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Illusionism in Sacred Monumental Painting of the Baroque Era, Optics of Perception

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Abstract--The investigation of the mechanisms of dual influence in a pair “work of art – viewer” opens up important opportunities for the worldview, cultural, aesthetic intentions laid down by the author(s), outlines the ways of transmitting the message to the recipient and assesses the effectiveness. The authors of this article analyse the practices of applying the mechanisms and principles of neuroaesthetics in the perception of baroque monumental paintings and the effects caused by the conscious use of illusory techniques in the duality of relationships. The authors of the article aim to find out the principles of the formation of cognitive and aesthetic connections expressed in specific formal principles-approaches, in the processes of perception of illusionistic baroque painting by the primary addressee—a person of the Baroque era – from the point of view of neuroaesthetics. The methodology refers to the implementing a multidisciplinary approach, based on the synthesis of cultural, anthropological and art research methods. To solve research problems and achieve results, we turn to the functional method and the modelling method, thanks to which defining effective models of interaction in the pair “work of art – recipient” and modes of functioning of consciousness when generating a pictorial image.

Keywords---artistic image, baroque, illusionistic painting, neuroaesthetics, perception models.

Introduction

Baroque illusionist painting fits into the classical model of perception, the participants of which are the Church – artist – painting – recipient. The study of the zone of mutual influences of the recipient's reaction to the work of art and the toolkit of visual stimuli, such a reaction is generated, allowed explaining how the universal principles of perception of the painting work according to the baroque illusionistic murals and which cognitive-aesthetic responses cause. Maximum use of perspective techniques of illusionistic painting – quadrature, anamorphosis, and angle – enhances the perceptual illusion. The heuristic effect is associated with the appeal to the principle of “grouping” and the use of anamorphoses to distinguish a clear object. The search process triggered by the mechanism of “solving difficulties of perception”, enhances the heuristic effect. The compositional principles of “repetition, rhythm and order” help to harmonize the impression of the image and enhance the aesthetic pleasure of its perception. And the principle of “deviation from standard thought” indicates an aesthetic emotion that exceeds the predicted norm. In painting, provocation, the artist's unexpected decision, new approaches and techniques begin to fascinate, and in the Baroque temple paintings such an unexpected gesture of the artist is a combination of images of very real architectural forms with unreal images of triumphal scenes with saints (Phillips, 2014; Hennion, 1997).

The flow concept explains the processes of forming a complete artistic image, which appears at the intersection of ascending (external visual influences) and descending (internal cultural and informational influences) flows. Recently, science has shown a keen interest in the problems of reactions of consciousness to paintings, in particular to the mechanisms of perception. In the philosophy of art, a new understanding of the perceiver as an independent creator of meanings is developed, and this new role is studied in the framework of receptive and aesthetic studies (Kemp, 1998).

Focusing on the phenomenon of perception of paintings in the context of different eras shows that this process will always differ according to specific ideas about understanding the organisation, composition, internal structure of painting and the type of artistic representation. In the history of art, we can outline the periods when the visual perception of painting becomes noticeable changes and patterns in the specifics of the interaction of the components of the system “artist – painting – recipient”. Accordingly, the understanding of such changes is quite naturally embodied in the formation of models of perception of painting: primordial, classical, non-classical and post-non-classical (Ilona, 2019). The principle is constructed in accordance with the general periodization of scientific knowledge – taking into account for each historical period a unique paradigm of worldview and scientific-technical apparatus. The spheres of art and science are constantly interconnected, as each builds a model of understanding and attitude to reality in its own way. Regarding the perception of painting, this classification is introduced in connection with four variants of interaction of components in the

“artist – painting – recipient” system. The sources of the primordial model of perception reach the Ancient World, when painting was the object of theurgist practice and had a certain degree of psychological impact. During perception, the recipient's attention is directed inward, reducing all previous visual experience. Painting arises as an object of introspection – an in-depth study and knowledge of one's own activity: individual thoughts, images, feelings, experiences, acts of thinking. Under appropriate perceptual conditions, internal resources are activated, which can result in a change in the mode of perception and the fact of experiencing an individual experience that is not directly related to the image (Szmit-Naud, 2020; Tomaszek, 2016).

For a long time, scientists have tried to build an algorithm to explain which paintings cause the highest degrees of aesthetic pleasure, because artists implemented their ideas both on an intuitive level and on an analytical one, causing cathartic effects of the viewer in the future. Belarusian psychologist L. Vygotsky explained the aesthetic reaction as a release of the tension of emotional affect, described changes in muscle tone and breathing rhythm as components of the aesthetic reaction (Vygotsky, 2008). He sees the work as a system of stimuli “consciously and deliberately organised in such a way as to cause an aesthetic reaction.” The basis of this aesthetic reaction, according to the scientist, is the effects caused by art, which are associated with the fact that the tension of feelings is “cleared” not by an external, but by an internal reaction. The perception of painting generates an emotional experience of creative discovery (Balas et al., 2003; Lutz et al., 2013).

Materials and Methods

The proposed article uses an interdisciplinary scientific approach as a basic one, which is based on a number of integrative research methods that are relevant at the intersection of related disciplines. This is due to the deepening of the interrelationships of the sciences, which led to the application of the results, techniques and methods of art history, neurasthenics, cultural studies, psychology and philosophy of art to effectively reveal the research topic. Art history analysis with iconographic methods is mainly used in the study of monumental painting of the Baroque era. Iconographic analysis consists in identifying plot scenes of temple paintings, while iconological analysis argues for the appropriateness of the artist's embodiment of the selected themes against the background of a given culture (Von der Malsburg, 1995; Ma, 2012).

The cultural-anthropological method made it possible to trace the algorithm of interaction in the system “church – artist – painting – recipient” in the context of the politics and tactics of the counter-reformation Church, thanks to which the approaches of baroque illusionist painting were compared with the historical context. The modelling method is based on the classical model of painting perception in the basis of the study of the phenomenon of illusionistic Baroque painting in the process of its perception by the recipient. At the same time, the principles of neurasthenics form models for elucidating the methods and techniques of illusionism used by Baroque artists in painting temples. The modes of functioning of consciousness when generating a pictorial image, namely: perception, understanding and imagination, are determined by the functional

method. At the same time, it reveals the mechanisms of two streams of perception of artistic information – ascending (bottom-up) with the function of external receptor visual influence and descending (top-down), which was determined by the socio-cultural context in the prism of the ideology of the Counter-Reformation Church. The synthesis of the applied methods of related disciplines made a comprehensive study of the phenomenon of optics of perception of illusion in the monumental painting of the Baroque era ([Iigaya et al., 2020](#); [Vittorio, 2009](#)).

The need for a detailed understanding of the optics of perception of works led to the emergence of a new discipline – neurasthenics, which is at the intersection of anthropology, biology, neurophysiology and aesthetics. It raises the question of the physiological foundations of aesthetic experience, the neural mechanisms of emotions associated with the perception of works of art. Scientists argue that universal perceptual principles operate in the diversity of national cultures and artistic styles. The research work is based on more accurate brain imaging technologies, including transcranial magnetic stimulation (TMS) and functional magnetic resonance imaging (fMRI). The founder of neuroaesthetics, Semir Zeki, studies the neural basis of creativity and aesthetic evaluation of art ([Zeki, 1999](#)). After brain scans using MRI scans of volunteers during the perception of painting, Zeki found a spike in dopamine, which is known to be associated with pleasure. The researcher claims that artists unconsciously use methods in painting that can subsequently have a strong emotional impact. “An artist is, in a sense, a neurologist who studies the potentials and capabilities of the brain using visual tools. Works that can evoke aesthetic experiences will manifest themselves in the responses of neurons in the audience's brain” ([Zeki, 1999](#)).

Scientists pay special attention to the study of the problem of human perception of works of art with the use of methods and techniques of illusion. Numerous examples of illusionistic art that have survived to this day, known from the history of art, still strike at the sight of the embodiment of the illusion of the image leaving a certain frame. One of the most spectacular phenomena in this area is the illusionistic (trompe-l'oeil) wall painting, the images of which “come out” of the walls and ceilings outside the architecture into an imaginary, horizontal, but perceived space. It concerns the study of those special properties of human feelings and mental inclinations which make it possible to create an illusion where the boundaries between the material and imaginary worlds are levelled. Quite common in Ancient Rome in Pompeii, this type of trompe-l'oeil painting was used by the early Renaissance artist Andrea Mantegna in the second half of the Quattrocento (15th century), and reached its apogee in the 17th century Baroque painting in Rome ([Folga Januszew, 1981](#)). Taking into account new scientific achievements in the field of studying the processes of perception and creation of an artistic image in the human consciousness, when examining a work of art, there is a problem need scientific substantiation and study of the processes of perception of works of illusory painting by a Baroque person ([Rinartha et al., 2018](#); [Diachenko et al., 2021](#)).

Results and Discussion

Models of painting perception: the paradigm of artistic image perception in the baroque era (classical model)

The classical model is characterised by the idea of artistic translation of the author's idea to the addressee-recipient. The key role belongs to the author. Therefore, interaction methods are aimed at decoding and adequacy of the recipient's reading of the original author's idea. Features of the non-classical model: the main attention is paid to the structure of the work, the nature of its impact on the perceiver. The meaning is set not by the author or recipient, but solely by the structure of the artistic message itself. The central one is painting: its structure (form, language), which determines the main modes of reaction of the recipient – both rational and emotional. The post-non-classical model of perception of painting is characterised by the fact that the recipient identifies or puts in the symbolic content that is relevant for him at a particular moment of perception. The object is the recipient himself with the proposed interpretation of what is perceived. The post-non-classical paradigm transfers attention from the sphere of aesthetic object and creativity to the plane of the subject who perceives this painting. The artistic object in this paradigm is now the recipient with an individual interpretation of what is perceived (Zubrytska, 1996). A certain specificity is noted for the interaction of participants in the process of perception and formation of an artistic image in the Baroque era. Most characteristic for this particular epoch is a classical model of perception. One more weighty component is added to the system “artist – painting – recipient” – “customer”, which is the Catholic Church – the ideologist and conductor of the Counter-Reformation. Accordingly, a certain transformation of the interaction of the components of this system takes place: The Catholic Church acts as the author of ideas, the artist acts as the implementer of these ideas, painting is a means of transferring ideas from the “author” to the recipient, the viewer remains the recipient of the author's ideas. That is, the participants in the classical model of perception in the Baroque era are the Church – the artist – painting – the recipient (Yang, 2021; Eshonkulov, 2021).

One of the methods aimed at decoding and adequacy of the recipient's reading of the original author's idea was the use of numerous techniques and methods of illusionistic (trompe-l'oeil) painting: quadrature, anamorphosis, angle (in particular, one of its forms – “di sotto in su”), and chiaroscuro effects. The initial author's intention was to awaken deep religious feelings and to involve a large number of believers in the “bosom” of the Church through strengthening the sense of the material reality of the other world and the inevitability of Eternal Salvation. According to this, preference was given to triumphal scenes: Ascension, Assumption, Last Judgment, Choir of Angels, triumphs of Saints. The main features of Baroque paintings were: showing movement, dynamic composition, theatricality, showing emotions, sharp chiaroscuro contrasts. Chronologically, the development and flourishing of baroque illusionist (trompe-l'oeil) painting is determined by the period from 1600 to 1700. The most outstanding examples of illusionist baroque monumental painting include: the scene of the assumption of the Virgin (1625-1627) on the lower part of the dome of the Church of Sant'andrea Della Valle, Rome, Giovanni Lanfranco (1582-1647), (Figure 1); Scene

Of The Triumph of Divine Providence (1633-1639) in Palazzo Barberini, Rome, Pietro da Cortona (1596-1669) (Figure 2); Scene Of The Triumph of the name of Jesus (1661-1679) in the Church of Ile-Jezu, Rome, Giovanni Batista Gauli (1639-1709) (Figure 3); Scene Of The Apotheosis with the fifth Ignatius Loyola (1688-1694) Church of Sant'ignazio, Rome, Andrea Pozzo (1642-1709) (Figure 4).

An aesthetic response is a response to artistic information embedded in a painting, and also correlates with experience, knowledge, and social-cultural context. Artists, when generating works, use cognitive methods – methods of influencing how recipients will acquire and retain knowledge. And if it is possible to manage these processes, then there is practical access to influencing people's behaviour. This influence is actively used in the modern world of visual action. Whether it is the field of advertising, or the art of street art, or a design solution, there is an active use of visual influence methods and manipulation of human perception through the construction of illusory images, ideas for which are often drawn from baroque illusionist painting and the tactics of the Counter-Reformation Church ([Letkiewicz, 2011](#)).



Figure 1. Assumption of the Virgin, Giovanni LaFranco, Church of Sant'enrea Della Valle, Rome



Figure 2. The triumph of Divine Providence, Pietro da Cortona, Palazzo Barberini, Rome



Figure 3. The triumph of the name of Jesus, Giovanni Batista Gaulli, Ile-Jesu church, Rome



Figure 4. The apotheosis of St. Ignatius Loyola, Andrea Pozzo, Church of Sant'ignazio, Rome

The “transfer” of a painter into an artistic image is carried out in the process of objectifying oneself through the creation of an artificial reality. The “transfer” of the viewer to the artistic image promotes emotional responsiveness (empathy, compassion), while it is not always realised that the image is conveyed in the work, and not the “real” reality itself. The recipient repeats all the complexity of the dialectic and dynamics of the artist's artistic consciousness, realised and

objectified in the study. According to the classical model of perception, the dialectic of the recipient's artistic consciousness lies in the fact that the process of empathising with the creator is inextricably linked and correlated with the reverse process of contemplating the artistic form. The recipient acts as an addressee focused on receiving a certain author's message, on establishing the original intention of the author (Tkachuk, 2016).

Optics of perception of an illusory image: principles and their implementation in illusionistic monumental painting of the baroque era

Many researchers have worked on the study of visual illusions. The question that primarily interests not only psychologists, but also artists, is how the three-dimensional visible world is recreated on the basis of a two-dimensional image on the retina. Some illusions arise in connection with the processing of incoming information. A person purely subjectively sometimes “sees” the world not as it really is, but as they would like to see it, according to formed habits, dreams or desires. They are seeking the desired shape, colour or other distinctive quality of the object among those presented. This property of selectivity is called the phenomenon of perceptual readiness. Illusions of perception primarily outline the boundaries and capabilities of our perceptual apparatus, and analysis of cognitive processes of consciousness can indicate how these limitations are established. Illusions in a scientific context are not investigated in order to reveal dysfunctions or malfunctions of the human perception apparatus, they indicate the specificity of perception, a feature of which is the enhancement of sensory inputs. Sensory perception is predominantly interpreted as substantial evidence of what is factual – when perceived, this is interpreted as “real”, “objective”. For a long time, philosophers and psychologists have been interested in how much what is perceived corresponds to reality and why the brain sometimes imposes a false picture of the world. Illusionists and magicians actively studied the phenomenon and were the first to discover that attention can be controlled. Since the 1970s, research on visual perception began, which was conducted by one of the founders of cognitive psychology, Ulrik Neisser. He argued that cognitive processes can be measured and analysed (Neisser, 1976).

The industry's first monograph develops a disjunctive (distributive) theory of visual experience – Experience (Hinton, 1973). It includes descriptions of three main types of visual experience – perception, illusions, and hallucinations. Hinton explains how perceptions and illusions can be inseparable from each other. He argues that when a person hallucinates, they gain an experience that, in the absence of a phenomenal character, is mistakenly perceived as real. A new approach is proposed that explains many illusions not as special examples of true perception or hallucination, but rather as mixed cases, with elements of one and the other. Data on various illusions that you can become the subject of: shapes, tones, colours – are explained as special cases of true perception. At the beginning of the 21st century, a corresponding trend in psychology appeared – neuromagic (Porta-Etessam, 2009). Scientists have found that errors in perception are associated with all cognitive processes: attention, thinking, memory, and you can influence them quite actively. An illusion is defined as a distortion in the perception of any feature of an object (shape, colour, brightness, mass, spatial placement). All these signs depend on the context of perception of

the object. Building images is a fast and efficient process, and it allows you to accurately understand the meaning even in a difficult situation. Due to the fact that perception is involved in a wide range of tasks, such rapid grasping can cause failures. Such perceptual errors, which we call “illusions,” proved to be the key to understanding the very mechanism of perception (Aripov, 2021; Amori 2021).

The problem of the relationship between art and reality is fundamental for understanding the specifics and nature of artistic expression, since the surrounding world is an important figurative source of art. At the same time, an artistic image cannot be presented as a copy of reality: the process of meaning formation in painting is extremely complex, and even the slightest transformation of a work can significantly changes its impact on the recipient. Elementary rearrangement of composition, perspective, angles, or shifting contrasts radically changes the optics of perception. In this regard, the question of the content of the aesthetic object is actualised – in essence and the meaning of the reality that the artist creates. Painting can create an illusory reality as one that really exists, even if only in the viewer's mind. The human visual apparatus is not perfect. One approach to understanding this indicates the impossibility of knowing the objective world due to distrust of the sense organs due to deviations of visual images perceived by a person from reality (Gregory, 1970). Another testifies that sensory perception is only one, the first, but not the main stage of cognition. Sensory perception is followed by thinking, which generalises and processes sensations. The main stage in the process of cognition is social – historical experience and cultural paradigm, which makes it possible to establish objective laws of the external world and form knowledge (Carbon & Albrecht, 2012).

The specific structure of the human eye is not an absolute limit for human cognition. It is joined by thinking, which itself is able to “create”. The phenomenon of acquiring the same false visual impressions suggests that vision provides only relatively accurate information about things in the outside world. The fact that different people in the process of visual perception have different abilities to make mistakes, sometimes see in objects what others do not notice, indicates the subjectivity of visual sensations and their relativity in relation to the objectivity of perception of visual information. Regardless of the different individuals who respond to visual stimuli, with skilful calculations and skill of the artist, their perception of an illusory image created on a plane turns into a sense of three-dimensional and quite “real”. Visual perception is an intensive process of intracerebral processing and filtering the flow of incoming information. There is a huge difference between the sensory data that reaches the eyeball and what the brain then constructs as “reality.” Human sensations function most clearly in a certain wavelength range of light, and a person sees the world around them as it is defined as a “coherent reality”, because all members of the human species have developed approximately the same perceptual ability.

The ideas of Professor of bionics Richard Langton Gregory develop the hypotheses of Herman Helmholtz, whose works revealed the causal dependence of sensations on the influence of external stimuli on the senses. Gregory is interested in perceptual anomalies (illusions and aftereffects) (Helmholtz, 2009). He noted that visual perception makes it easy to create illusions with distorted dimensions and

distances. There are also well-known competing hypotheses, each of which can be given priority. Gregory explained the illusions of perception based on the hypothesis of constancy of the general perspective (Gregory, 2017). Professor of psychology and neurophysiology Vileyanur Ramachandran, studying the Psychophysiology of vision, proposed the general concept of art as a kind of distortion of reality, subject to the laws of visual perception (Ramachandran et al., 1998). Artists, in his opinion, use the physiological foundations of human vision intuitively guessed by them to enhance the aesthetic impact on the viewer. The professor developed a theory of artistic experience based on neural mechanisms. Due to the wide variety of artistic traditions and schools, the scientist sees the general principles of visuals and formulates the laws of perception used in painting, which are universal and basic, and can later be supplemented with new scientific discoveries in this field.

The scientist is the author of eight universal principles of visual perception of works of art: maximum displacement; grouping; isolation; symmetry; repetition, rhythm, order; deviation from standard thought; solving difficulties of perception; visual metaphor (Ramachandran & Hirstein, 1999). Five of these principles are relevant in the study of the process of perception of monumental illusionist painting of the Baroque era. An example of such illusionist implementations can serve as paintings of the vault of the Church of Sant'ignazio in Rome, which were executed by the Italian Jesuit artist, architect, set designer and perspective theorist Andrea Pozzo. It is an illusionistic dome and fresco with a scene of the Apotheosis of Saint Ignatius of Loyola. Both were created between 1685-1694. These works are the quintessence of illusionist painting in the 17th century and thanks to a wide repertoire of formal means and techniques, they provide a basis for the implementation of these principles of visual perception. The principle of "maximum displacement" Ramachandran & Hirstein (1999), as the use of overtime stimuli to excite areas in the brain stronger than natural stimuli. The principle is the key to understanding the need for methods and techniques of illusionistic painting: various types of perspective that expanded the space and seemed to level the boundaries of real architecture, as well as anamorphoses, angles and black-and-white effects that together created an additional illusion (Figure 4).

The principle of "grouping" Ramachandran & Hirstein (1999), explains the use of anamorphosis, when the brain manages to select a clear object from a complex environment, finding the desired angle of contemplation or reflection in a mirror. This gives absolute aesthetic pleasure. In the case of puzzle images, at first nothing is visible except a set of spots. The brain tries to solve this perceptual problem by isolating meaning from chaos by grouping the corresponding fragments. To see an object, a message arrives from the visual centres of the brain to the emotional centres of the limbic system, giving them a push along with the object's definition. This heuristic effect gives pleasure (the reward system is triggered). Its source is the evolutionary need to find hidden objects and settings to search for the whole, by collecting it from scattered spots, dots and other elements of disguise. Anamorphoses are also associated with the principle of "solving the difficulties of perception" Ramachandran & Hirstein (1999), which consists in the phenomenon of the brain experiencing pleasure from the search process itself. An object discovered after some effort is more desirable than one

that is immediately obvious, because the human brain has evolved in an environment with a complex disguise. Therefore, the connection of visual centres with emotional ones guarantees satisfaction from the search itself (Figures 5; Figures 6).



Figure 5. Illusionistic dome, Andrea Pozzo, Church of Sant'Ignazio, Rome

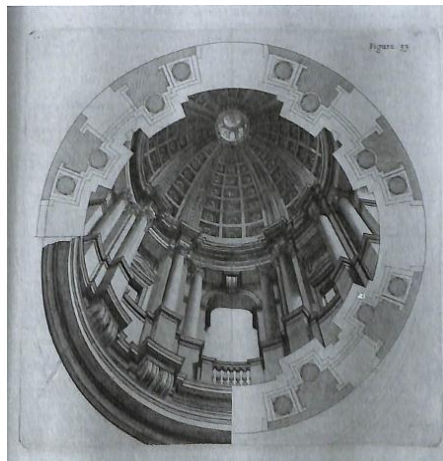


Figure 6. Illusionist Dome project, Andrea Pozzo

The principle of “repetition, rhythm and order” [Ramachandran & Hirstein \(1999\)](#), was applied to the triumphal scenes of murals in the construction of figurative compositions. Human nervous activity is characterised by a synthetic orientation. A person constantly builds unambiguous, clear and believable models of the world. They are prone to ordering, so they are constantly seeking form, order, and this gives a certain pleasure, calms. Thus, visual rhythm creates a sense of beauty. By repeating visual or auditory stimuli, these rhythms can be enhanced until the subjective states of altered consciousness are reached, and painters use this quite successfully (Figure 1; Figure 7).



Figure 7. The apotheosis of St. Ignatius Loyola, Andrea Pozzo, Church of Sant'ignazio, Rome

The principle of “deviation from standard thought” [Ramachandran & Hirstein \(1999\)](#), indicates the aesthetic emotion caused by artistic information exceeds the predicted norm. The nervous system is particularly well-adapted for registering differences. It is prone to addiction and therefore does not notice repetitive and expected stimuli and, as a result, reacts much more energetically to new and unexpected factors. In painting, provocation, an unexpected decision of the artist, new methods and techniques begin to fascinate. In Baroque paintings, such an unexpected gesture of the artist is the combination of images of very real architectural forms with unreal images of triumphant scenes with Saints, the use of unusual, numerous angles in figurative parts. Pozzo, actively using numerous means of imitating the three-dimensionality of space, in his paintings realises the illusion in two ways: acting according to the principle of formal analogies and the principle of formal contrasts, referring to the spatial capriccio [Letkiewicz \(2011\)](#), (Figure 8-10).



Figure 8. The apotheosis of St. Ignatius Loyola, Andrea Pozzo, Church of Sant'ignazio, Rome



Figure 9. The apotheosis of St. Ignatius Loyola, Andrea Pozzo, Church of Sant'ignazio, Rome

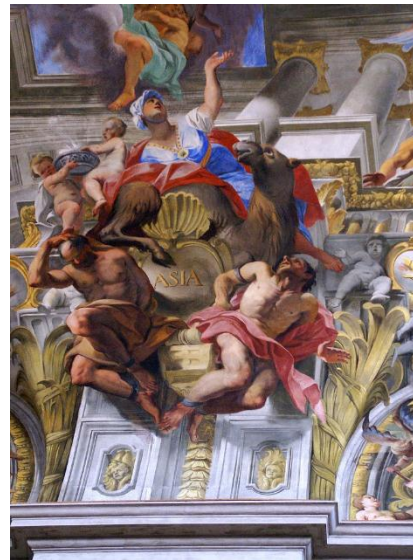


Figure 10. The apotheosis of St. Ignatius Loyola, Andrea Pozzo, Church of Sant'ignazio, Rome

The concept of opposite flows of painting perception: upward (bottom-up) and downward (top-down)

In his work "The Imaginary: A Phenomenological Psychology of the Imagination", French philosopher Jean-Paul Sartre identifies three types of functioning of consciousness, through which we can be given one object: perception, understanding and imagination (Sartre, 2001). In "perception", the object is given only from one position, but involves multiplying the channels of perception. In

contrast, in “understanding” knowledge is placed conditionally in the centre of the object, which makes it possible to “cover the idea completely”. The difference between an object in perception and an object in figurative consciousness also lies in the fact that perception positions the object as real, while figurative consciousness implies unreality – absence, which states the essential structure of the image. “It is not only the matter of the object itself that is surreal; all the definitions of space and time to which it is subordinated are inherent in this surrealism” (Sartre, 2001). Perceiving a work of painting, a person faces two worlds – the world of the imaginary and the world of the real, formed from the same objects. According to Sartre, “a work of art is something surreal.” Painting acts as an external analogue of the image – a material thing that makes it possible to “grasp the image”, that is, to manifest the unreal.

The complex organisation of the process of perception of painting is presented in the concept of two counter-currents: ascending (bottom-up) and descending (top-down) (Gregory, 1970). Ascending refers to external influences – light, colour, shape. Information is transmitted to the retina and transmitted to the next levels of cognitive analysis. Moving through the analyser channel, this sensory flow is transformed, acquiring a form that is convenient for reconciliation. According to the feedback principle, the opposite process is simultaneously going on in the opposite direction: the representation corresponding to the perceived object is activated and enters the analyser (Tkachuk, 2016). These streams of artistic information interact, and the result is the formation of an image. The top-down stream is a powerful mapping tool to facilitate perceptual processes by compressing the “big data” of sensory inputs into smaller data packets with pre-categorised labels (Carbon, 2008).

People rely on schemas that convey the essence of things, situations that are formed by prior knowledge and their specific activation (Carbon & Albrecht, 2012). The perceptual system has the ability to intensify, expand and amplify perceived artistic information (intensifying, enhancing and amplifying), and the result is the formation of prototype, schematic perceptions and representations. The metaphor of the mechanism of perception as a camera that makes prints of reality is not appropriate. Perception is not just an imprint, but a cognitive process aimed at reconstructing any scene at its core. To analyse the organisation of the process of perception and formation of an artistic image, we rely on the concept of counter-currents – ascending (bottom-up) and descending (top-down), which interact, and the result is the appearance of a complete artistic image. The ascending (bottom-up) flow of perception concerns external influences – chiaroscuro, colour, shape, in the case of baroque illusionist painting – applied techniques for imitating the three-dimensionality of space, figures and things: quadrature, anamorphosis, foreshortening, and chiaroscuro techniques. The downstream (top-down) flow is determined by social, cultural requirements and the context of the presentation of artistic information. Thus, within the framework of the classical model of perception, thanks to the selection of a number of principles designed for the formation of specific perceptual effects, and the appeal to the flow concept in the process of image formation, a complete picture of optics – artistic and cognitive – appears in illusionistic monumental painting of the Baroque era.

During the Counter-Reformation movement, when the Catholic Church actively used the tools of illusionism in works of art as one of the means of influencing, persuading and promoting its ideas, monumental painting became an important tool of influence. It was designed to create an alternate world where reality and illusion were mixed, where the earthly world was combined with the heavenly one. According to the theory of the organisation of the perception process (Gregory, 1970), in the context of the events of that time, the ascending (bottom-up) flow of perception concerns external influence – chiaroscuro, colour, shape, in a particular case – applied techniques to simulate the three – dimensionality of space, shapes and things: quadrature, anamorphosis, angle (in particular, one of its forms – “di sotto in su”), chiaroscuro-tenebrism). The downstream (top-down) flow is determined by social, cultural requirements and the context of the presentation of artistic information. It explains the tasks that were posed to the then artists, and the corresponding optics of perception of the audience through the prism of dogmas and narratives that the Catholic Church imposed in the context of the Counter-Reformation. The truthfulness of the presentation made the viewer believe to varying degrees that they really see the presented object or space, perceive what was drawn for real. It is the consequence of the interaction of these flows that becomes the final result of perception and construction of a complete artistic image, which has a powerful cathartic effect. Actually, according to the aspirations of the Church, baroque illusionist paintings were supposed to be the embodiment of the place and time of mystical visions that are given to a person at the moment of divine insight and deep conviction in the reality of eternal salvation.

Conclusions

In modern studios devoted to Baroque painting, we can also distinguish the study of the perception of works of art using approaches of various scientific disciplines. However, until now, the aspect of the recipient's perception of illusionist Baroque paintings in the optics of neurasthenics has not been properly covered. Thanks to the latest developments of cognitive scientists, art philosophers, neurasthenics and specialists from other related scientific fields, it became possible to focus on the study of the relationship zone of the recipient's reaction to the work and the tools of visual stimuli that generate such a reaction. System ideas about the perception of a work of art are embedded in a three-level structure that provides for a general model that corresponds to the paradigm of world perception unique for a certain historical period and the existing scientific and technical apparatus; the principles on which the application of the model is based; and, finally, the flows that determine the organisation of the perception process. Baroque illusionist painting fits into the classical model of perception, the participants of which are the Church – artist – painting – recipient. They interact within a clear scheme and sequence: the author of ideas is the Catholic Church, the implementer is the artist, painting is a means of transferring ideas from the “author” to the recipient, and the viewer remains the recipient of author's ideas. The solution of the problems set out in the circle of outlined problems allowed us to explain exactly how the universal principles of perception of a work of art affect in relation to baroque illusionist paintings and what cognitive and aesthetic responses cause. As fundamental principles, we distinguish several principles.

- Neurasthenic approaches can be explained through the principle of “maximum displacement” with the use of excess stimuli by artists of various types of perspective, which expanded the space and seemed to level the boundaries of real architecture, as well as anamorphoses, angles that created an additional perceptual illusion.
- The principle of “grouping” reveals the use of anamorphoses, in which the brain manages to isolate a clear object from a complex environment, and this heuristic effect gives a sense of pleasure.
- Anamorphoses are also associated with the principle of “solving the difficulties of perception”, which consists in the phenomenon of the brain experiencing pleasure from the search process itself.
- The principle of “repetition, rhythm and order” was used in the construction of figurative compositions, because a person is inclined to order, constantly looking for form, order, and this gives compensation, and the visual rhythm creates a sense of harmony.
- The principle of "deviation from standard thought" indicates the aesthetic emotion caused by artistic information exceeds the predicted norm. In painting, provocation, the artist's unexpected decision, new approaches and techniques begin to fascinate, and in the Baroque temple paintings such an unexpected gesture of the artist is a combination of images of very real architectural forms with unreal images of triumphal scenes with saints.

Thus, the study covers a wide range of potential addressees in modern humanities and can be useful to historians and art theorists, anthropologists, cultural studies, psychologists.

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