

Vertigo

Op Art and a History of Deception 1520–1970

May 25 to October 26, 2019



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mumok

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Exhibition

Op Art and a History of Deception
1520–1970

May 25 to October 26, 2019

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Some of the artworks on display use techniques of visual stimulation that might lead to physical discomfort such as sudden dizziness, nausea and vomiting or epileptic attacks. mumok will not assure any liability. Further information: www.mumok/en/vertigo-warning

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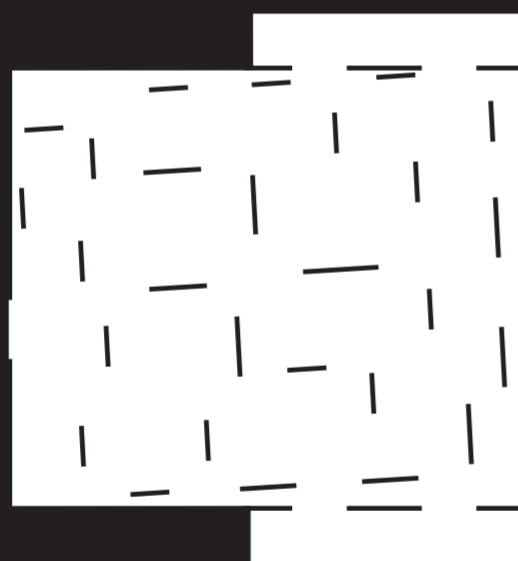
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Level

0



Vertigo takes a new look at an artistic movement that first began in the mid-1950s. Ten years later, it became known as Op Art, in the run-up to a first large presentation of works at the Museum of Modern Art in New York in 1965.

This abstract art aims to create strong sensual reactions. It appeals not only to our vision, but also to our senses of hearing and touch, and sometimes it can affect our entire bodies in ways that lead to discomfort and disorientation. Spirals with vertiginous powers of suction, overlapping and distorted grids that lead to the Moiré effect and other pulsating patterns, ambiguous images, picture puzzles, and flicker effects are just some of the many methods and strategies that this art uses in its images, (kinetic) objects, experiential spaces, and films.

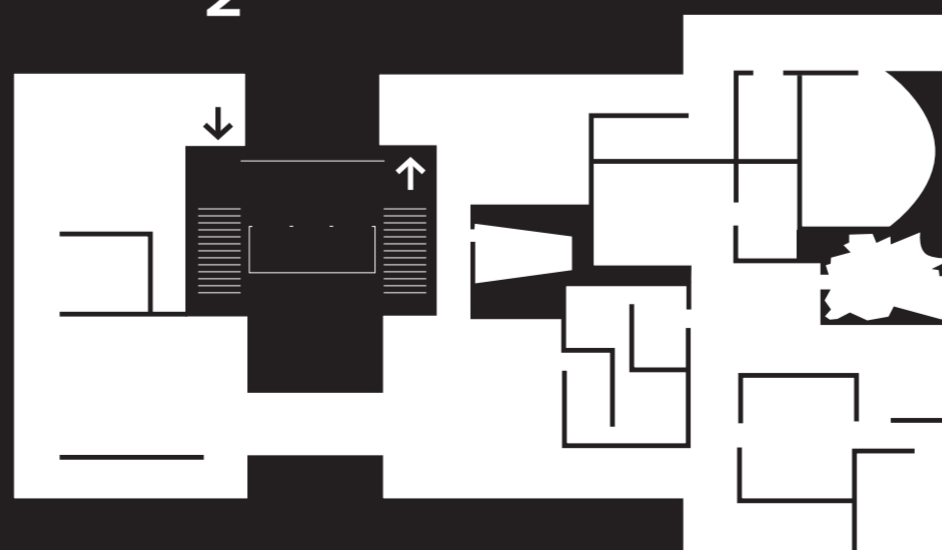
The works of Op Art have no narratives or messages on offer. They are rather “props” and aids for viewers to make their own experiences. They quite literally show us the limitations of human perception, and they thereby initiate epistemological reflection. More than other works of art, they focus on the observers and create an awareness as to how far our own different sensual, psychological, and intellectual reactions are responsible for how we interpret art. Op Art works can also change their appearance depending on the observer’s vantage point, and they explicitly require that we move around when looking at them. They can also be moving works themselves, using mechanical or electric motors.

The human body is directly involved in Op Art, with visual stimulation leading to effects on the whole body. The effects of these works may be slight visual irritation or massive optical over-stimulation and confusion, and also dizziness and vertigo, or even epileptic attacks. *Vertigo* is a medical term for physical dizziness and as the title of this exhibition it also refers to Alfred Hitchcock’s 1958 movie. There too, vertigo is meant two ways—as a physical sensation and as cognitive deception and illusion.

This exhibition is the first to present Op Art from the 1950s and 1960s together with much older examples from art history. Op Art’s own rejection of clarity and balance, and its assertion of movement, confusion, discomfort, and illusion corresponds to a shift from the classical to the anti-classical which can be understood in terms of a universal concept of mannerism. *Vertigo* sees Op Art as the mannerism of the concrete art of the twentieth century and compares it with examples of European mannerism from the sixteenth to the eighteenth centuries and with works of classical modernism.

Level

2



Around 1960 new groups of artists came together in northern Italy and France, and also in Germany and Croatia, whose aim was to explore the basic prerequisites of visual perception. They created new kinds of pictures, and they developed labyrinthine and convoluted environments that resemble fairgrounds. Their works playfully confuse viewers, and sometimes use stronger destabilizing optical stimuli to demonstrate and make people aware of the limitations of perception.

The phenomenon of the after-image, for example, in which the retina is subjected to forceful intermittent stimuli, shows us that seeing is a temporal process. Current optical stimuli enter into mutual effects with the echo of images just perceived and the two meld to become a single irritating experience. This leads to an immersive and dislocating experience of space, whose parameters shift. The viewers become part of the artwork that is literally constituted in the act of perception. This also undermines the chance of contemplative viewing.

Stroboscopes, laser technology, and ultraviolet light in kinetic spaces or in the context of lumino-kinetic objects and environments illustrate both the interest in contemporary theories of perception and also a fascination for innovative (digital) technology at the threshold to the information age. These artists deliberately used industrial materials as a way of distancing themselves from what they saw as a reactionary notion of the artist genius in the dominant gestural painting of the 1950s. For Op artists, the key issue was that the effects of their works were no longer the result of subjective self-expression, but rather a physical experience induced by a rationally calculated procedure.

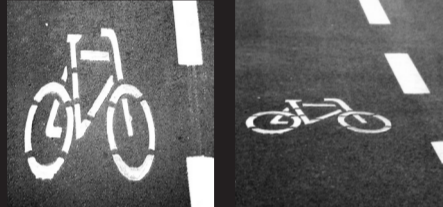
The exhibition design of *Vertigo* draws on the idea of the labyrinth. Here, the labyrinth is the hinge between the visual experience of the Op Art of the 1960s and optical experiments undertaken in the sixteenth and seventeenth centuries that aimed to playfully question the relationship between seeing and knowing in an age of transformation. The labyrinth is seen as a key visual symbol of European mannerism, and as such it again became highly relevant in 1960s theory when Umberto Eco, the most significant theorist of Arte programmata, declared the unfinished and open to be key principles of art. Op artists also advocated the idea of an “open work of art.” The work is by definition unfinished both in terms of its meaning and in terms of how it interacts with viewers, and the relations between art object, artist, and receiver become a field of opportunities undergoing constant change.

Anamorphosis

Anamorphosis is a reverse of central perspective. Both use a grid and vanishing lines to represent space and depth. While central perspective attempts to reproduce our real experience of seeing, anamorphosis initially “destroys” an existing image by transferring it into an exaggeratedly stretched grid. This makes it illegible unless viewed from a very specific angle (perspective anamorphosis) or when looking at a mirrored cylinder or cone (catoptric anamorphosis), when the image is reconstructed in the eye of the beholder. Anamorphoses can also be created in real spaces, where seemingly unconnected fragments come together to form a recognizable image when viewed from a specific vantage point in the room.

Parmigianino’s *Self-Portrait in a Convex Mirror* (1523/24), a gift to Pope Clemens VII, became a well-known example of the skill of anamorphosis. Instead of a distorted and ephemeral self-portrait on the surface of a convex mirror, the picture shows a brilliantly executed painting. The illusion of the mirror image competes with the illusion of painting. We think we really are standing before a mirror, and may then be confused by the fact that we do not see ourselves in this mirror, but the self-portrait of the painter. This kind of picture was known as a capriccio in the late Renaissance, an artful piece made for collectors and cabinets of curiosities. In her work *Blaze II* (1963), Bridget Riley creates a comparable three-dimensional effect, with the displacement of concentric circles in addition giving the impression of dynamic rotation.

Example of perspective anamorphosis



Camouflage

Something that is nearly invisible in nature—in a field or a forest— is used in fashion to attract us. Camouflage is a pattern intended to disguise that was developed for military uses, and it could be seen as the expression of the ever more secretive and backhand forms of warfare of the twentieth century. In the nineteenth century, brightly colored uniforms and resplendent helmet plumes decoratively distinguished combatting armies, whereas already in the industrialized warfare of World War I soldiers, tanks, and entire ships were protected from the enemy’s weapons by camouflage. The model is nature—through their colors, patterns, and shapes animals imitate the leaves, branches, or sand of their surroundings in an attempt to become invisible.

One special form is the striking dazzle camouflage. In World War I, when British warships were threatened by German submarines, attempts to camouflage them with the colors of the sky or the sea were of no avail. British artist and naval officer Norman Wilkinson suggested not trying to hide the ships but painting them with very conspicuous and optically confusing patterns. The contrasting dazzle patterns were intended to confuse the optical systems of telescopes and the faculties of judgement of the enemy captains, making it impossible to determine the direction, speed, and size of the ships. After the war, Edward Wadsworth, who had been involved in the camouflage program, turned this strategy into an artistic motif in paintings like *Camouflaged Ship in Dry Dock* (1918), using a complex technique with both central perspective and anamorphosis.

Dazzle camouflage is still used in the car industry today. In order to prevent the publication of photographs of test cars from unreleased new models the cars are covered in camouflage wrap. This confuses journalists and the competition, and snapshots reveal as little as possible about the new design and technology.

There are parallels to this in nature. Researchers believe that the zebra’s striking pattern has similar reasons—the stripes are not designed to protect them from big cats, as these hunt mainly by smell, but from mosquitos, who find it much harder to land when confused by the contrasting colors. Victor Vasarely’s *Zèbres* (1932–42) are famous—interwoven abstract shapes that seem to be in spiral movement and are only seen as animals on a second look.

Flickering, Shimmering, Stroboscopic Flashes

If you turn a light on and off rapidly, then it begins to flicker. If you speed this up, then at some point you reach a limit and it seems that the light is turned on all the time. For most people, this illusion of permanent light is reached when the light is turned on and off around sixty times per second, or, put differently, when the flickering attains a frequency of 60 Hertz. All stimulation of the eye by light leaves an after-image on our retina, and at 60 Hertz and higher the real image and the after-image overlap so that we have the impression of permanent light.

Sunlight is a natural source of light and does not flicker. This means that living organisms have not developed any ways to compensate for flickering light in the course of evolution. Flickering can have negative effects on our nervous system. Information is received more rapidly than our brains can process it, and the brain is overwhelmed in its attempt to bring the quick succession of single images into a sequence. This can result in physical sickness, headaches, or in some cases even epileptic attacks. How strongly or unpleasantly we experience flickering light depends on the constitution of the individual, the intensity of the light source, and the levels of variation in brightness.

Stroboscopes emit flashes of light at regular intervals. Depending on the frequency of the flashes, the stroboscopic effect can be that movement appears static or that the direction of movement seems to be reversed. Tony Conrad’s experimental film *The Flicker* (1966) works with these effects. Light reflexes at various frequencies lead to different experiences for the individual viewers that can involve different patterns or even perceptions of color. These “images” are not just taken in by the eye but are formed by a neural reaction in the brain.

The vertiginous effects of Giovanni Aneschi’s *Ambiente a shock luminosi* (Space with Light Shocks, 1964) are based on a slight displacement or overlapping of fundamentally regular sensual stimuli. In two interlinked corridors, stroboscopic flashes are emitted at regular intervals, but as these intervals can marginally differ this can lead to physical discomfort and dizziness. Long-term stimulation can also lead to the Ganzfeld effect, a form of expansion of consciousness. If our field of vision becomes a single unstructured field of light, the brain begins to produce its own images and brainwaves become “visible.”

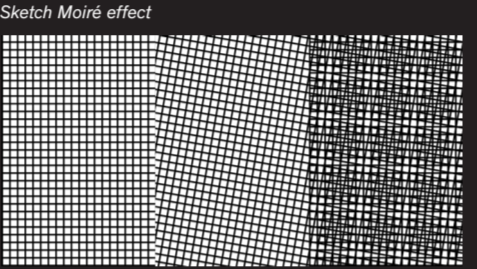
The Moiré Effect

If you lay two grid patterns on top of each other but not exactly covering each other this leads to a form of interference known as the Moiré effect. The human eye interprets focal points in the grid and connects these to create new non-existent structures. This leads in our perception to a chunkier grid, and an uneven distribution of darkness and light, and thus also to the impression of depth. The image begins to vibrate in our perception, and even more so if the viewer is in motion. The movement of the eye or the body leads to shifting angles for the reception of the image. The eye is continually seeing new pieces of information and trying to connect these, so that the image itself seems to be moving. The Moiré effect is not automatically experienced identically by everyone, and is rather the expression of each person’s own sensations. In technical procedures for printing grid

patterns, an unwanted Moiré effect can easily arise when the grids are not placed precisely. This effect is deliberate in Moiré textiles, for example, in which two simple woven pieces of cloth are firmly attached to each other, and intentional overlapping leads to the Moiré effect.

Op artists who use the Moiré effect include Gabriele de Vecchi. *URMNT* (1962) consists of a black perforated surface behind which soft white fabric is rotated by a small motor, thus constantly producing new Moiré effects. Due to their own different perspectives and their movements, beholders all see this work differently, while it is itself also continuously changing in form and thus remains somehow intangible. Jesús Raphael Soto enacts the Moiré effect as a spatial experience in *Metal Vibration* (1969–1970) by hanging sticks in front of stripe patterns on a wall. When the sticks are moved by draughts of air then the room seems to flicker.

Sketch Moiré effect



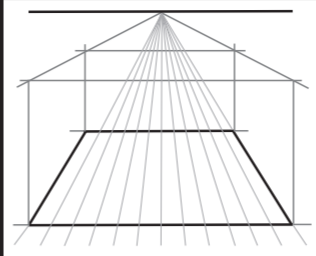
Central Perspective Projection

Naturalist representation always leads to a formal problem. How can three-dimensional “reality” be depicted on a two-dimensional surface? Various solutions have been developed throughout art history, all giving the impression that we are seeing the images represented under the same conditions of seeing with which we see reality.

Linear or central perspective came to prominence in early Renaissance Italy. The key factor here is making the depiction subjective, as central perspective assumes a fixed position for the viewer and imitates the ways in which human seeing functions (strictly speaking those of a single eye). For the construction of perspective mathematical principles were used for the first time in art. An eye line corresponding to the real height of the eyes is marked on the surface of the medium. Then one or more vanishing points are marked along this line. All the lines that lead into the depth of the image will then run towards these vanishing points. The effects of this method are so powerful that art theorist Leon Battista Alberti was able to assert in 1435 that the picture was like an open window to the world, and he developed the idea of the pictorial surface as a semi-transparent veil onto which reality projected itself from behind.

Central perspective enables the direct identification of the viewer with the gaze of the painter or draughtsman. A photographic image works in the same way, with its apparent realism mostly based on the vision of one eye. Images using perspective have now so influenced our ways of seeing that we sometimes do not even notice that we are looking at a representation and not the object itself. Artistic breaches of convention make use of our habitual ways of seeing, by creating procedures that use distortion or reversal of the “correct” forms of representation and thus confuse our habitual perception of two-dimensional works, as in anamorphosis. In architectural fantasies by Giovanni Battista Piranesi such as his *Carceri* (1760–61) we see confusing constructions in which perspectives compete and elements collide with one another. They show how easily the eye can be deceived by seemingly convincing perspectival constructions.

Construction of central perspective



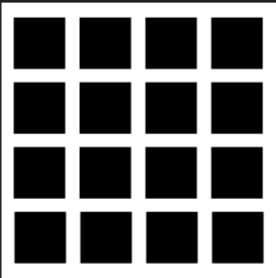
Grid

A grid is a simple structuring and organizational principle. Grids are used in creating perspective in images and in printing techniques. In modernist abstraction the grid becomes an independent motif that suspends all claims for illusions of depth that had set in with the discovery of central perspective in the Renaissance. Instead of diagonals that suggest a perspectival space behind the surface of the image, making the picture a window into another reality and guiding our gaze into depth, the grid remains on the surface. It asserts itself as a concrete structure and is no longer the means to achieve an illusion.

This rational structure may include differing effects that deceive the eye into seeing something that is not actually there. If overlapping grids are slightly incongruent, this causes what is known as the Moiré effect, for example. The human eye finds it difficult to gain a stable hold on even a simple grid pattern. The regularity offers us no outstanding feature that the eye can focus on. Our visual system begins to make false assumptions about the stimulations it is receiving, and the brain reacts by creating optical illusions, like dots and colors that are actually not present in the image. Depending on the effect, we speak of café wall illusions, chess board grids, or Hermann grids.

If grids are laid on top of each other, the eye generates further effects. Francois Morellet, for example, lays grids exactly diagonal to each other, beginning at 45 degrees and then with a series of further precise right angles at 22.5 degrees or at 67.5 and 112.5, 135, and 157.5. This very objective and rational operation creates uncontrollable agitation, with webs of lines that seem to break out into bubbles at various junctures that themselves continually shift. This effect is generated by the eye.

Hermann grid example



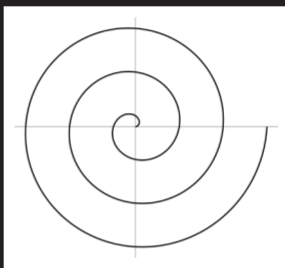
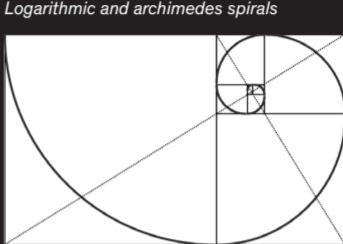
Spirals

The spiral has always fascinated and inspired people, probably due to its endless and dynamic geometry. There are two kinds of spirals. In a logarithmic spiral the radial distance to the preceding coil continually increases. The longer the spiral, the broader it becomes. This makes it “resemble itself,” as no matter how far we zoom into the center it always looks exactly the same. The golden spiral is a special form of logarithmic spiral based on the proportional relations of the golden section and often used as a principle of composition in painting and photograpy.

In an Archimedes spiral the radial distance to the previous coil is always identical. This is frequently seen in technical or artisanal products, such as the music or audio record. There are no Archimedes spirals in the natural world. If the spiral is set in motion and then rotates, we get a suction effect. When rotated the Archimedes spiral seems to grow and wander toward the margins, while logarithmic spirals seem to be moving toward the observer.

One famous example of an Archimedes spiral is a copper engraving by Claude Mellan from the year 1649, showing the head of Christ constructed by a single spiral line. The inscription on the drawing reads “Formatur Unicus Una / Non Alter” (the unique one made by one / like no other), so that it makes sense that he is depicted by means of one line only. The miraculous “appearance” of the face of Christ on the veil of St. Veronica is here seen as an optical effect that is created by the eye’s own suggestive power when it combines lines of different width to make a recognizable image. Similar effects are created by Maria Apollonio’s more than five-meter large Disc *Dinamica Circolare 4S* (1968/2019) made of concentric circles. The varying width of these creates an impression of three dimensions and a spatial depth that can lead to dizziness and vertigo.

Logarithmic and archimedes spirals



Vertigo

The word vertigo derives from the Latin word for a whirling or spinning movement. As a medical term it denotes a sensation of turning or stumbling and imminent loss of consciousness. Vertigo is defined as the body’s reaction to an illusory perception of movement between the body and the world, caused by the stimulation of one or several sensory systems in the body—the somatosensory nervous system (deep receptors in our muscles), the eyes, or the vestibular system in our inner ear, which regulates our sense of balance. We feel as if the ground beneath our feet is moving, and either our bodies or our surroundings are rotating and being dragged. Vertigo can also be accompanied by symptoms like sickness, vomiting, palpitations of the heart, ringing in the ears, and headaches.

Vertigo as a physical reaction to an optical stimulus also constitutes epistemological proof that seeing is both a physical and psychological phenomenon. In other words, in contradicts and disproves the old idea that spirit and material or body and soul are two distinct entities, as propagated particularly by René Descartes. There is no objective and pure perception, as perception is always dependent on the subject and is always also physical. Philosopher Immanuel Kant says that in a state of vertigo our imagination takes us besides ourselves.

Vertigo is an ambiguous state of mind involving both fear and attraction—the desire to fall and the fear of falling. It embodies a simultaneous desire for both proximity and distance, the confirmation of identity and its dissolution, and ultimately for death and the fear of death. These are the themes of Alfred Hitchcock’s famous film *Vertigo* (1958), which has provided the title for this exhibition. Hitchcock’s hero Scottie suffers not only vertigo in the medical sense, but also experiences the vertigo of being unable to distinguish between illusion and reality. And Scottie is also the victim of tricks and treachery—the deception of others. The film’s opening credits show a spiral rotating out of an eye, increasing in size and pulling in the viewers—optical perception and the deception of vertigo are inextricably interlinked.

Picture Puzzles

Picture puzzles with latent images are based on ambiguity. One motif is actually two, depending on how the viewer sees it. This is called multi-stable perception, in which it is only be possible to see either one of the two images at any one time. They cannot be seen together. Picture puzzles are known from antiquity in grid-pattern floor mosaics that play with latent images. A simple stereometric depiction of a cube with no foreshortening of perspective always involves latent images, as the brain must decide how it wishes to construct its three dimensionality.

More complex picture puzzles hide one image behind the other: Franz Kafka wrote in his diary that picture puzzles were images where “one would never find anything if one did not know it was there.” The shift in perception requires neither different stimulation nor any active change on the part of the viewer, such as movements of the eye or conscious shifts in focus. *My Wife and My Mother-In-Law* is a famous ambiguous image by the English cartoonist William Ely Hill. It was published in 1915 in the American satirical magazine Puck.

Ambiguous images were particularly popular in the late Renaissance and mannerism. Giuseppe Arcimboldo’s paintings of people made up of sea-fish, fruit, and vegetables are famous examples. Picture puzzles may link very different themes, such as the landscape after Heinrich Christian Vollaert (c. 1750), which also conceals a human head. Another kind of picture puzzle requires just a change of standpoint in order to see the hidden image. A picture with slats from the circle of Guido Reni (first half of the seventeenth century) shows both Christ and Mary, depending on the viewpoint. In his series of *Psychromies* (since 1950) Carlos Cruz Diez works in a similar way, using overlapping and alternating abstract shapes and different effects of color depending on the viewpoint. Austrian artist Marc Adrian also creates similar effects by placing transparent ripple glass in front of his reliefs—as viewers move many different images are revealed.

Picture puzzles

