

# Measuring the Rothko experience in school visitors to modern art museums

Carmen Urpí, Charo Reparaz & Fernando Echarri

To cite this article: Carmen Urpí, Charo Reparaz & Fernando Echarri (2022): Measuring the Rothko experience in school visitors to modern art museums, The Journal of Educational Research, DOI: [10.1080/00220671.2022.2074950](https://doi.org/10.1080/00220671.2022.2074950)

To link to this article: <https://doi.org/10.1080/00220671.2022.2074950>



© 2022 The Author(s). Published with  
license by Taylor & Francis Group, LLC.



Published online: 13 May 2022.



Submit your article to this journal [↗](#)



View related articles [↗](#)



View Crossmark data [↗](#)

# Measuring the Rothko experience in school visitors to modern art museums

Carmen Urpí<sup>a</sup> , Charo Reparaz<sup>a</sup>  and Fernando Echarri<sup>b</sup> 

<sup>a</sup>School of Education and Psychology, University of Navarra, Pamplona, Spain; <sup>b</sup>University of Navarra Museum, University of Navarra, Pamplona, Spain

## ABSTRACT

Recent studies in museum education focus on the quality of visitor experience to help engagement. To understand how it occurs when it comes to dealing with young visitors to modern art museums, the researchers studied the esthetic experience of Mark Rothko's masterpiece *Untitled* (1969) with 678 primary and 335 secondary students. Four dimensions—sensory, emotional, cognitive, and spiritual, are taken into consideration for the development and preliminary validation of a specific instrument to evaluate the so-called “Rothko experience.” Based on quantitative data analysis, results suggest that school visitors can experience Mark Rothko's modern art intensely by perceiving changes in its color and other sensory features while making self-references to time and space vanish. Besides, cultural background makes a difference in intensely experiencing Rothko's modern art. Suggestions are made for the development of pedagogical strategies that engage young audience in museum experience of modern art.

## ARTICLE HISTORY

Received 9 January 2022

Revised 21 April 2022

Accepted 3 May 2022

## KEYWORDS

Child and adolescent spirituality; cultural background; emotion and cognition; esthetic experience; modern art appreciation; museum education services; school pupils' perception; young audience engagement

Rothko's exhibition at MoMA, during the big snowstorm. The intense light of the snow entered through the skylights; the paintings were pulsating

Lucia Berlin (2016)

## Theoretical framework



Three fundamental ideas build the theoretical framework for this study from a general to a particular approach: (1) Modern and contemporary art museums become non-formal settings for esthetic education by developing innovative programs in addition to the school curriculum. (2) Beyond sensory arousal, the esthetic experience of abstract art reaches the emotional, cognitive, and spiritual dimensions of human development. (3) The contemplation of Mark Rothko's paintings arouses intense esthetic experience and brings the viewer closer to modern and contemporary art.

## *Esthetic education in modern and contemporary art museums*

Among art curators and educators, one of the main purposes of art museums is to provide meaningful experiences and promote visitors' esthetic education (Burnham & Kai-Kee, 2011; Falk, 2009; Falk & Dierking, 1992; Hein, 1998; Hooper-Greenhill, 2007; Vallance, 2007). To become a “significant learning environment” (Hein, 1998), museums implement pedagogical innovations (Filippoupoliti & Sylaiou,

2015; Fontal & Marín-Cepeda, 2016; Hooper-Greenhill, 2007; Kristinsdóttir, 2017; Pastor, 2004). By creating unique experiential places of variable forms (Falk, 2009), visitors are encouraged to participate in esthetic experience with their own creative skill. Recent studies in the fields of art curating and education focus on the co-creative role of visitors, since the concept of audience participation is turning into a more involving concept of co-creation, differently addressed in the research literature (Barnes & McPherson, 2019; Govier, 2010; Holdgaard & Klasturp, 2014; Rogers & Rock, 2016; Simon, 2010). According to an educational approach, museum staff are challenged to encourage the young viewer's co-creative response to works of art in search of a meaningful experience even if it occurs when they are a captive audience of a school visit. Indeed, school visitors are a target of particular interest to address the problems of inclusion and cohesion of children and adolescents, since out-of-school activities become a chance to bridging inequality and cultural differences marked by family context (Oskala et al., 2009).

Visitor involvement in art contemplation is not a recent claim. In 1925, the Spanish philosopher Ortega y Gasset (2010, p. 310) argued for the need for pause, lingering, and slow contemplation in art experience versus quick gazing and passing by the art object. He had previously written about the evolution of art history by considering the change of perspective in the artist's point of view, from objective to subjective, and finally proposing the concept of “intrasubjective,” which had special impact for the American abstract expressionism of Mark Rothko (Cohen-Solal, 2016, p. 127).

**CONTACT** Carmen Urpí  [curpi@unav.es](mailto:curpi@unav.es)  School of Education and Psychology, University of Navarra, Pamplona, Spain.

© 2022 The Author(s). Published with license by Taylor & Francis Group, LLC.

This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way.

This concept posits that art experience requires a visual dialogue between the viewer and the artwork at the deepest levels of insight, in which the first sensory arousal progressively evolves into emotional, cognitive, and meta-cognitive response; ultimately, becoming what some authors, such as Pelowski and Akiba (2011), call *the transformative esthetic experience*. This would be similar to what other researchers in the field of environmental education call *significant life experience*, referring to youthful experiences in outdoor pristine environments that ground and develop the engagement with nature conservation (Chawla, 2001; Tanner, 1980; Williams & Harvey, 2001) or with a spiritual sense of life (London, 2003; Noddings, 2003; Vining & Merrick, 2012).

To foster this kind of experience with child and youth audiences, museum educators face a challenge comparable to that of the artist or the curator when trying to communicate immaterial experience through material form. Educators must design pedagogical proposals according to the viewers' immaterial skill and the content's material feature, since both (subject and object) together determine the educational experience, in the same way that determine the arts esthetic experience, with consequent implication of novelty and genuine human growth (Dewey, 1934; Kerlan, 2004). However, personal meaning always emerges in a particular, intimate, unexpected way for each human being, so that the educator never has guaranteed total control over it and only approximation is possible, by means of designing, planning, and implementing the best conditions for it to succeed (Kerlan, 2004). The same occurs to the artist's control of creativity in the art process. In the Aristotelian philosophical tradition, apart from technical skill, art mastery requires inspiration (Gilson, 1961; Lizarraga, 2000), which is equivalent to saying, in the experimental psychological sense, that art quality depends on originality apart from the skill factor (Kozbelt, 2004).

Consequently, a pedagogical approach, based both in philosophical tradition and psychological studies, recommends that art museum educators take into consideration that perceptual dimensions of the encounter between the viewer and the artwork belong to both at the same time, as if they were two sides of the same coin, recalling to what Spira names *non-dual experience* (Spira, 2014, p. 167). Those perceptual dimensions potentially become for museum educators the pedagogical dimensions of art creative contemplation. Current research on esthetic education rarely brings together the philosophical and psychological approaches, although the model of Csikszentmihalyi and Robinson (1990) has inspired some attempts to study these dimensions from an integrative approach, such as that of Stamatopoulou (2004) and more recently Wanzer et al. (2020).

### **Pedagogical dimensions of art contemplation**

Esthetic education is mainly based on the idea that human life is sensitive to the qualities of the material world and to how these qualities relate to each other (Eisner, 2002; Hart, 2018; Merleau-Ponty, 1945). Since art is about mastery in relating qualities, its contemplation offers the best opportunities for esthetic education. Art sensibility has to do with

material physical perception (Berlyne, 1971) as well as immaterial psychological perception, as sensory arousal connects with emotion and cognition making (Ellsworth, 1994; Hepburn, 1980; Leder & Nadal, 2014); but it also connects with the spiritual (Campbell & Simmons, 2012). For this reason, since Aristotle's *Poetics* and the notion of *catharsis*, it is still said today by so many other researchers that art contemplation can profoundly touch and change lives (e.g., Musaio, 2007; Read, 1947; Roenpagel, 2015; Tourián, 2016).

According to the above mentioned idea of "transformative aesthetic experience" (Pelowski & Akiba, 2011), true art contemplation is a complex phenomenon that goes beyond assimilating art information. It is neither self-escape nor any other kind of evasion from the real world. On the contrary, it demands overcoming initial cognitive disruption and discrepancy by deeply touching the inner self and maybe finally producing an intimate epiphany. Teaching and learning to contemplate an art object requires attention to the different perceptual dimensions of this esthetic experience: sensory, emotional, cognitive, and spiritual (Efland, 1990).

Considering there is an educational value of somaesthetics in the embodied art experience (Doddington, 2015; Shusterman, 2018), the link created between the artwork and the viewer is not complete if the sensory dimension is not considered—if it dispenses from the esthetic observation. "We must teach observation," César Manrique used to say (Gómez-Aguilera, 1994), calling for changes to the responsibility of the eye in educating the gaze.

However, the education of observation must go beyond the basic physical dimension. Following Walt Whitman (1855), sculptor Jorge Oteiza thinks it is necessary to learn the observation of the invisible (Merino, 2008). It is by educating the gaze that the observer can reach the possible messages that matter contains, in all its dimensions. An educated gaze allows the observer to have an internal vision, the vision of conscience where looking outside is to see inside, meaning that artworks are not windows to see landscapes or objects, but rather are blinded walls and abysses that impose limits on space and light to make the essentials able to be experienced by consciousness. Artworks reverse the order of communication between the canvas and the viewer in the basic exchange of information and esthetic pleasure (Arnheim, 1969; Yenawine, 2013). In a progressive relationship between artwork and viewer, the former is constantly inviting the latter to retrace the same steps the artist took to create it. This means that a developed sensitive observation can give access to a new level of vision, where it is possible to gain greater depth of creative contemplation. This is nothing but personal consciousness's identification with exterior reality (Noddings, 2003; Vining & Merrick, 2012); it consists of an emotional interiorization of what can be seen, together with a "space conception deepening process" (Vega, 2010, p. 9). Therefore, artworks such as Rothko's *Untitled* can guide sensitive and attentive young viewers from the colors and forms of external spaces and lights to the inner clarity and depth of their thinking and conscience. As Vega (2010) points out, "the object of contemplation or observation is the subject himself who has

initiated, with his gaze outwards, an exit that will find no other way than that of return to himself" (p. 86).

### ***Backwards into a Rothko experience***

The work of the artist Mark Rothko (1903–1970) is considered one of the greatest exponents of the so-called American Abstract Expressionism. His "multiform" works have an almost total abstraction, since they contain only colors organized in rectangles, called "color fields." Rothko's painting style contains special features that favor the activities of contemplation (Karkabi et al., 2014), which involve the "meditative gaze" (Muñoz, 2008, p. 86). When we face the contemplation of a Rothko multiform canvas, experiences can emerge (Echarri & Urpi, 2018). These can be of a variety of ranks and intensities. In some particular cases, the "color fields" (Chave, 1989, p. 6) create undefined, extemporal, and infinite atmospheres that can provoke vivid emotional experiences (Nodelman, 1997, p. 9). The atmosphere created by the painting envelops the spectator in what Rothko himself defined as the highest ideal of his painting: "the simple expression of a complex idea" (Muñoz, 2008, p. 86). For this reason, his canvases are suitable for meditation and reflection, because their simplicity in representing complex ideas makes it possible for "experiences" to occur. "Fullness and emptiness, openness and closeness; there are some differences between how the canvas looks at the beginning of the viewing encounter and how it looks at the end, after the eyes get tired and begin to produce after-images" (Phillips & Crow, 2005, p. 2). Rothko is conscious of the potential of his paintings to expand or contract in all directions according to the extra or introspective process of each visitor's gaze (Baal-Teshuva, 2003, p. 57). His paintings are capable of connecting macro- and microcosms (Chave, 1989, p. 107) as though they could extend into the infinite (Gonzalo, 2016, p. 21). For Arya (2011), contemplating Rothko's artwork is a spiritual journey, "vertiginous feelings prompt questions about the meaning of life and the fragility of mortality" (p. 84). As Rothko himself said, "people who cry before my pictures are having the religious experience I had when I painted them" (Baal-Teshuva, 2003, p. 57).

Certainly applicable to Rothko's paintings are the reflections by Hooper-Greenhill (2005) and Hein (2000), that artwork has a life of its own, albeit one provided by each visitor in a manner that is individualized, interpreted, and defined by the perspective that each person grants to the contemplated work (Hooper-Greenhill, 2005, p. 3). For those who are in tune with the artist's vision when contemplating a work by Rothko, "the experience can be akin to a trancelike rapture" (Janson & Janson, 2001, p. 817). There are even authors who call it "the Rothko experience," which can be physical, emotional, intellectual, and spiritual (Phillips & Crow, 2005, p. 1). This type of experience corresponds to what the anthropologist Nelson Graburn calls "reverential experience" (Falk & Dierking, 1992, p. 15). The "Rothko experience" implies an active attitude of contemplation. Hence, the

experience "will be both positive and memorable" (Falk & Dierking, 1992, p. 157).

Considering all these reasons, it seems that the "Rothko experience" produces in people a response at a great level of intensity, perhaps an emotional and spiritual state (Hawks, 1994) of unusual power, rarely experienced and therefore remembered, and perhaps unforgettable (Vining & Merrick, 2012). Sometimes characterized by "absorption in the moment and a sense of timelessness" (Palmer et al., 1999), it coincides with features comparable to the flow experience described by Csikszentmihalyi and Robinson (1990) for the esthetic experience, and recently studied by Wanzer et al. (2020). Other authors consider that these flow features provide the state prior to an experience of greater intensity, a sense of consciousness of the real, a discovery of a transcendent self. Museum educators are therefore challenged to engage younger audiences in flowing communication with Rothko's paintings so that they can experience higher levels of intensity and meaning.

The description provided here of the Rothko experience as intimate, epiphanic or transformative may sound difficult to apply with pupils from primary and secondary education, since there are models of esthetic experience that state that the challenge of an artwork must be in balance with the skills of the viewer because a complex work of art will engage only a person who has developed complex visual skills. For instance, based on the interplay of cognitive mastering and affective and emotional processing, Leder and Nadal (2014) emphasizes the importance of skill level and expertise in art appreciation and judgment. However, other researchers are of the opinion that the viewer's knowledge may interfere with the artwork and is not always positive for the esthetic experience (Shimamura, 2012). This recalls the thoughts of many artists who prefer the genuine perception of a child audience to adult rationalistic questioning (Tarkovsky, 1989). The underlying issue here for museum educators is whether children and teenagers can to some extent enjoy a Rothko experience despite having little art training or knowledge, because if anything the educator is concerned with reaching those who are more isolated, distanced, or less likely to connect.

Rothko paintings are not basic frames, but places to experience. The painter himself said "I have made a place" (Vega, 2010, p. 73), referring to murals in the Four Seasons restaurant in the Seagram Building. Because his artworks have metaphysical dimensions that fit inside houses, galleries, and museums, and demand all of one's senses, not only sight, they achieve an organized mixture of forms and colors, "multiform" and "sectional," with deep perceptions of space and light that transform into intimate emotions, like music or architecture (Cirlot, 1996; Rothko, 2004, p. 79; Wick et al., 2004, p. 18). Because of all this, the presence of Rothko artwork in a museum gallery turns into an event. With one or more artworks, a new visibility is created—a new space where attentive energies immediately awaken, making transformation possible for the sensitive and creative observer. The following study intends to provide research outcomes for helping the museum educator to design effective art contemplation proposals in order to foster young



visitor creative response to Mark Rothko's paintings, and extend it even to other abstract modern or contemporary art.

## Design of the study

### Objective

Considering all this conceptual background, the objective of the study is to analyze the perceptual impact of the contemplation and creative interpretation of Rothko's painting *Untitled* (1969) in the child and adolescent school population participating in the educational context of a modern and contemporary art museum. In particular, based on esthetic indicators of the so-called "Rothko experience" and other above mentioned references of general esthetic experience, we investigate how the contemplation of the painting affects four perceptual dimensions –sensory, emotional, cognitive, and spiritual– to better understand the intensity of the experience and its educational potential in young populations. For this purpose, we created an assessment instrument for the contemplation of Rothko's "multiform" artworks. In addition, the study presents a preliminary validation of the instrument for the assessment of the Rothko experience in the young population.

Based on this general objective, we pose the following research questions (RQ):

RQ1: Which are the most relevant perceptual dimensions of the Rothko experience in the child and adolescent population? Which perceptual dimensions are more related to the spiritual dimension of this experience? Are the perceptual dimensions different for students with intense and meaningful aesthetic experiences of Rothko's artwork? Does cultural background influence the intensity of the Rothko experience?

Our starting hypotheses in this regard are:

- H1. The sensory dimension will be the most relevant in the Rothko experience for both the child and adolescent populations of primary and secondary school visitors to art museums.
- H2. The sensory dimension will be more related to the spiritual dimension.
- H3. The perceptual dimensions will be significantly higher for students with higher intense esthetic experiences of Rothko's artwork.
- H4. The Rothko esthetic experience will be more intense and meaningful for students with a greater cultural background.

RQ2: Does the Rothko Experience Scale have a factor structure in which the sensory, emotional, cognitive, and spiritual perceptual dimensions are captured?

We start from the following hypothesis in this regard:

- H5. The Rothko Experience Scale has a factor structure that will capture the four perceptual dimensions: sensory, emotional, cognitive, and spiritual.

### Sample

Approximately 300 primary and secondary education schools in the local community, both public and private were invited to participate in the *Rothko.50 Project* via e-mail and postal mail. A pilot study was first carried out with 89 students from 5 groups in order to adjust the survey Rothko Scale as the measurement instrument. After the pilot study, and once adjusted the Rothko Scale, other 40 groups of students from 28 schools, with a total of 1,535 students, participated in the educational experience that was carried out at the museum. Of the 1,535 school visitors, a total of 1,013 completed the survey Rothko Scale, while the other 522 refused to participate in the survey. Of the total 1,013 participants who completed the survey, 53% were male and 47% were female; 48% belonged to state schools and 52% to charter schools; 67% were primary school students (aged 9 to 11) and 33% were secondary school students (aged 12 to 17).

To carry out the field study, a certificate was obtained from the Research Ethics Committee at the researchers' institution, as well as a signed informed consent form from each of the parents or legal guardians, since the students were minors.

### Context of the study

For the commemoration of the 50th anniversary of the creation of Rothko's painting *Untitled* (1969), the museum developed an educational proposal called *Project Rothko.50* for school children and adolescents, with the aim of promoting a relevant esthetic experience based on painting contemplation practice and creative collaboration. The program included:

- a. A contemplation activity in the gallery in front of the artwork (Figure 1), followed by a visual thinking activity, according to the ideas of Arnheim (1969) and Yenawine (2013). This activity lasted half an hour: 5 minutes of group accommodation and introduction to the activity, 10 minutes of contemplation (relatively variable according to the functioning of the group) and 15 minutes of "visual thinking" (relatively variable according to the participation of the group). The contemplation was done in silence, focusing only on the deep look at the work. The introductory activity consisted of asking the participants to close their eyes and pretending that it was the first time they had seen something, in order to try to pay full attention to what they were looking at. It was emphasized that the exercise consisted of continuing "looking" even if they got tired of it or they thought they had seen everything. If they got distracted, they had to go back to the looking exercise. As for the "visual thinking" exercise, the aim was to achieve "looking deeply for an extended time and thinking about what they saw" (Yenawine, 2013, p. 6) using the following questions proposed (p. 25):

What's going on in this picture?  
 What do you see that makes you say that?  
 What more can we find?



Figure 1. Contemplation of Rothko's *Untitled* (1969).

These questions were energized by the museum facilitators who encouraged the emergence of different individual perceptions, qualifying all of them as valid and thanking the viewers for participating.

- b. A collaborative activity by the students in the workshop space for the co-creative production of five large-format murals that simulated Rothko's artwork in acrylic on canvas (Figure 2).
- c. An individual creative activity using markers and the collage technique to capture the experience of the contemplation of Rothko's artwork (Figure 3).

In short, with a total two-hour extension, the program sought to promote an experience with the artwork similar to that which the author himself was seeking, according to what Vega (2010) points out: "Rothko wanted the viewer to feel his point of view and experience" (p. 83).

Finally, on the closing day, there was an exhibition of the murals created by the young visitors (Figure 4).

### Instrument proposal

An instrument was created to assess the experience. Based on the analysis of the main perceptual characteristics found in the literature on Rothko's multiform artworks, 46 questions in a 5-point Likert scale were derived and organized to comprehensively assess the impact of the experience of the contemplation of the artwork in four perceptual dimensions: sensory, emotional, cognitive, and spiritual. In addition, the instrument included items that collected information on the intensity of the experience and its contribution to the understanding of abstract art. Finally, the instrument included a section on participants' cultural background, taking into account two factors that integrate participants' relation to arts and culture both as consumers and producers (Oakley & O'Brien, 2016). On the one hand, participation



Figure 2. Collaborative production of a mural in the Rothko style.



Figure 3. Individual creative activity on the Rothko experience.

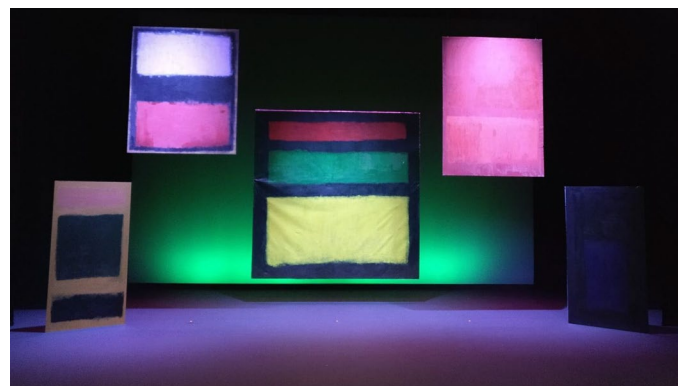


Figure 4. Closing day. Murals exhibition.

**Table 1.** Cronbach's  $\alpha$  values in the sample of the pilot study.

	No. of items	Cronbach's $\alpha$
The painting makes me notice (sensory)	18	.76
The painting makes me feel (emotional)	12	.73
The painting makes me think (cognitive)	10	.45
While looking at the painting (spiritual)	6	.85
Total Scale	46	.91

**Table 2.** Adequacy of the sample.

N	KMO	$\chi^2$	gl	p
1013	.883	8666.183	780	.000

in cultural activity of any kind, such as visiting museums, monuments or exhibitions, attending music concerts or theater plays, and traveling to get to know other cultures; on the other hand, regular art practice such as music performance, composition or singing, visual arts designing, and poetry writing. This first instrument was tested in a pilot study applied to a population of 86 primary and secondary school students. Table 1 shows the internal consistency values.

From these results and after eliminating four items for improving the reliability of the instrument, a second version of 42 items with the same structure was generated. This version was applied to the entire sample of the empirical study.

### Analysis

The first data analyses that have been performed were those corresponding to the psychometric analysis of the Rothko Experience Scale in the sample of 1013 primary and secondary school students. These data analyses were carried out with the SPSS v15.0 program. The level of significance was set at 0.05. Therefore, it responds to RQ2, posed on the factor structure of the scale.

An exploratory factor analysis of the study sample was carried out to determine the validity of the developed scale. Before this, the Bartlett's sphericity test was applied to confirm that the correlation matrix was not an identity matrix. Moreover, it was also confirmed that the sample size was adequate to carry out the factor analysis. By applying the rule of the subject-item relationship (Anthoine et al., 2014), the limit in the calculation of the sample size is between 1.2 and 10 subjects for each item of the scale, so our sample size was adequate. The principal components method was used for extracting the dimensions of the construct with an oblique rotation method (oblimin with Kaiser).

The reliability of the analyzed scale was measured by the internal consistency calculated through the Cronbach's alpha coefficient, both for each of the subscales and for the entire instrument. We considered that values above 0.6 were acceptable, as Nunnally (1978) suggested that a Cronbach's  $\alpha$  value above 0.5 was an acceptable level of reliability.

After verifying the psychometric properties of the scale, we carried out a descriptive study of the sample to answer the RQ1, which concerns the most important perceptual qualities of the Rothko experience in younger populations, as well as to know how their esthetic experience was. These

analyses were specifically carried out on primary and secondary school students aged 9 to 11 and 12 to 17, respectively. Subsequently, we analyzed the existence of possible significant differences between both groups of students through the corresponding parametric test (t-test). Similarly, we carried out a parametric analysis to verify the existence of possible differences between the factors in each group of students (paired t-test).

### Results

We start by presenting the results of RQ2 that refer to the factor structure of the Rothko Experience assessment instrument to verify the psychometric goodness of fit of the instrument.

#### Preliminary validation of the instrument

Regarding the validity of the construct, we present the results of the exploratory factor analysis. Table 2 shows the statistics of the study of the adequacy of the sample to the selected model of analysis. We confirmed that the adequacy of the data to the factor analysis is very good for the study sample. The results of the Bartlett's sphericity test ( $\chi^2$ ) indicate that we can reject the null hypothesis of sphericity, so we consider the adjustment of the variables through the ideal factor analysis.

On the other hand, the sample size is "very good" for the number of items according to Lloret-Segura et al. (2014). As discussed in the following section, we have only considered items with communalities greater than .50; thus a sample size of 200 cases is sufficient.

To identify the number and composition of the factors indicated in the initial hypothesis that are necessary to explain the shared variance of the set of analyzed items, we carried out a principal component analysis. The initially selected factor rotation was the oblique (oblimin) since it was considered that these were related factors.

The results obtained with the 42 items of the scale are shown in Table 3, with a structure of six factors and 31 items. These results follow a factor solution with six factors (we eliminated communalities smaller than .50) and an oblique rotation (oblimin), which has allowed us to better explain the saturations of the items and of the representation of the starting theoretical model. One of the four dimensions (the sensory dimension) was broken up into three factors



**Table 3.** Exploratory factor analysis.

No. of items	No. of factors	% variance
31	6	49.66%

**Table 4.** Explained variance in the sample.

Factors	No. of items	% variance	% accumulated
1	7	22.54	22.54
2	6	7.57	30.11
3	4	5.58	35.69
4	4	5.05	40.74
5	4	4.73	45.47
6	6	4.18	49.66

**Table 5.** Rotated factor loadings for the final EFA solution.

	Space-time	Emotional	Color	Synesthesia	Spiritual	Cognitive
The shapes move or shift inside the painting	.646					
I forget where I am	.633					
The painting embraces me, and it seems that I am inside	.629					
The shapes change in size	.611					
I see a deep space	.584					
The color of the painting creates light	.566					
I don't notice the passage of time	.563					
The painting makes me feel anguish		.772				
The painting makes me feel anger		.698				
The painting makes me feel concern		.600				
The painting makes me feel disgust/rejection		.572				
The painting makes me feel sadness		.566				
The painting makes me feel fear		.542				
The color green appears			.792			
The color blue appears			.704			
Color changes appear			.605			
The color yellow appears			.578			
Music or musical sounds are heard				.746		
Voices or noises are heard				.726		
I notice flavors				.677		
I sense smells				.667		
I think about God					.908	
I feel the presence of God					.893	
I think about the meaning of life					.579	
I connect with my spirituality					.512	
The painting makes me think of a known person						.697
The painting makes me think of known places						.670
The painting makes me think of known ideas						.650
The painting makes me think of new places						.621
The painting makes me think of new persons						.596
The painting makes me think of new ideas						.587

(space-time, color and synesthesia), which explains why there are 6 factors for the four dimensions. On the other hand, although the instrument included items referring to positive emotions such as surprise, joy, attraction, tranquility, well-being, there were no significant loadings for those emotions in the exploratory factor analysis. For this reason, as will be seen below, positive emotions were not taken into account in the subsequent analyses of the study.

We always take factors with eigenvalues higher than the unity, following the Kaiser's criterion. The results are shown in Table 4. In addition, Table 5 presents the six factors that compose the instrument and corresponding saturations of the items in each of them. The order in which they appear in their respective cells, also maintained in the following tables and figures, is given by their contribution to the variance of the instrument, according to their highest to lowest load. Finally, Table 6 shows the internal consistency values of the Rothko Experience Scale for each of the six factors and the total.

Based on these analyses, which allowed us to verify the psychometric goodness of fit of the instrument, we proceed to answer the different questions related to RQ1.

### **Descriptive analysis of the rothko experience**

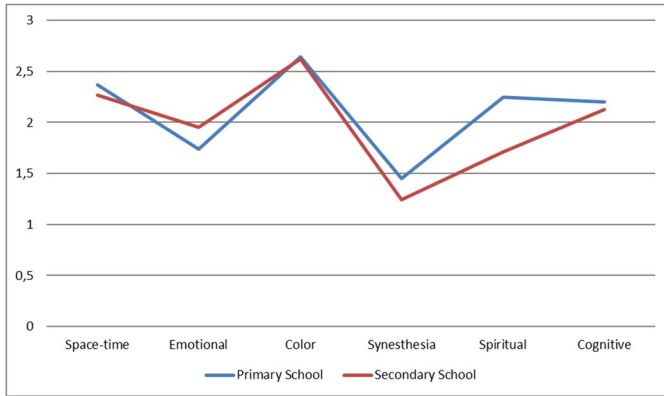
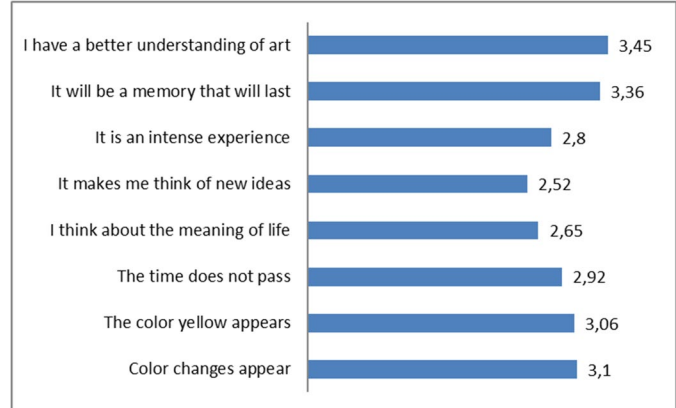
Regarding the first question, RQ1, on the most significant perceptual dimensions of the Rothko experience in child and adolescent population and the consequently formulated H1, we can state the following results.

As we have seen above, the instrument analysis presents six distinct factors for the four perceptual dimensions of our theoretical framework. For the sensory dimension, three factors corresponding to space-time, color and synesthetic perceptions have been loaded separately. Figure 5 shows that the sensory perceptual qualities related to color and space-time are the most important factors in the Rothko Experience, both in child and adolescent students, with no significant differences between the two groups



**Table 6.** Cronbach's  $\alpha$  values.

Factors	No. of items	Cronbach's $\alpha$
Sensory 1. Space-time	7	.74
Emotional	6	.71
Sensory 2. Color	4	.66
Sensory 3. Synesthesia	4	.69
Spiritual-transcendent	4	.80
Cognitive	6	.79
Total Scale	31	.89

**Figure 5.** Mean values for primary and secondary school visitors for the six factors.**Figure 6.** Most valued items for primary school students.

(color  $t = .273$ ,  $p = .785$ ; space-time  $t = 1.559$ ,  $p = .119$ ). On the other hand, the sensory dimension related to synesthesia presents the lowest mean values in both groups of age.

Comparing primary school children and adolescent secondary school students, there are significant differences in the emotional dimension ( $t = -3.841$ ,  $p = .000$ ) in favor of secondary school students (in fact, it is the only dimension in which the mean score of secondary school students is higher than that of primary school students). In addition, there are significant differences in the spiritual ( $t = 7.176$ ,  $p = .000$ ) and sensory synesthetic ( $t = 4.668$ ,  $p = .000$ ) dimensions in favor of primary school students. As observed in Figure 5, the greatest difference in the mean score of primary and secondary school students occurs in the spiritual dimension.

Regarding the question, "Which perceptual dimensions are more related to the spiritual dimension?" and its H2, the results of the correlation study are the following.

Both in the group of primary and secondary school students, the dimensions most related to the spiritual dimension are: (1) the sensory in its space-time dimension ( $r = .521$ ,  $p = .000$ , and  $r = .460$ ,  $p = .000$ , respectively), and (2) the cognitive ( $r = .551$ ,  $p = .000$ , and  $r = .551$ ,  $p = .000$ , respectively). Similarly, the emotional dimension is the least correlated with the spiritual dimension in both groups of students (primary  $r = .174$  and  $p = .000$  and secondary  $r = .162$  and  $p = .005$ ).

In addition, as a complementary analysis, Figures 6 and 7 show the most highly valued items of the instrument for both child and adolescent participants. These figures show a great coincidence between both groups.

With regard to H3, which derived from the question "Are the perceptual dimensions different for higher intense

aesthetic experiences of Rothko's artwork?" we analyzed whether participants with high- and low-intensity esthetic experiences of Rothko's artwork have a different perceptual patron for the six dimensions. We found that there are differences between participants with high- and low-intensity esthetic experiences after contemplating the painting.

Primary schoolchildren who claimed to have had an intense esthetic experience after contemplating the painting have a significantly higher mean score in each of the six factors of the instrument: space-time ( $F = 151.996$ ,  $p = .000$ ), emotional ( $F = 19.306$ ,  $p = .005$ ), color ( $F = 56.769$ ,  $p = .000$ ), synesthesia ( $F = 43.119$ ,  $p = .000$ ), spiritual ( $F = 121.574$ ,  $p = .000$ ), and cognitive ( $F = 112.887$ ,  $p = .000$ ) (Figure 8).

Secondary students who claimed to have had an intense experience after contemplating the painting have a significantly higher mean score in five of the six factors of the instrument: space-time ( $F = 107.865$ ,  $p = .000$ ), color ( $F = 13.711$ ,  $p = .000$ ), synesthesia ( $F = 8.558$ ,  $p = .004$ ), spiritual ( $F = 53.932$ ,  $p = .000$ ), and cognitive ( $F = 82.866$ ,  $p = .000$ ). In this case, the emotional dimension ( $F = 4.388$ ,  $p = .037$ ) does not significantly differentiate between participants (Figure 9).

With regard to H4, whether the esthetic experience is most meaningful for those with a greater cultural background, we firstly analyzed the differences between the two factors considered: cultural participation and art practice. Results show for both children and adolescents a higher average involvement in cultural activities than in regular art practice in their leisure time. There are no significant differences between their respective evaluations of cultural participation, despite being the primary child mean ( $m = 2.61$ ) somewhat higher than the adolescent one ( $m = 2.47$  and  $t = 2.30$ ,  $p = .022$ ).

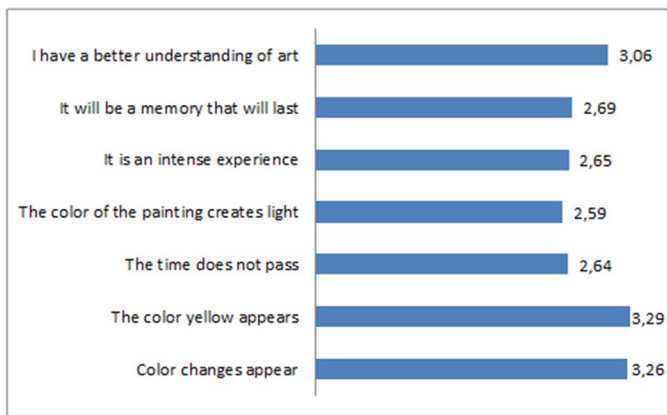


Figure 7. Most valued items for secondary school students.

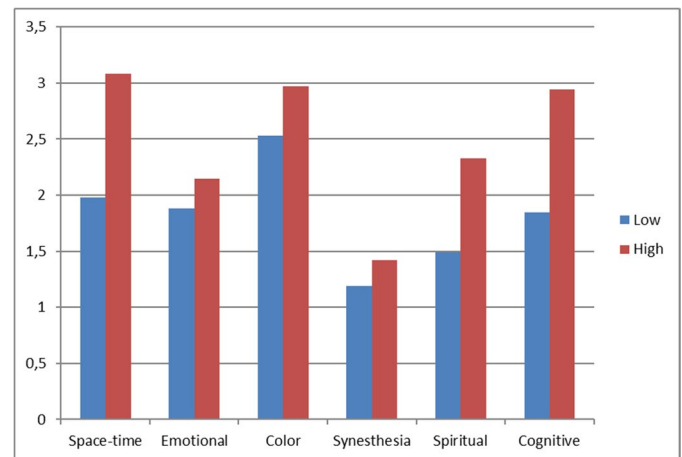


Figure 9. Mean values for secondary school students according to the intensity of the esthetic experience.

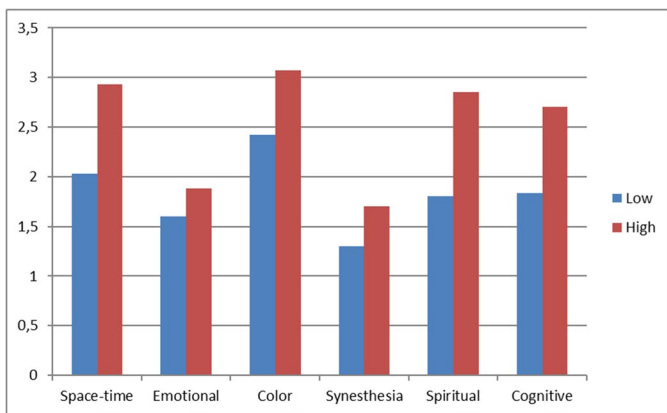


Figure 8. Mean values for primary school children according to the intensity of the esthetic experience.

Besides, as can be seen in Figure 10, the average evaluation that schoolchildren make of their arts practice in leisure time ( $m=2.48$ ) is higher than that of secondary adolescent students ( $m=2.17$  and  $t=4.43$ ,  $p = .000$ ). Significant differences can be seen in relation to this question.

To further study the possible influence of participants' cultural background on the meaningful esthetic experience of Rothko's painting at the museum, we divided the two variables studied (cultural participation and art practice) into high and low scores according to the results of the 5-point Likert scale. The results obtained are shown in Figures 11 and 12.

When we analyzed the intensity of the experience lived by schoolchildren according to their cultural participation, that is, according to the cultural activities that they carry out with their family and friends in their leisure time, we found that there are significant differences in favor of those with a greater cultural background ( $U=3909.500$  and  $p = .000$ ). Similarly, in Figure 11, we found that a greater intensity of esthetic experience occurs for participants with more art practice ( $U=4713.500$  and  $p = .000$ ).

In adolescence, this same result is maintained: students with a greater cultural participation and with more art practice reach a greater intensity in their esthetic experience

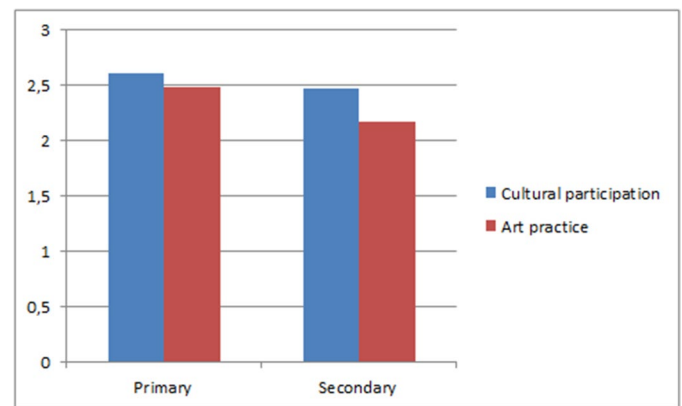


Figure 10. Participants' Mean Values of cultural activity and art practice in their leisure time.

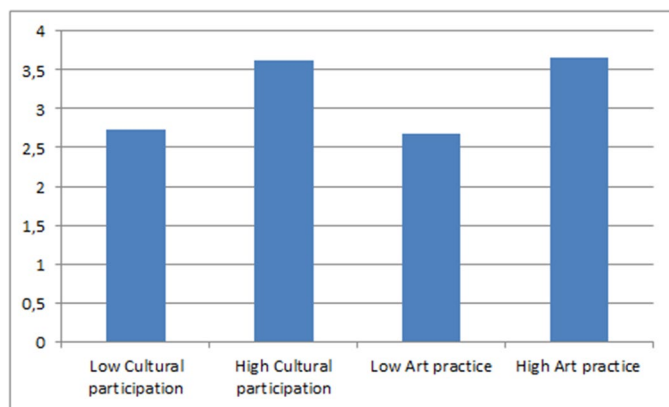
( $U=260$ ,  $p = .001$  and  $U=692,500$ ,  $p = .000$  respectively) (Figure 12).

## Discussion

### On the factor structure of the instrument

The exploratory factor analysis of the Rothko Experience Scale has allowed us to confirm preliminarily that the instrument presents six distinct factors for the four perceptual dimensions proposed following the theoretical review of the literature. As for the sensory dimension, three factors are identified separately: space-time elements, color, and synesthesia. In this sense, further research on the sensory dimension could precise internal distinctions and agroupments, for instance, between perceptions of the artwork's external features, such as the space and time within the painting (e.g., *the shapes change in size*), and perceptions corresponding to the observer's internal sensations, such as the evanescence of space and time (e.g., *I forget where I am*, and *I don't notice the passage of time*), which could better be grouped as part of the flow in the intensity of the experience.

With these considerations in mind, according to the psychometric analysis, the scale has good fit indexes. Significantly



**Figure 11.** Intensity of the experience for schoolchildren according to their cultural background.

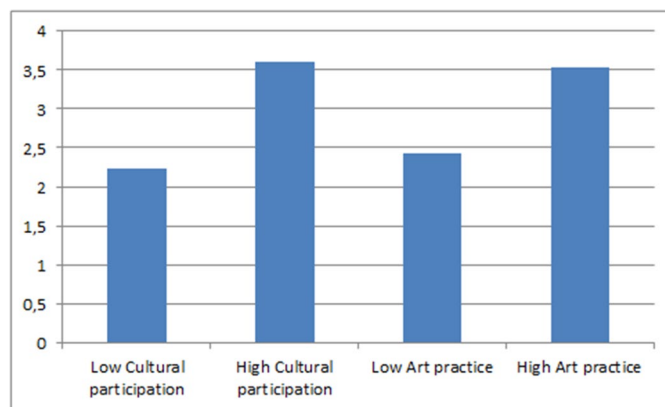
higher mean values on most dimensions in participants with more intense esthetic experience are indicating validity of the instrument.

With the proposal of this scale, we intend to contribute with the assessment of the perceptual dimensions that affect the intensity of the esthetic experience of an artwork by Rothko in child and adolescent visitors to art museums. The proposed Rothko Experience Scale, with its four perceptual dimensions (sensory, emotional, cognitive, and spiritual), constitutes an instrument to assess the esthetic experience produced by the contemplation of Rothko's artwork in younger populations. This scale serves as an educational guide on how Rothko's painting should be observed and experienced by the students at this age. It facilitates the dialogue and interpretation of the complexity of his painting, and conceptually supports the different achievable narratives. It contributes to the analysis, reflection, and understanding of the possible "Rothko experience" with young audiences.

We are aware of the psychometric limitations of this preliminary study and of the need to continue analyzing it with different samples of students. It is for this reason that we are sharing our findings with the scientific community.

### ***On the descriptive analysis of the Rothko experience***

The results obtained in populations of children and adolescents contemplating Mark Rothko's artwork corroborate the focus on the sensory dimension (Alexander, 2008) over the emotional, cognitive, and spiritual dimensions, which were also perceptible, as many authors have studied (Karkabi et al., 2014, Muñoz 2008, Nodelman 1997), but less prominent. For children and adolescents, the force of color, in particular, stands out as a significant pictorial quality of the abstract expressionism of this American artist, according to what Chave (1989) suggested with the connections between micro- and macrocosm in Rothko's paintings. Along with color, the perceptions of space-time play a crucial role in the sensory contemplation of Rothko's painting by young visitors, regardless of their age. In line with what different authors such as Vega (2010), Cirlot (1996) or the painter himself (Rothko 2004) considered, his painting is expressed



**Figure 12.** Intensity of the experience for adolescent students according to their cultural background.

through sensations of space and movement, such as shifts of shapes both inside the canvas and expanded on the outside, as it happens with colors. This, together with the disappearance of the surrounding space and the absence or suspension of time reported by the participants, would be provoking a perceptual state similar to what Palmer et. al (1999) qualified as a significant life experience, and Csikszentmihalyi and Robinson (1990) identified in flow, corroborated empirically by Wanzer et al. (2020). As for the low prevalence of synesthetic perception of Rothko's painting in both groups of age, this was entirely expectable, considering that only 2%-4% of the general population presents synesthetic conditions, such as smelling or hearing colors (Simner et al., 2006).

While sensory perception of Rothko's painting is about the same between children and adolescents, the spirituality explained by Phillips & Crow (2005), Janson & Janson (2001) and Arya (2011) has the most significant difference in terms of age, with the younger visitors showing a higher spiritual perception than the elders. This could be explained by cognitive developmental factors that describe adolescence as an age of rational argumentation and critical thinking, with consequent rejection of spiritual attitudes, along with the loss of child innocence and faithfulness, as Hay & Nye (2006) and Ziebertz (2006) have studied. However, whether children or adolescents, we find spiritual perception loading significantly higher for those with higher space-time and cognitive perceptions, suggesting that spirituality in Rothko's painting may be strongly experienced through sensations. This correlation corroborates what research literature says on esthetic experience and spirituality (Lo & Matsunobu, 2014), and points to the potential of art education in the appreciation of the bodily substrates of human spirituality. At the same time, it enhances the interest of interdisciplinary studies that contribute to the understanding of the embodied nature of spiritual thought and feeling (Fuller, 2007), since the way children understand the world, also the spiritual, is based first on their body sensations, movements, and manipulations of material objects, where art would have much to say. Some researchers claim that children at young ages are able to experience spirituality through daily situations (Noddings, 2003) and sensations

of a deep self in them (Wilson, 2004). In this sense of a deep self, independently of religion, spirituality could be developed through the sensations of esthetic experience in non-formal learning environments, such as museums and art galleries. At the same time, a developed spirituality in life may help to experience material artworks. Further research on the educational implications of this correlation between sensory and spiritual perception in art experience is recommended.

Complementary, and in terms of the intensity of the Rothko experience, we find much similarity between children and adolescents. For children aged 9–11 with high and low intense esthetic experience, all perceptual dimensions are significantly different, being spirituality the most significant, followed by space-time sensations and cognitions, while emotions present the least difference of all factors studied. For the group of adolescents, this difference in emotions is statistically non-significant for the intensity of their esthetic experiences. Concerning the other dimensions, they all correlate positively with the intensity. Space-time sensations, followed by cognitions, are the most significantly different for adolescents with high or low intense experience. It is striking that emotions have low relevance for the intensity of the experience in these ages. This is paradoxical since the emotional dimension is often the main protagonist in exercises of esthetic education with youth audiences. Thus, further readjustments in how to include emotions in the studies with children and adolescents should be reconsidered.

In contrast, space-time sensations are highly implied in the intensity of the Rothko experience in both populations studied. In agreement with the initial theoretical framework, these findings allow us to expect that the level of the esthetic experience of Mark Rothko's painting will increase by promoting educational activities linked to the contemplation of sensory features related to the space-time perceptions, as the basis of a more complete and even transformative esthetic experience (Pelowski & Akiba, 2011; Doddington, 2015). This suggests that prominent sensory arousal of esthetic experience might help younger audiences better connect with Rothko's modern art, but must not for that reason the cognitive, spiritual, nor the emotional connection be left aside. For centuries, philosophers, and now neuroscientists, have shown how sensory perception is most of the time at the basis of human cognition, emotion, and spirituality, for not in vain do we humans live physically immersed in the surrounding material world.

If any advice can be transferred from this discussion to museum educators who want to offer younger audiences a full experience of Rothko's modern art, it is to focus primarily on its sensory features as a strategy to further address cognitive, spiritual, and emotional issues. Particularly, as regards adolescents, the experience of contemplating Rothko's abstract expressionism also intensifies through cognitive components related to thoughts, memories, and mental images, suggesting that, when dealing with an audience of adolescents, museum educational proposals will be more effective if they add further cognitive issues to the sensory

issues related to space-time perception. Something different will happen for the proposals aimed at children, where the sensory impact can be associated with issues related to spirituality, such as the sense of life, death, immaterial, transcendence, or God. Although these issues seem very complex to deal with young primary school students, many pedagogical recommendations can be made to museum educators to increase the level of esthetic experience by promoting educational activities that enhance its spiritual dimension, according to its correlation to the sensory impact in our study. Precisely, a helpful recommendation would be to connect spiritual issues to the sensory perceptual dimension of the experience, attending to what educational theorist Nel Noddings (2003) states on how children at an early age perceive spirituality in a very natural way in their daily life. For instance, when looking above the starring night, sharing family or friends meetings, experiencing their own or others illness, desiring intensely or praying for something to happen. Further research in all these factors related to the intensity of other Rothko paintings as well as other abstract expressionism artworks are recommended to contrast and extend findings among other esthetic experiences and museum educational contexts.

If we add to all this further considerations about cultural background, results corroborate previous studies, proving this background is beneficial for engagement in esthetic and arts experience (Oskala et al., 2009). Particularly, our study shows that cultural participation in leisure time activities as much as arts practice in extracurricular activities taking place out of the school context have a positive influence on the intensity of esthetic experiences of Rothko's painting in museum educational context. This has educational implications for inclusion of participants with difficulties in intensely experiencing Rothko's painting. Policy development and access promotion of child and youth to culture and arts participation through formal via such as school curriculum and out-of-school visits are highly recommended here. In this sense, museum educator efforts must respond to criteria of accessibility and inclusion of vulnerable populations with less opportunities to engage intensely in arts esthetic experiences. Pedagogical strategies must place participants first and at the heart of museum educational programs.

### Limitations of the study

The design of the study focused on the perceptual measures of the esthetic contemplation of Rothko's painting and there was only one program for all students, including both contemplation activity and art production, which does not allow conclusions concerning the effects of the collaborative and individual creative activities that followed contemplation. We cannot tell by now if the art production does increase the experience or results measured by the instrument would have been the same without the art production. Further research on the evaluation of these activities and its impact on the results of the Rothko experience is recommended to broaden conclusions.



## Conclusions

In conclusion, educational programs aimed at providing child and adolescent with an intense and engaging experience of modern art can base their strategy in perceptual factors of the emerging of the so-called “Rothko experience” and the fostering of its increased intensity, by designing the material conditions to guide a careful sensory contemplation of the paintings. Within that process, visual thinking of the sensory features would be favorable for adolescents while immaterial spiritual references to sensory perceptions would preferably help primary students.

Thinking about future continuity in this research, we ask whether this experience can be transferred to other museums that have Rothko's multiform artworks in their collections and offer educational programs to child and adolescent school visitors. In addition, the results can provide suggestions to further contemporary or modern art galleries or museums with similar abstract expressionist artwork.

## Acknowledgment

We acknowledge the financial support received for the publication of this study within the framework of Project AME (Arts, Museum and Education), PIUNA2020/18, from the Research Plan of the University of Navarra.


## Ethics declaration

The study under project number 2019.159 obtained previous approval from the local ethical committee of the university in which it was conducted. Although personal data was not collected and only anonymous data was gathered, informed consent was obtained from school participants by signed letters with explanation on the study goals and data treatment provided by the researcher.

## ORCID

Carmen Urpi  <http://orcid.org/0000-0003-1032-0756>

Charo Reparaz  <http://orcid.org/0000-0003-4270-4826>

Fernando Echarri  <http://orcid.org/0000-0003-1886-8927>

## References

- Alexander, J. C. (2008). Iconic experience in art and life. *Theory, Culture & Society*, 25(5), 1–19. <https://doi.org/10.1177/0263276408095213>
- Anthoine, E., Moret, L., Regnault, A., Sébille, V., & Hardouin, J. B. (2014). Sample size used to validate a scale: a review of publications on newly-developed patient reported outcomes measures. *Health and Quality of Life Outcomes*, 12, 176. <https://doi.org/10.1186/s12955-014-0176-2>
- Arnheim, R. (1969). *Visual thinking*. University of California Press.
- Arya, R. (2011). Contemplations of the spiritual in visual art. *Journal for the Study of Spirituality*, 1(1), 76–93. <https://doi.org/10.1558/jss.v1i1.76>
- Baal-Teshuva, J. (2003). *Mark Rothko*. Taschen.
- Barnes, P., & McPherson, G. (2019). Co-creating, co-producing and connecting: Museum practice today. *Curator: The Museum Journal*, 62(2), 257–267. <https://doi.org/10.1111/cura.12309>
- Berlin, L. (2016). *Manual para señoras de la limpieza [A Manual for cleaning women]*. Alfaguara.
- Berlyne, D. E. (1971). *Aesthetics and Psychobiology*. Appleton-Century-Crofts.
- Burnham, R., & Kai-Kee, E. (2011). *Teaching in the art museum: Interpretation as experience*. Getty Publications.
- Campbell, L. H., & Simmons III, S. (Eds.). (2012). *The heart of art education: Holistic approaches to creativity, integration, and transformation*. National Art Education Association.
- Chave, A. C. (1989). *Mark Rothko: Subjects in abstraction*. Yale University Press.
- Chawla, L. (2001). Significant life experiences revisited once again: Response to vol. 5(4) ‘Five critical commentaries on significant life experience research in environmental education. *Environmental Education Research*, 7(4), 451–461. <https://doi.org/10.1080/13504620120081313>
- Cirlot, J. E. (1996). Rothko y Scriabin: Paralelos entre colores y sonidos [Rothko & Scriabin: Parallels between colors and sounds]. In E. Granell Trías, & E. Guigon (Eds.), *Mundo de Juan Eduardo Cirlot [World of Juan-Eduardo Cirlot]* (pp. 236–238). Generalitat Valenciana & IVAM.
- Cohen-Solal, A. (2016). *Mark Rothko: Buscando la luz de la capilla. [Mark Rothko: Toward the light in the chapel]*. Paidós Testimonios.
- Csikszentmihalyi, M., & Robinson, R. E. (1990). *The art of seeing: An interpretation of the aesthetic encounter*. J. P. Getty Museum.
- Dewey, J. (1934). *Art as experience*. Balch Publishers.
- Doddington, C. (2015). Embodied arts experience: The educational value of somaesthetics. In M. Fleming, L. Bresler, & J. O’Toole (Eds.), *Routledge international handbook of the arts and education* (pp. 60–67). Routledge.
- Echarri, F., & Urpi, C. (2018). Mindfulness in art contemplation. A Rothko story. *Journal of Museum Education*, 43(1), 35–46. DOI: <https://doi.org/10.1080/10598650.2017.1384977>
- Efland, A. (1990). *A history of art education: Intellectual and social currents in teaching the visual arts*. Teachers College Press.
- Eisner, E. W. (2002). *The arts and the creation of mind*. Yale University Press.
- Ellsworth, P. C. (1994). Levels of thought and levels of emotion. In P. Ekman, & R. J. Davinson (Eds.), *The nature of emotion* (pp. 192–196). Oxford University Press.
- Falk, J. H., & Dierking, L. D. (1992). *The museum experience*. Whalesback Books/Howells House.
- Falk, J. H. (2009). *Identity and the museum visitor experience*. Left Coast Press.
- Filippopoliti, A., & Sylaiou, S. (2015). Museum education today: Creative synergies and pedagogic innovations in multicultural contexts. *Museum and Society*, 13(2), 119–122. <https://doi.org/10.29311/mas.v13i2.321>
- Fontal, O., & Marín-Cepeda, S. (2016). Heritage education in museums: An inclusion- focused model. *The International Journal of the Inclusive Museum*, 9(4), 47–64. <https://doi.org/10.18848/1835-2014/CGP/v09i04/47-64>
- Fuller, R. C. (2007). Spirituality in the flesh: The role of discrete emotions in religious life. *Journal of the American Academy of Religion*, 75(1), 25–51. <http://www.jstor.org/stable/4139837> <https://doi.org/10.1093/jaarel/flf064>
- Gilson, E. (1961). *Pintura y realidad. [Painting and reality]*. Aguilar.
- Gómez-Aguilera, F. (1994). Arte y naturaleza en la propuesta estética de César Manrique. [Art and nature in the aesthetic proposal of César Manrique]. *Atlántica: Revista de Arte y Pensamiento*, 8, 58–63.
- Gonzalo, J. (2016). Espacios de meditación: Mark Rothko y Morton Feldman. [Spaces of meditation: Mark Rothko and Morton Feldman]. *Revista Judía de la Cultura*, 106, 20–23.
- Govier, L. (2010). Leaders in co-creation? Why and how museums could develop their co-creative practice with the public, building on ideas from the performing arts and other non-museum organisations. University of Leicester. <https://le.ac.uk/rcmg/research-archive/leaders-in-cocreation>.
- Hart, T. (2018). Beauty and Learning. In M. Binder, S. Crowell, J.P. Miller, K. Nigh, & B. Novak (Eds.), *International handbook of holistic education* (pp. 25–32). Routledge.
- Hawks, S. R. (1994). Spiritual health: Definition and theory. *Wellness Perspectives*, 10(4), 3–11.
- Hay, D., & Nye, R. (2006). *The spirit of the child*. Jessica Kingsley Publishers.

- Hein, G. E. (1998). *Learning in the museum*. Routledge.
- Hein, H. S. (2000). *The museum in transition. A philosophical perspective*. Smithsonian Books.
- Hepburn, R. W. (1980). The arts and the education of feelings and emotions. *Higher Education Quarterly*, 35(1), 110–129. <https://doi.org/10.1111/j.1468-2273.1980.tb01286.x>
- Holdgaard, N., & Klasttrup, L. (2014). Between control and creativity: Challenging co-creation and social media use in a museum context. *Digital Creativity*, 25(3), 190–202. <https://doi.org/10.1080/14626268.2014.904364>
- Hooper-Greenhill, E. (2005). *Museums and the interpretation of visual culture*. Routledge.
- Hooper-Greenhill, E. (2007). *Museums and education: Purpose, pedagogy, performance*. Routledge.
- Janson, H. W., & Janson, A. F. (2001). *History of art*. Abrams.
- Karkabi, K., Wald, H. S., & Castel, O. C. (2014). The use of abstract paintings and narratives to foster reflective capacity in medical educators: A multinational faculty development workshop. *Medical Humanities*, 40(1), 44–48. <https://doi.org/10.1136/medhum-2013-010378>
- Kerlan, A. (2004). *L'art pour éduquer? La tentation esthétique: contribution philosophique à l'étude d'un paradigme. [The art to educate? The aesthetic temptation: philosophic contribution to the study of a paradigm]*. Presses de l'Université Laval.
- Kozbelt, A. (2004). Originality and technical skill as components of artistic quality. *Empirical Studies of the Arts*, 22(2), 157–170. <https://doi.org/10.2190/NDR5-G09N-X7RE-34H7>
- Kristinsdóttir, A. (2017). Toward sustainable museum education practices: Confronting challenges and uncertainties. *Museum Management and Curatorship*, 32(5), 424–439. <https://doi.org/10.1080/09647775.2016.1250104>
- Leder, H., & Nadal, M. (2014). Ten years of a model of aesthetic appreciation and aesthetic judgments: The aesthetic episode - Developments and challenges in empirical aesthetics. *British Journal of Psychology* (London, England: 1953), 105(4), 443–464. <https://doi.org/10.1111/bjop.12084>
- Lloret-Segura, S., Ferreres-Traver, A., Hernández-Baeza, A., & Tomás-Marco, I. (2014). El análisis factorial exploratorio de los ítems: una guía práctica, revisada y actualizada. [Exploratory item factor analysis: A practical guide, revised and updated. *Anales de Psicología*, 30(3), 1151–1169. <https://doi.org/10.6018/analesps.30.3.199361>
- Lizarraga, P. (2000). Las valoraciones artísticas. [The artistic valuations]. In P. Pérez-Illarbe, & R. Lázaro (Eds.), *Verdad, bien y belleza: cuando los filósofos hablan de valores [Truth, good and beauty-when philosophers speak of values]*. Cuadernos de Anuario Filosófico. Serie Universitaria., 103, 185–194.
- Lo, K. Y., & Matsunobu, K. (2014). Role of art and creativity in child culture and socialization. In A. Ben-Arieh, F. Casas, I. Frønes, & J. Korbin (Eds.), *Handbook of child well-being*. Springer. [https://doi.org/10.1007/978-90-481-9063-8\\_185](https://doi.org/10.1007/978-90-481-9063-8_185)
- London, P. (2003). *Drawing closer to nature: Making art in dialogue with the natural world*. Shambhala.
- Merino, J. L. (2008). *Habla Oteiza. [Oteiza speaks]*. Colegio Oficial de Arquitectos Vasco-Navarro/Editorial Avance Proyectos.
- Merleau-Ponty, M. (1945). *Phénoménologie de la perception. [Phenomenology of perception]*. Éditions Gallimard.
- Muñoz, R. (2008). Apunte sobre Mark Rothko: La tela nos ha hablado. [Note on Mark Rothko: The canvas has spoken to us]. *Fedro, Revista de Estética y Teoría de Las Artes*, 7, 85–95.
- Musaio, M. (2007). *Pedagogia del bello. Suggestioni e percorsi educativi. [Pedagogy of the beautiful. Educational suggestions and pathways]*. Franco Angeli.
- Nodelman, S. (1997). *The Rothko chapel paintings: Origins, structure, meaning*. University of Texas Press.
- Noddings, N. (2003). *Happiness and education*. Cambridge University Press.
- Nunnally, J. C. (1978). *Psychometric theory* (2nd Ed.). McGraw-Hill.
- Oakley, K., & O'Brien, D. (2016). Learning to labor unequally: Understanding the relationship between cultural production, cultural consumption and inequality. *Social Identities*, 22(5), 471–486. <https://doi.org/10.1080/13504630.2015.1128800>
- Ortega y Gasset, J. (2010). *España invertebrada: La deshumanización del arte y otros ensayos de estética. [Invertebrate Spain: The dehumanization of art and other essays on aesthetics]*. Centro Editor PDA (First edition, 1925).
- Oskala, A., Keaney, E., Chan, T. K., & Bunting, C. (2009). *Encourage children today to build audiences for tomorrow: Evidence from the Taking part survey on how childhood involvement in the arts affects engagement in adulthood*. Arts Council England.
- Palmer, J. A., Suggate, J., Robottom, I. M., & Hart, P. (1999). Significant life experiences and formative influences on the development of adults' environmental awareness in the UK, Australia, and Canada. *Environmental Education Research*, 5(2), 181–200. <https://doi.org/10.1080/1350462990050205>
- Pastor, M. I. (2004). *Pedagogía museística: Nuevas perspectivas y tendencias actuales. [Museum pedagogy: New perspectives and current trends]*. Ariel Patrimonio.
- Pelowski, M., & Akiba, A. (2011). A model of art perception, evaluation and emotion in transformative aesthetic experience. *New Ideas in Psychology*, 29(2), 80–97. <https://doi.org/10.1016/j.newideapsych.2010.04.001>
- Phillips, G., & Crow, T. (2005). *Seeing Rothko*. Getty Research Institute.
- Read, H. (1947). *Education through art*. Faber and Faber.
- Roepagel, N. (2015). Other-than-ego consciousness. Approaching the spiritual in secular art education. *Artizein: Arts and Teaching Journal*, 1(1), 39–54.
- Rogers, A., & Rock, J. (2016). Community co-creation of exhibitions within a museum setting. *Tauhere: Connections*, 2, 62–74.
- Rothko, M. (2004). *La realidad del artista: Filosofías del arte. [The reality of the artist: Philosophies of art]*. Editorial Síntesis.
- Shimamura, A. P. (2012). Toward a science of aesthetics. In A. P. Shimamura, & S. E. Palmer (Eds.), *Aesthetic science: Connecting minds, brains, and experiences* (pp. 3–28). Oxford University Press.
- Shusterman, R. (2018). *Aesthetic experience and somaesthetics*. Brill.
- Simner, J., Mulvenna, C., Sagiv, N., Tsakanikos, E., Witherby, S. A., Fraser, C., Scott, K., & Ward, J. (2006). Synaesthesia: the prevalence of atypical cross-modal experiences. *Perception*, 35(8), 1024–1033. <https://doi.org/10.1068/p5469>
- Simon, N. (2010). *The participatory museum*. Museum 2.0.
- Spira, R. (2014). *Presencia, el arte de la paz y la felicidad. [Presence - the art of peace and happiness]*. Editorial Sirio.
- Stamatopoulou, D. (2004). Integrating the philosophy and psychology of aesthetic experience: Development of the aesthetic experience scale. *Psychological Reports*, 95(2), 673–695. <https://doi.org/10.2466/pr0.95.2.673-695>
- Tarkovsky, A. (1989). *Sculpting in time: Reflections on cinema*. University of Texas Press.
- Tanner, T. (1980). Significant life experiences: A new research area in environmental education. *The Journal of Environmental Education*, 11(4), 20–24. <https://doi.org/10.1080/00958964.1980.9941386>
- Touriñán, J. (2016). Educación artística: Sustantivamente ‘educación’ y adjetivamente ‘artística’ [Artistic education: substantively ‘education’ and adjetively ‘artistic’]. *Educación XXI*, 19(2), 45–76.
- Vallance, E. (2007). Museums, cultural centers, and what we don't know. In L. Bresler (Ed.), *International handbook of research in arts education* (pp. 673–677). Springer.
- Vega, A. (2010). *Sacrificio y creación en la pintura de Rothko: La vía estética de la emoción religiosa. [Sacrifice and creation in Rothko painting: The aesthetic pathway of the religious emotion]*. Siruela.
- Vining, J., & Merrick, M. S. (2012). Environmental epiphanies: Theoretical foundations and practical applications. In *The Oxford handbook of environmental and conservation psychology*. Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780199733026.001.0001>
- Wanzer, D. L., Finley, K. P., Zarian, S., & Cortez, N. (2020). Experiencing flow while viewing art: Development of the aesthetic experience questionnaire. *Psychology of Aesthetics, Creativity, and the Arts*, 14(1), 113–124. <https://doi.org/10.1037/aca0000203>
- Whitman, W. (1855). *Leaves of grass*. Author.

- Wick, O., Joos, P., Bashkoff, T., & McCormick, J. (2004). *Mark Rothko. Paredes de luz: Catálogo de la exposición en el Museo Guggenheim Bilbao (8 de junio al 24 de octubre de 2004). [Mark Rothko: Light Walls. Catalogue of the exhibition in Guggenheim Bilbao Museum (June 8th – October 24th, 2004)]*. Museo Guggenheim Bilbao.
- Williams, K., & Harvey, D. (2001). Transcendent experience in forest environments. *Journal of Environmental Psychology*, 21(3), 249–260. <https://doi.org/10.1006/jevp.2001.0204>
- Wilson, M. (2004). *A part of you so deep*. New England Network for Child, Youth and Family Services.
- Yenawine, P. (2013). *Visual thinking strategies: Using art to deepen learning across school disciplines*. Harvard Education Press.
- Ziebertz, H. G. (2006). Germany: Belief in the idea of a higher reality. In H. G. Ziebertz & W. K. Kay (Eds.), *Youth in Europe II. An international empirical study about religiosity* (pp. 58–80). LIT Verlag.