

An Exploration of the Application of Visual Illusion in Contemporary Installation Art

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Abstract. We often believe that what we see with our eyes is real. However, this is not always the case. Sometimes, when we look at certain patterns or scenes, our perceptions may differ from the actual situation, or even be completely opposite. This is not because our eyes are deceiving us, but rather a natural reaction in information processing. Artists have utilized the principle of visual illusion to create works, providing audiences with unique visual experiences. More importantly, it prompts people to reflect on the relationship between sensation, reality, and illusion. In contemporary installation art, visual illusion has been entrusted with a more significant mission. It constantly challenges and adjusts audiences' expectations and perceptions, encouraging more people to understand the complexity and diversity of the world.

Keywords: Visual Illusion, Installation Art, Contemporary Art

1. Introduction

From two-dimensional paintings of the Renaissance to three-dimensional images today, visual illusion has not only brought a sense of freshness to art but also gradually integrated with science, which is an inevitable development. Innovation in form is indispensable. Through collaboration between artists and scientists, combined with the latest multimedia technologies such as Augmented Reality (AR) or Virtual Reality (VR), the real world and the virtual world are integrated to create more engaging visual experiences.

2. What is visual illusion? (concept definition)

Regarding the well-known phenomenon of visual illusion, art psychologist Ernst Gombrich pointed out in a light-hearted tone: "When certain shapes and colors are juxtaposed, they play the most unexpected tricks on us, which are called 'visual illusions' [1]." It includes shape perception, size perception, depth and distance perception, orientation perception, and spatial localization. Among these, perception in two-dimensional space involves shape and size perception, while depth and distance perception belong to three-dimensional spatial perception. Human spatial perception involves a process of interpreting two-dimensional images as three-dimensional ones, which is a fundamental principle for us to understand the world [2].

3. Conditions for the formation of visual illusion

3.1. Analysis of "explicit" and "implicit" visual illusions

① Explicit Visual Illusion: Explicit visual illusion refers to illusions that we can immediately perceive. It is highly objective and universal, making people feel a sense of reality. Different from common visual habits, life experiences, or thinking set, it creates shocking, novel, and bizarre artistic effects through contrast. However, an undeniable feature of explicit visual illusion is its obstinacy, which is difficult to completely shake off. For example: "Cloud Gate" in Chicago, a huge sculpture made of mirrored stainless steel, forms distorted skyline reflections by reflecting the surrounding urban landscape, creating an illusion of a psychedelic space. ② Implicit Visual Illusion: Implicit visual illusion is relatively hidden and not easy to detect directly. To perceive such illusions, careful analysis and cues from the surrounding environment are usually required to piece together our understanding of the world. For instance, Olafur Eliasson's The Weather Project—a huge sun halo combined with diffused fog mimics the scene of a real sunset. When audiences stand inside, they feel as if they are truly at sunset, as if being personally on the scene. This precisely utilizes the principle of implicit visual illusion.

3.2. Elements of visual illusion works that blur dimensional boundaries

① Geometric Illusion: Geometric illusion manifests in several forms. For example, sometimes line segments appear to be of different lengths; sometimes areas seem to be of different sizes; sometimes images appear to shift positions; and sometimes afterimages are seen after looking at objects. What causes these illusions?

Length Illusion of Line Segments: Among them, the Müller-Lyer illusion is one of the most famous geometric illusions. Two line segments of the same length have arrows pointing inward at one end and outward at the other. When we look at them, the line segment with inward-pointing arrows appears shorter than the one with outward-pointing arrows. This is because the direction of the arrows alters our perception of the line segment's length. In reality, however, the two line segments are of equal length.

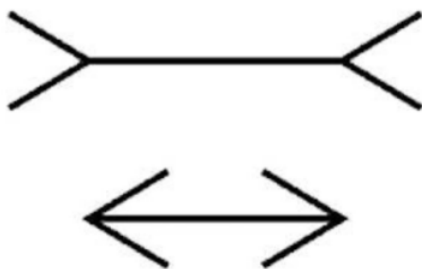


Figure 1. Length Illusion of Line Segments

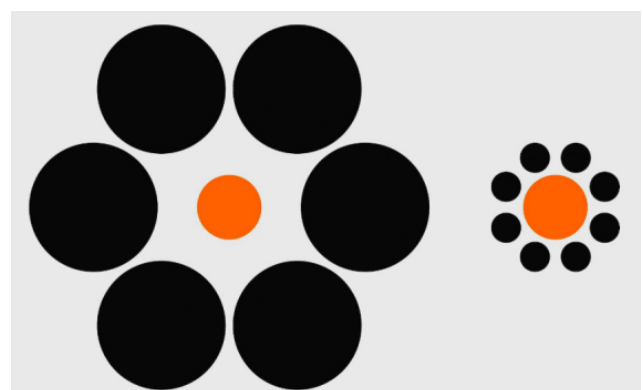


Figure 2. Size Illusion of Areas

Size Illusion of Areas: Visual perception is interfered by the surrounding environment. The same-sized area may appear different in size when placed in different positions. The Ebbinghaus illusion is a good example: two identical circles, one surrounded by a large circle and the other by a small

circle. Although the two central circles are exactly the same size, the one surrounded by the large circle seems smaller than the one surrounded by the small circle.

Displacement Illusion is an interesting phenomenon that makes us feel that objects have moved, but they have not actually moved. For example, if you see two parallel straight lines with rows of vertical lines between them, you may feel that the two straight lines are no longer parallel. They appear wavy or slightly tilted to the side—this is the Zöllner illusion.

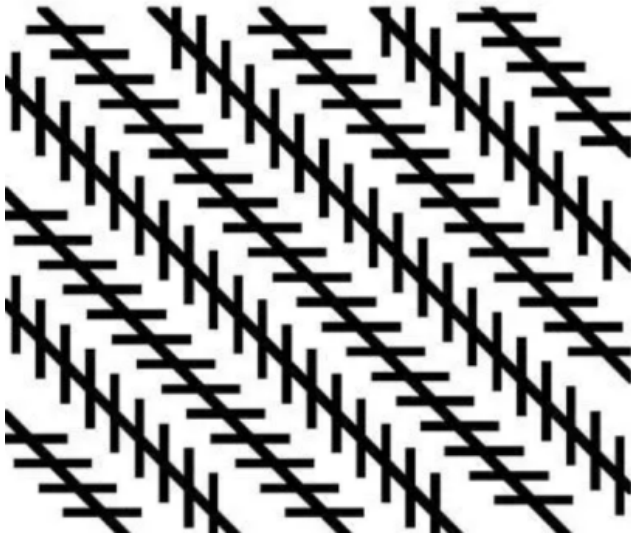


Figure 3. Displacement Illusion

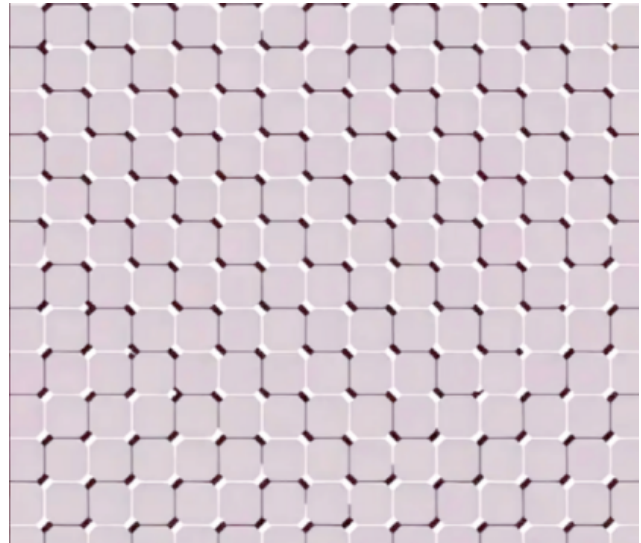


Figure 4. Afterimage Illusion

Afterimage Illusion: When a rapidly moving image stops, your eyes may still temporarily "see" it even if it is no longer in sight. This is because the photoreceptor cells in the eyes need some time to return to their original state. The continuous movement of a figure without any external force is directly influenced by the physiological characteristics of the eyes. When the eyes look at an object, there is a viewing angle, similar to the wide-angle of a camera. At the same time, human eyes may have problems such as hyperopia, myopia, and astigmatism: hyperopia occurs when the focal point falls behind the retina, myopia when it falls in front of the retina, and astigmatism when the refractive status of each meridian containing the visual axis is different. Therefore, everyone's eyes are unique [3].

Distortion Illusion: Distortion illusion involves misunderstandings of shape. A classic example is the Wundt illusion, where identical triangles appear to change shape due to different arrangements of surrounding figures.

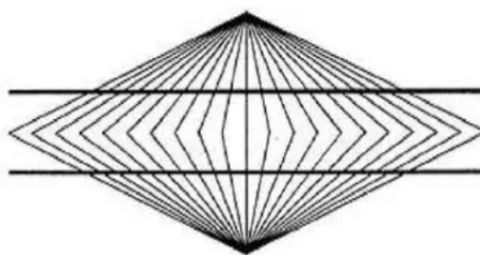


Figure 5. Distortion Illusion

② Irradiation Illusion: Also often referred to as the lateral inhibition effect, it is a way in which the human visual system processes brightness and contrast. It is a phenomenon of area illusion where light-colored objects produce visual expansion due to strong light reflection against a dark background, and its formation is related to the physical properties of light and the human visual system. The core mechanism of this phenomenon lies in the neural processing in the retina. Such art does not overly focus on objectivity, or even the materiality of the artwork; the real object is not in its projection, but in the audience's spiritual and sensory experience. At this level, it deals a huge blow to the division between subject and object in art, bringing the audience into a more complex dialogue [4].

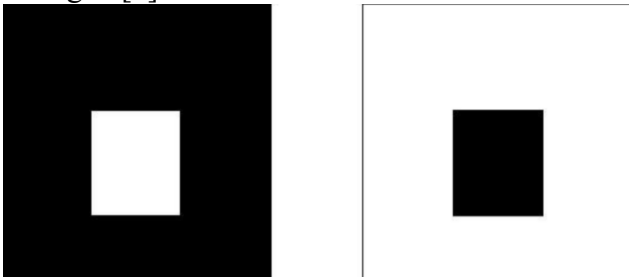


Figure 6. Irradiation Illusion

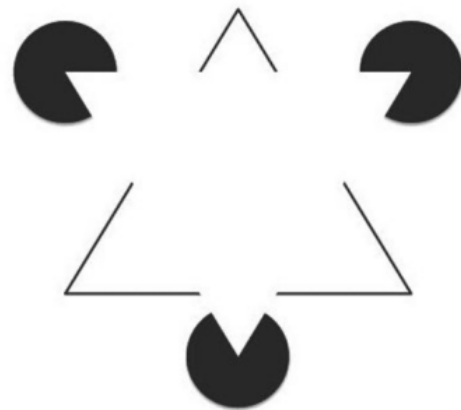


Figure 7. Motion Illusion

③ Motion Illusion: Motion illusion has several different manifestations, such as rotation illusion, fluctuation illusion, and radiation illusion. The brain habitually seeks patterns and tries to piece together fragmented visual information into a complete story. Take rotation illusion as an example: when an object rotates on a plane, you will feel that its shape is also changing. This is because when the brain looks at objects, it tends to connect their edges and corners to imagine a complete appearance. As a result, we may have the feeling that it is rotating. A famous example is the "Kanizsa triangle," where three overlapping circles obscure the gaps between them, forming an invisible triangular outline.

④ Color Illusion: Factors contributing to color illusion include: color contrast illusion, color weight and distance illusion, color temperature, taste, and fatigue illusion, etc. In addition to the visual illusions created by the proportion of different colors and cold-warm tones, the lightness of colors can also bring different weight experiences to people. Colors with high lightness feel light, while those with low lightness feel heavy [5]. The reason for this illusion is the interaction between the eyes and the brain when we see colors. We do not only see the color itself, but the surrounding colors also affect our judgment.

4. Concept and characteristics of installation art

Installation art is related to people's understanding of art, ideas about space, and the environment. It breaks some traditional rules of art, regarding space itself as part of the work, and even making the audience part of the work, creating a novel experience.

Characteristics of Installation Art: ① The connection between the space where the artwork is placed and the exhibition environment—this type of art takes the entire space as a creative stage. It

generally presents the following features: it has the characteristic of expressing multiple viewpoints, and is mostly applied in art and design. At first glance, it has a rigorous perspective relationship and precise painting skills, but these are just a gorgeous coat covering the "flaws" to confuse people. However, precisely because this "impossibility" is hidden and covered by many gorgeous skills [6], it creates an illusion that integrates the work into a broader three-dimensional space or even four-dimensional time and space, stimulating your senses at multiple levels and allowing you to experience art in a new way. ② Audience participation and perception are indispensable parts of installation art. The development of modernization has led to the improvement of individual value based on the individual, resulting in the lack of understanding of individual teleology. The aimless and vague artistic expression of installation art, in the context of modernization, is mostly metaphorical, thereby mobilizing the audience's eyes and thinking.

5. How to express installation art through visual illusion

Fantasies and daydreams indicate that humans have unfulfilled desires, which are the root cause of fantasies. Humans either realize these desires or correct the unsatisfactory reality through fantasies [7].

5.1. Physiological and psychological mechanisms involved in visual illusion

Visual illusion makes predictions and interpretations based on existing experience and pattern recognition capabilities. Tracing the causes of visual illusion, there are mainly two aspects: physiology and psychology [8]. ① Physiological Basis: The retina mainly contains two types of photoreceptor cells: rod cells and cone cells. Rod cells help us see light-dark differences in dim light. Cone cells are responsible for distinguishing colors and details, and the distribution of these two types of cells is different. The central area of the retina has many cone cells, while the peripheral area has more rod cells. ② Psychological Factors: A Priori Knowledge and Expectations: When we see things, our brain interprets what we see using past experiences and ideas. We all know that electric poles are arranged in a row with equal distances between them. However, when we look from a distance, we feel that the electric poles are closer together. This is because the brain uses past experience to interpret what is seen in front of us. In fact, physiological and psychological factors often act together, so even the same line shape may evoke opposite feelings depending on its size [8].

5.2. Common visual illusion expression methods in contemporary installation art

① Environmental Integration: Installation art works are closely combined with their exhibition environment, making the works feel both belonging to this place and transcending the simple limitation of location. For example, Doris Salcedo's *Prounoun*—when the audience enters the exhibition hall, they feel as if they have just experienced an earthquake. ② Material Camouflage: Sometimes, artists choose unexpected materials for creation. They may use soft fabrics to create the appearance of rigid buildings. ③ In-depth Integration of Installation Art and Multimedia: Artists often combine video, audio, dynamic images, and real-time interaction technologies to create an immersive feeling. Virtual reality makes you feel as if you have entered another world, distorting time and space or experiencing multi-dimensional illusions. ④ Reflection and Refraction: Artists use mirrors, glass, pools, and other things to reflect or refract light, which can create infinite extension or distorted visual effects in space. ⑤ Dynamic Installation: Dynamic installations bring

static elements to life through mechanical movement, wind, or audience participation, producing dynamic visual illusions. Ann Hamilton's large-scale installation work *The event of a thread* is a representative work of dynamic installation. He hung huge white silk from the ceiling, and the upper ropes were intertwined to connect more than a dozen swings, generating a tactile relationship belonging to the entire space.



Figure 8. The event of a thread



Figure 9. House I



Figure 10. Waterfall

6. Application of visual illusion principles in contemporary installation art works

Visual Illusion Installation Works: ① 3D Visual Illusion Installation Art: It is a creative method that makes two-dimensional images present three-dimensional visual effects. For example: "House I (1998)" by American artist Roy Lichtenstein not only reflects Lichtenstein's in-depth exploration of sculpture art in his later career but also his unique expression of visual illusion and spatial perception. At the same time, 3D illusion art museums emerged as the times require, also known as "trick art" museums, which specialize in displaying 3D visual art works using the principle of visual illusion. Through specific layout and design, these venues allow audiences to interact with elements in the paintings when taking photos from specific positions, thereby creating an immersive feeling. There are two very famous 3D illusion art museums in South Korea and Thailand.

② Spatial Distortion Installation: One of the most impressive works is the installation *Waterfall* designed by Eliasson, standing on the Grand Canal along the central axis of the garden. In terms of design concept, Eliasson brought powerful natural forces into the man-made environment. Technically, a complex support structure was designed and hidden behind the waterfall. It does not damage the overall appearance but can withstand the impact of a large amount of water flow, being both romantic and safe.

③ Interactive Visual Illusion Installation: Interactive visual illusion installations allow direct audience participation. For example, "Duetti"—a bench that shakes and plays choral music, and a lamppost that turns walking into dancing. Synchronized movements produce harmonies, and at the same time, the bench is practical in design.

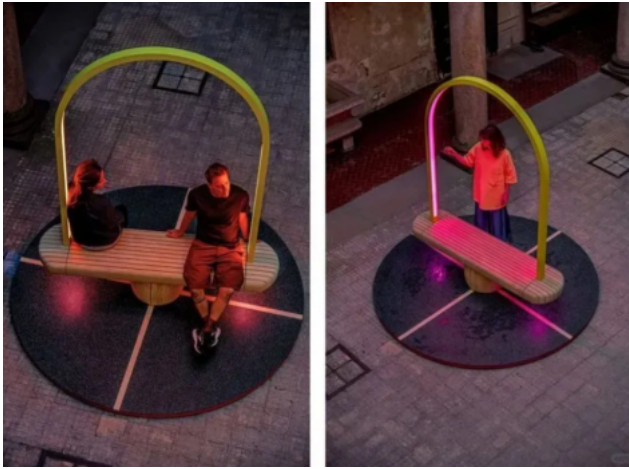


Figure 11. 5Vie Network Infinite Design Orchestra



Figure 12. Traces of Life

④ Digital Media Visual Illusion: Digital media visual illusion refers to the creation of visual effects inconsistent with objective physics in digital media by utilizing the characteristics of visual perception. For example, teamlab, a Japanese team, is committed to breaking the barrier between humans and art. Their work "Traces of Life" is a work that can transcend physical space, allowing you to freely shuttle in a space surrounded by projections, with each moment being a unique experience.

7. Prospect of visual illusion installation art

7.1. Artistic value and social impact of visual illusion installation art

Artistic Value: Public art is a form of practice in the field of art. On the one hand, it inherits the basic attributes of art, such as creativity, aesthetics, and expressiveness; on the other hand, it expands these attributes to public spaces and the public domain, making public art a special field of art. Different from individual artistic practice, public art emphasizes the publicity of art works, which distinguishes public art from general art in terms of function and purpose [9]. **Social Impact:** Visual illusion installation art enriches cultural life. I believe that with the continuous development of science and technology and the renewal of artistic ideas, this type of installation art will have greater potential and influence. It will continue to play an important role in creating a better society.

7.2. Predicting the development trend of contemporary visual illusion installation art

We can predict the following main development trends: ① Future visual illusion installation art will be deeply integrated with digital technologies: With the advancement of VR, AR, and MR technologies, future visual illusion installation art will better integrate these digital technologies to bring immersive experiences. ② Enhancing audience interaction and participation: Real-time capture of audience behavior, expressions, and brainwaves to achieve true two-way interaction. In the future, audiences can interact with artists in real-time through installations and jointly participate

in artistic creation. A high degree of personalized experience will further blur the boundary between the audience and the work.

8. Conclusion

Visual illusion plays an undeniable role in contemporary installation art. By actively and strategically "deceiving" our perceptual system, it successfully exposes the limitations and constructiveness of human perception. Utilizing this principle, artists have turned installation art with visual illusion into a lens for us to examine ourselves and understand this complex world. It reminds us that the "reality" we firmly believe in may be just a well-constructed and stable collective illusion. This art form encourages us to reflect and challenge inherent perceptions. From a different perspective, we may discover a brand-new scene.

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