in interaction were not predicted by either arousal or dominance (see Table 2).

TABLE 2.

Results of the Stepwise Multiple Regression on Engagement in Interaction with Installations

Predictors	Model 1		Model 2		Model 3	
	β	p	β	p	β	p
Valence	.59	< .001	.49	< .001	.49	< .001
Subjective significance			.29	< .001	.30	< .001
Origin					.11	.027
Variables excluded from the model						
Arousal	.12	.029	.03	.574	.04	.439
Dominance	.15	.010	.07	.248	.06	.254
Origin	.07	.188	.11	.027		
Subjective significance	.29	< .001				

DISCUSSION

Interaction with Installations and Aesthetic Judgements

The results did not show that the degree of interactions influences understanding. Thus, H1 was not supported. Similarly, Savaş et al. (2021), who measured participants' cognitive flexibility did not show differences in viewers' cognitive functioning under the influence of installation interactivity. Hence, the level of interactivity does not seem to be a sufficient factor for satisfactory completion of the cognitive mastering process for the viewer of installation art or helping viewers to discover the artist's ideas (Tinio, 2013). In Pelowski et al.'s (2017) model of art perception, processing relating to action and the body is one of the elements in achieving cognitive mastery. Perhaps the impact of interactivity would have been revealed if the participants had understood the installations better thanks to provided titles or descriptions. The recent study on the interactivity effect suggests that the possibility of interacting redirects the attention of viewers who do not know the works' titles or descriptions away from the content and meaning, and towards the interaction itself (Savaş et al., 2021). Referring to the mirror model (Tinio, 2013), in the gallery condition, the viewers might have stopped at the first stage of the artwork reception. Perhaps they did not proceed to the higher (cognitive) stages of processing the installations due to enjoyment caused by their bodily experience.

At the same time, the interactivity factor influenced liking. Thus, H2 was supported. However, we did not find that higher levels of interaction resulted in a greater appreciation of installations since there were no statistically significant differences in liking when the three experimental conditions were compared with each other in pairs. Nevertheless, when we combined the results of the conditions without own interactions (i.e., both laboratory conditions) and compared them with the results of the own interaction condition (in the gallery), we found higher liking in the own interaction condition. Yet, it should be stressed that this difference can be explained both by the possibility of the participants having their own (i.e., higher level of) interactions with the installations and the effect of the art gallery. Many studies have shown that art is appreciated more in a gallery than outside a gallery (Brieber et al., 2014; 2015; Grüner et al., 2019; Szubielska, Imbir, & Szymańska, 2021; Szubielska & Imbir, 2021). The interpretation referring to the art gallery effect rather than interactivity seems more plausible because, in laboratory conditions, liking did not differ according to whether or not the participants had the opportunity of observing the person viewing the installation interacting with the artwork.

Importantly, the effect of genuineness is often entangled in the gallery/museum effect (for a discussion, see Grüner et al., 2019; Specker et al., 2021) because (as in the current study) real artworks are usually presented in a museum and digital reproductions are presented in laboratory conditions (Brieber et al., 2014; 2015; Szubielska, Imbir, & Szymańska, 2021; Szubielska & Imbir, 2021). Although a meta-analysis of the genuineness effect did not show this effect after considering the context (Specker et al., 2021), there is some evidence for a genuineness

effect. For instance, a recent study by Siri et al. (2018) that compared the reception of immobile real works of art in the gallery versus digital reproductions in the gallery (participants were sitting on chairs when stimuli were presented) showed that high-quality reproductions were rated as arousing less intense emotions and less willingness to touch them than real artworks. At the same time, no statistically significant differences were found in terms of rating the color intensity, the perceived movement, and the aesthetic value. Thus, even in a fixed viewing context (e.g., an art gallery), certain aspects of evaluating an artwork may change due to the reception of the genuine artwork compared to the digital reproduction. On the other hand, Gulhan et al. (2021), in an eye-tracking study, showed very similar patterns of viewing of art installations in the real artwork versus VR condition.

It was suggested that the lack of genuineness effect might be theoretically explained by referring to the facsimile accommodation hypothesis (proposing that viewers may achieve a similar aesthetic experience when viewing high-quality digital reproductions and genuine artwork, due to imagining how the reproduction would look in real life, Specker et al., 2021; Specker & Leder, 2022). However, the recent study by Specker and Leder (2022) did not show evidence for the facsimile accommodation hypothesis.

Interaction with Installations and Affective States

Despite the fact that in almost all cases, raw emotional assessments in gallery conditions offered a chance to interact with art were higher than in other conditions (see Table 1), inferential statistics suggest that the degree of interactions did not affect the participants' affective states. The possible explanation for such a result may be that in the gallery context, in comparison to other conditions, the measurement of affective reactions was a bit delayed from the moment the participants looked at the particular installation. Upon entering the exhibition room in the art gallery, the participants immediately saw all the installations, which they then viewed and evaluated one by one. We observed that the duration of the testing in the gallery was longer than in the laboratory conditions, which seems to be determined by longer viewing of the artworks in the gallery. As we stated in the Method section, the time of inspecting the installation in all conditions was unlimited, but the dynamics of this process are different in different settings. Possibly, own interactions were more demanding. Thus, a process of habituation lowered the intensity of the experienced emotions.

Another explanation is that while interacting or viewing the interactions, there are two sources of affect, that is, the artwork itself and own actions or an actor's actions (in the current study, participants had a chance to view videos showing the interactions with the installation. In this condition, there was the possibility of creating an analogy to the situation of the gallery context). Especially when the artwork is complex, they may work in an opposite way, evoking positive (i.e., curiosity) and negative (i.e., failure in exploration) feelings simultaneously, thus blurring the final emotional assessment. Watching an artwork in a laboratory may, to some extent, allow for focusing only on the artwork, but the experience may be less intense (Brieber et al., 2014; 2015;

Grüner et al., 2019; Savaş et al., 2021; Specker et al., 2021; Szubielska, Imbir, & Szymańska, 2021; Szubielska & Imbir, 2021).

Affective Reactions and Engagement in Interaction with Installations

Affective states in terms of valence, subjective significance, and origin correlated with participants' engagement in interactions with the installations. The more positive, subjectively significant, and reflectively originated the artworks were, the more engagement was present. Considering valence, the effect can be interpreted in the context of approach versus avoidance motivation (i.e., [Krieglmeyer et al., 2010](#)). This is a very basic motivational mechanism: when we feel positive about a certain object, we want to investigate this object and interact with it, when we want to approach it, we feel more positive ([Gable & Dreisbach, 2021](#)). Considering the role of subjective significance (the reflective form of activation: feeling that something is important, meaningful, etc.) and origin (feeling that the mechanism of an affective reaction is automatic vs. reflective), the results are also coherent with predictions of the dual-process theories ([Epstein, 2003](#); [Imbir, 2015](#)): We engage in interactions when something is important for us. Subjective significance is also associated with the reflective origins of emotional reactions ([Imbir, 2015](#)), and therefore, origin is also treated as a predictor for engagement. The context of an art gallery might provoke reflective thinking (aesthetic admiration, getting to know the meaning and the message of the art, etc.). Thus, we found congruent predictors. We found no effect of arousal or dominance. Arousal, as an automatic form of activation ([Imbir, 2015](#)), should predict engagement in pleasurable activities at an automatic level ([Epstein, 2003](#)), but not at a reflective one. The dominance of affective experiences concerns the most polarized and intense feelings. In the current study, we found rather moderate (close to the center of the scales) assessments. Therefore, the stimuli did not provide a space for possible dominance effects.

An important issue worth discussing is the direction of observed effects. The current study design did not allow us to firmly formulate conclusions concerning the causal order. From a theoretical point of view, engagement with art installations may appear to be triggered in between two different phases of emotional reaction: (a) initial reaction to the physical features of an object, and (b) interpretation of the object's meaning. What is more, the engagement triggered at the first stage may stimulate the willingness to engage in meaning interpretation. This may apply specifically to the intensity of the reflective originated emotions, but in the general intensity of all aspects of emotional reactions (valence, arousal, subjective significance, and dominance). To solve this issue, engagement of psychophysiological measures is needed. Therefore, due to the methodology used in the current study, results should be interpreted with caution.

Limitations and Future Research

The current study has some limitations, mainly because the research material was based on a real, temporary exhibition presented in an art gallery.

First, the study would have benefited from the addition of two conditions in the gallery context, with or without the possibility of

observing the interaction of another viewer, without the viewer's own interaction. Unfortunately, due to time constraints, it was not possible to include additional groups of participants tested in the exhibition. We believe that a continuation of our research is needed to clarify whether the elevated degree of liking of the installations in the exhibition by the viewers should be explained by the effect of the art gallery or the possibility of their own interaction with the artwork.

The second limitation refers to the differences between the way the installations were presented in the art gallery and in the laboratory settings. In the art gallery setting, participants viewed genuine artworks in the exhibition hall. Consequently, they had access to visual, auditory, tactile, and even olfactory information on the installations. Moreover, they viewed a particular installation in the context of all exhibitions (the other artworks were a kind of background and the installation on which the participant concentrated at a given moment was the figure). In the laboratory conditions, participants viewed video recordings of installations, that is, without access to information other than visual. The specifics of the exhibition (the presence of several sound-generating installations) did not allow for audio-video recordings to be made in which only the sound of a particular installation would be heard, with no other sounds in the background. On the other hand, recording background sounds could have been misleading for participants watching the recordings: they could think that the background noise was part of a particular installation. Hence, it would be worth undertaking a replication that would include installations that do not have a soundtrack or the possibility for the viewer to generate sounds as an essential feature. Moreover, in the gallery setting, participants might have observed interactions with artworks made by several adults, whilst the recordings presented one child viewer interacting with installations. Choosing a child viewer in the videos while participants were young adults was caused by the fact that the exhibition was designed for a young audience. Consequently, the child viewer's height and stature were more appropriate for manipulating the installations. Nevertheless, the child might have engaged differently (i.e., in terms of facial expressions) than adult viewers. It is also possible that taking the perspective of a child viewer rather than an adult viewer was more difficult for the adult participants tested in the laboratory setting. Another problem with the recording was that it was looped. Repeatedly watching the same video is far from real interaction. In the gallery, longer viewing times are likely related to consistently changing the point of viewing of the visual scene and new input (i.e., no repetition).

Third, we measured the affective state after interaction with the installation and the viewing was finished. This should raise caution about the causal interpretation of obtained data. Also, engagement in the interaction was self-rated after acting with the artworks. It seems that the interaction time factor may be relevant to the viewer's affective reactions. Therefore, we suggest testing the dynamics of aesthetic experience (especially in terms of affect) in subsequent studies, for instance, by manipulating the viewing time and measuring participants' experiences repeatedly after a particular duration of interaction with the artwork (for a similar procedure, see [Belfi et al., 2019](#)). Moreover, in addition to the subjective measurement (i.e., using self-reports), the

engagement in interaction with installations is worth measuring objectively (for different measurement approaches, see Jacucci et al., 2009; 2010). This could be done using, for example, eye-tracking (Garbutt et al., 2020; see also Gulhan et al., 2021; Pelowski, Leder, et al., 2018). Other aspects of measures connected with body movements are also worth considering in subsequent studies, for example, the amount of movement, bodily arousal, and physiological reactions (e.g., similar to those used by Siri et al., 2018). Besides, participants might have been asked (as in Savaş et al., 2021) how they explored the artworks and whether they were aware that some installations (e.g., *Night Life of Household Appliances*, *Organ of King Pompilius*, *Method for Reaching Extreme Heights*) responded to their movements.

Fourth, although there is evidence that art appreciation correlates with viewing time (Brieber et al., 2014), we did not measure the time spent in the gallery and in the laboratory setting by each participant on viewing the particular installation.

In sum, the most important next step for a future study would be to use an additional condition with no interaction in the art gallery to compare aesthetic experience between interaction versus no interaction in the art gallery. Knowing how the viewers' physical involvement in receiving art translates into aesthetic experience is an essential issue for curators. When planning exhibitions, they decide, among other things, whether the artworks on display can be viewed up close or touched or whether viewers and the artwork should be separated by a tape/rail to prevent interaction. It seems that viewers should be encouraged to come to the exhibitions by the possibility of freely examining the artworks physically and interacting with them. The issue of the body's involvement in the reception of art seems also vital for empirical aesthetics as it has been still not sufficiently researched.

CONCLUSIONS

Although it is too early to state that own interactions are essential for appreciating installation art, future experiments in an art gallery considering the interactivity factor might settle that matter. The most interesting result we obtained was that when viewing the artworks in the exhibition hall, dimensions of affective states such as more positive valence, higher subjective significance, and origin, metaphorically originating more from the mind, correlated with participants' greater engagement in interactions with installations.

FOOTNOTES

1. A similar thought guided the curator of the exhibition that is the subject of this study.
2. We decided to record a child viewer since adult viewers were too large physically in relation to most of the installations and obstructed large parts of artworks when interacting with them.
3. The videos can be found in the Supplementary Materials.
4. However, as participants watched the videos together in the lab conditions, they were not as free with respect to viewing time as in the gallery condition (e.g., participants could not swap the video if the particular installation did not interest them; similarly, participants who

may have wanted to see the video multiple times hurried due to the other participants having made their ratings already). In other words, participants in the laboratory setting had less control over their engagement than participants in the art gallery condition – also in terms of viewing time.

ACKNOWLEDGEMENTS

KI: This work was supported by the Faculty of Psychology, University of Warsaw, from the funds awarded by the Ministry of Science and Higher Education in the form of a subsidy for the maintenance and development of research potential in 2022. MS received financial support from the internal grant of The John Paul II Catholic University of Lublin.

We are grateful to Agata Sztorc, Ewa Sabeł and Katarzyna Bucior for their help in data collection. We are thankful to Radosław Bultowicz for preparing video recordings presenting artworks at the exhibition, Agata Sztorc for her organisational help in conducting the research, and the Galeria Labirynt art gallery for the possibility of carrying out the current study and releasing participants from the admission fee.

DATA AVAILABILITY

The data are available on Figshare: [10.6084/m9.figshare.17900570](https://doi.org/10.6084/m9.figshare.17900570)

Supplementary materials are available on Figshare: [10.6084/m9.figshare.17900570](https://doi.org/10.6084/m9.figshare.17900570)

REFERENCES

- Azevedo, R. T., & Tsakiris, M. (2017). Art reception as an interoceptive embodied predictive experience. *The Behavioral and Brain Sciences*, 40, e350. doi: 10.1017/S0140525X17001856
- Belfi, A. M., Vessel, E. A., Brielmann, A., Isik, A. I., Chatterjee, A., Leder, H., Pelli, D. G., & Starr, G. G. (2019). Dynamics of aesthetic experience are reflected in the default-mode network. *NeuroImage*, 188, 584–597. doi: 10.1016/j.neuroimage.2018.12.017
- Bradley, M. M., & Lang, P. J. (1999). *Affective Norms for English Words (ANEW): Technical manual and affective ratings*. The Center for Research in Psychophysiology, University of Florida.
- Brieber, D., Nadal, M., & Leder, H. (2015). In the white cube: Museum context enhances the valuation and memory of art. *Acta Psychologica*, 154, 36–42. doi: 10.1016/j.actpsy.2014.11.004e
- Brieber, D., Nadal, M., Leder, H., & Rosenberg, R. (2014). Art in time and space: Context modulates the relation between art experience and viewing time. *Plos One*, 9, e99019. doi: 10.1371/journal.pone.0099019
- Brinck, I. (2018). Empathy, engagement, entrainment: The interaction dynamics of aesthetic experience. *Cognitive Processing*, 19, 201–213. doi: 10.1007/s10339-017-0805-x
- Bubić, A., Sušac, A., & Palmović, M. (2017). Observing individuals viewing art: The effects of titles on viewers' eye-movement profiles. *Empirical Studies of the Arts*, 35, 194–213. doi: 10.1177/0276237416683499
- Dezeuze, A. (red.) (2010). *The do-it-yourself artwork: Participation*

- from *Fluxus to new media*. Manchester University Press.
- Epstein, S. (2003). Cognitive-experiential self-theory. In T. Millon & M. J. Lerner (Eds.), *Handbook of personality: Theory and research* (pp. 165–192). John Wiley & Sons, Inc.
- Francuz, P. (2013). *Imagia. W kierunku neurokognitywnej teorii obrazu* [Imagia. Towards a neurocognitive theory of image.] Wydawnictwo KUL.
- Gable, P. A., & Dreisbach, G. (2021). Approach motivation and positive affect. *Current Opinion in Behavioral Sciences*, 39, 203–208. doi: 10.1016/j.cobeha.2021.03.030
- Ganczarek, J., Hünefeldt, T., & Olivetti Belardinelli, M. (2018). From “einfühlung” to empathy: Exploring the relationship between aesthetic and interpersonal experience. *Cognitive Processing*, 19, 141–145. <http://doi.org/10.1007/s10339-018-0861-x>
- Ganczarek, J., Ruggieri, V., Nardi, D., & Olivetti Belardinelli, M. (2015). Intersection of reality and fiction in art perception: Pictorial space, body sway and mental imagery. *Cognitive Processing*, 16, 233–236. doi: 10.1007/s10339-015-0702-0
- Gao, J., & Soranzo, A. (2020). Individual differences in aesthetic preferences for multi-sensorial stimulation. *Vision*, 4, 6. doi: 10.3390/vision4010006
- Garbutt, M., East, S., Spehar, B., Estrada-Gonzalez, V., Carson-Ewart, B., & Touma, J. (2020). The embodied gaze: Exploring applications for mobile eye tracking in the art museum. *Visitor Studies*, 23, 82–100. doi: 10.1080/10645578.2020.1750271
- Gibson, J. J. (1979). *The ecological approach to visual perception*. Lawrence Erlbaum Associates.
- Grüner, S., Specker, E., & Leder, H. (2019). Effects of context and genuineness in the experience of art. *Empirical Studies of the Arts*, 37, 138–152. doi: 10.1177/0276237418822896
- Gulhan, D., Durant, S., & Zanker, J. M. (2021). Similarity of gaze patterns across physical and virtual versions of an installation artwork. *Scientific Reports*, 11, 18913. doi: 10.1038/s41598-021-91904-x
- Imbir, K. K. (2015). Affective norms for 1,586 polish words (ANPW): Duality-of-mind approach. *Behavior Research Methods*, 47, 860–870. doi: 10.3758/s13428-014-0509-4
- Imbir, K. (2016). From heart to mind and back again. A duality of emotion overview on emotion-cognition interactions. *New Ideas in Psychology*, 43, 39–49. doi: 10.1016/j.newideapsych.2016.04.001
- Jacucci, G., Spagnolli, A., Chalambalakis, A., Morrison, A., Liikkanen, L., Roveda, S., & Bertoincini, M. (2009). Bodily explorations in space: Social experience of a multimodal art installation. In T. Gross, J. Gulliksen, P. Kotzé, L. Oestreicher, P. Palanque, R. O. Prates, & M. Winckler (Eds.), *Human-Computer Interaction – INTERACT 2009* (pp. 62–75). Springer. http://dx.doi.org/10.1007/978-3-642-03658-3_1
- Jacucci, G., Wagner, M., Wagner, I., Giaccardi, E., Annunziato, M., Breyer, N., Hansen, J., Jo, K., Ossevoort, S., Perini, A., & Roussel, N. (2010). ParticipArt: Exploring participation in interactive art installations. 2010 *IEEE International Symposium on Mixed and Augmented Reality – Arts, Media, and Humanities* (pp. 3–10).
- Jarymowicz, M., & Imbir, K. (2015). Toward a human emotions taxonomy (based on their automatic vs. reflective origin). *Emotion Review*, 7, 183–188. doi: 10.1177/1754073914555923
- Kagan, J. (2007). *What Is emotion? History, measures, and meanings*. Yale University Press.
- Kapoula, Z., Adenis, M.-S., Lê, T.-T., Yang, Q., & Lipede, G. (2011). Pictorial depth increases body sway. *Psychology of Aesthetics, Creativity, and the Arts*, 5, 186–193. doi: 10.1037/a0022087
- Krieglmeyer, R., Deutsch, R., De Houwer, J., & De Raedt, R. (2010). Being moved: Valence activates approach-avoidance behavior independently of evaluation and approach-avoidance intentions. *Psychological Science*, 21, 607–613. doi: 10.1177/0956797610365131
- Lang, P. J. (1980). *Self-assessment manikin*. University of Florida.
- Leder, H., Belke, B., Oeberst, A., & Augustin, D. (2004). A model of aesthetic appreciation and aesthetic judgments. *British Journal of Psychology*, 95, 489–508. doi: 10.1348/0007126042369811
- Leder, H., Gerger, G., Dressler, S. G., & Schabmann, A. (2012). How art is appreciated. *Psychology of Aesthetics, Creativity, and the Arts*, 6, 2–10. doi: 10.1037/a0026396
- Lee, G., & Choi, Y.-J. (2016). 인터랙티브 미디어아트 콘텐츠의 인지적 어포던스가 관람자의 인터랙션과 흥미에 미치는 영향 [Effect of cognitive affordance of interactive media art content on the interaction and interest of audience]. 정보처리학회논문지: 소프트웨어 및 데이터공학 [KIPS Transactions on Software and Data Engineering], 5, 441–450. e
- Marin-Morales, J., Higuera-Trujillo, J. L., Greco, A., Guixeres, J., Llinares, C., Gentili, C., Scilingo, E. P., Alcañiz, M., & Valenza, G. (2019). Real vs. immersive-virtual emotional experience: Analysis of psycho-physiological patterns in a free exploration of an art museum. *PLoS ONE*, 14, e0223881. doi: 10.1371/journal.pone.0223881
- Miller, C. A., & Hübner, R. (2022). The relations of empathy and gender to aesthetic response and aesthetic inference of visual artworks. *Empirical Studies of the Arts*. Advance online publication. doi: 10.1177/02762374221095701
- Muth, C., Ebert, S., Marković, S., & Carbon, C.-C. (2019). “Aha”ptics: Enjoying an aesthetic aha during haptic exploration. *Perception*, 48, 3–25. doi: 10.1177/0301006618818014
- Osgood, C. E., Suci, G. J., & Tannenbaum, P. H. (1957). *The measurement of meaning*. University of Illinois Press.
- Pelowski, M., Leder, H., Mitschke, V., Specker, E., Gerger, G., Tinio, P. P. L., Vaporova, E., Bieg, T., & Husslein-Arco, A. (2018). Capturing aesthetic experiences with installation art: An empirical assessment of emotion, evaluations, and mobile eye tracking in Olafur Eliasson’s “Baroque, Baroque!”. *Frontiers in Psychology*, 9, 1255. doi: 10.3389/fpsyg.2018.01255
- Pelowski, M., Markey, P. S., Forster, M., Gerger, G., & Leder, H. (2017). Move me, astonish me... delight my eyes and brain: The Vienna Integrated Model of top-down and bottom-up processes in Art Perception (VIMAP) and corresponding affective, evaluative, and neurophysiological correlates. *Physics of Life Reviews*, 21, 80–125. doi: 10.1016/j.plrev.2017.02.003
- Pelowski, M., Specker, E., Gerger, G., Leder, H., & Weingarden, L. S. (2018). Do you feel like I do? A study of spontaneous and deliberate emotion sharing and understanding between artists and perceivers of installation art. *Psychology of Aesthetics, Creativity, and the Arts*,

- 14, 276–293. doi: 10.1037/aca0000201
- Pihko, E., Virtanen, A., Saarinen, V.-M., Pannasch, S., Hirvenkari, L., Tossavainen, T., Haapala, A., & Hari, R. (2011). Experiencing art: The influence of expertise and painting abstraction level. *Frontiers in Human Neuroscience*, 5, 94. doi: 10.3389/fnhum.2011.00094
- Reiss, J. H. (1999). *From margin to center: The spaces of installation art*. MIT Press.
- Russel, P. (2003). Effort after meaning and the hedonic value of paintings. *British Journal of Psychology*, 94, 99–111. doi: 10.1348/000712603762842138
- Russell, P. A., & Milne, S. (1997). Meaningfulness and hedonic value of paintings: Effects of titles. *Empirical Studies of the Arts*, 15, 61–73. doi: 10.2190/EHT3-WVM-52CB-8QHJ
- Sánchez Clemente, A. (2017). *To touch or not to touch: Multimodal integration in the aesthetic appreciation of artworks in an art gallery* [Master's thesis, University of Balearic Islands]. <http://hdl.handle.net/11201/146222>
- Savaş, E. B., Verwijmeren, T., & van Lier, R. (2021). Aesthetic experience and creativity in interactive art. *Art & Perception* 9, 167–198. doi: 10.1163/22134913-bja10024
- Siri, F., Ferroni, F., Ardizzi, M., Kolesnikova, A., Beccaria, M., Rocci, B., Christov-Bakargiev, C., & Gallese, V. (2018). Behavioral and autonomic responses to real and digital reproductions of works of art. *Progress in Brain Research*, 237, 201–221. doi: 10.1016/bs.pbr.2018.03.020
- Specker, E., Fekete, A., Trupp, M. D., & Leder, H. (2021). Is a “real” artwork better than a reproduction? A meta-analysis of the genuineness effect. *Psychology of Aesthetics, Creativity, and the Arts*. Advance online publication. doi: 10.1037/aca0000399
- Specker, E., & Leder, H. (2022). Testing the facsimile accommodation hypothesis. *Acta Psychologica*, 222, 103482. doi: 10.1016/j.actpsy.2021.103482
- Stewart, J., Gapenne, O., & Di Paolo, E. A. (Eds.) (2014). *Enaction: Toward a new paradigm for cognitive science*. MIT Press
- Strack, F., & Deutsch, R. (2014). The reflective–impulsive model. In W. Sherman, B. Gawronski, & Y. Trope (Eds.), *Dual-process theories of the social mind* (pp. 92–104). Guilford Press.
- Swami, V. (2013). Context matters: Investigating the impact of contextual information on aesthetic appreciation of paintings by Max Ernst and Pablo Picasso. *Psychology of Aesthetics, Creativity, and the Arts*, 7, 285–295.
- Szubielska, M., & Imbir, K. (2021). The aesthetic experience of critical art: The effects of the context of an art gallery and the way of providing curatorial information. *PLoS One*, 16, e0250924. doi: 10.1371/journal.pone.0250924
- Szubielska, M., Imbir, K., & Szymańska, A. (2021). The influence of the physical context and knowledge of artworks on the aesthetic experience of interactive installations. *Current Psychology*, 40, 3702–3715. doi: 10.1007/s12144-019-00322-w
- Szubielska, M., & Niestorowicz, E. (2020). Seeing suppresses haptic pleasure while perceiving contemporary art. *i-Perception*, 11. doi: 10.1177/2041669520932948
- Szubielska, M., & Sztorc, A. (2019). The influence of extended contextual information provided in a contemporary art gallery on aesthetic experience of art faculties students. *Polish Psychological Bulletin*, 50, 345–351. doi: 10.24425/ppb.2019.131316
- Szubielska, M., & Sztorc, A. (2021). Doznania estetyczne Głuchych i słyszących osób dorosłych oglądających interaktywne instalacje w galerii sztuki. Raport z badań pilotażowych [Aesthetic experience by the Deaf and hearing adults viewing interactive installations in an art gallery. Report from pilot studies]. *AVANT. Trends in Interdisciplinary Studies*, 12, 1–17. doi: 10.26913/avant.2021.03.01
- Szubielska, M., Szymańska, A., & Augustynowicz, P. (2021). The pilot study on viewing times of artworks and labels and assessment of artworks in a gallery depending on the abstractedness of a piece of art. *Polskie Forum Psychologiczne*, 26, 451–466. doi: 10.34767/PFP.2021.04.0
- Tinio, P. P. L. (2013). From artistic creation to aesthetic reception: The mirror model of art. *Psychology of Aesthetics, Creativity, and the Arts*, 7, 265–275. doi: 10.1037/a0030872
- Tröndle, M., Kirchberg, V., & Tschacher, W. (2014). Is this art? An experimental study on visitors' judgement of contemporary art. *Cultural Sociology*, 8, 310–332. doi: 10.1177/1749975513507243
- Varela, F. J., Thompson, E., & Rosch, E. (1991). *The embodied mind: Cognitive science and human experience*. MIT Press.
- Vi, C. T., Ablart, D., Gatti, E., Velasco, C., & Obrist, M. (2017). Not just seeing, but also feeling art: Mid-air haptic experiences integrated in a multisensory art exhibition. *International Journal of Human-Computer Studies*, 108, 1–14. doi: 10.1016/j.ijhcs.2017.06.004

RECEIVED 10.01.2022 | ACCEPTED 28.07.2022