العنوان:	Techniques of Optical Illusion and their Effect on Visual Dazzling in Contemporary Interior Design
المصدر:	مجلة التصميم الدولية
الناشر:	الجمعية العلمية للمصممين
المؤلف الرئيسي:	Mahmood, Shahrayar Abdul Qader
المجلد/العدد:	مج11, ع2
محكمة:	نعم
التاريخ الميلادي:	2021
الشهر:	مارس
الصفحات:	291 - 298
رقم MD:	1165681
نوع المحتوى:	بحوث ومقالات
اللغة:	English
قواعد المعلومات:	HumanIndex
مواضيع:	التصميم الداخلي، التصميمات المعاصرة، الإبهار البصري، الخداع البصري
رابط:	http://search.mandumah.com/Record/1165681

Techniques of Optical Illusion and their Effect on Visual Dazzling in Contemporary Interior Design

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Abstract:

Design creativity can be achieved through the application of the art of optical illusion and its various techniques through the creative treatments of interior spaces, which is a vision resulting from the ability of the interior designer to different types of arts through the use of tools and possibilities in creating an innovative interior design environment for any space and addressed in new design formulations. The subject of research shows in many design fields such as architecture, interior design, photography, sculpture, graphics and other arts in order to improve the optical vision in terms of size and proportions using optical illusion and use it in design processors to suit the nature of functional space and requirements that will help to change the visual perception of the spaces through producing creative formative designs and solutions based on standards, rules and basics of this art. Therefore, we find that the art of optical illusions is an extension and development of many art styles emerged in different periods of time, which implemented mathematical sciences in plastic arts to create a new vision in contemporary interior design through the use of digital technology.

Introduction:

The art of optical illusion is one of the creative manifestations that emphasize the fusion of art and science in a single crucible to achieve visual visions characterized by optical brilliance according to the mathematical coordinates of the science of perspective and light science where these coordinates grow in straight waves of the relationships of plastic art that does not end but generating by the tide of aesthetic values inherent in this beautiful art (Lo, Cha, 2011).

Whereas the vision is one of the most important senses that human has, so the art of optical illusion is a deception of the visual sense, and it is one of the pillars of energy and one of its elements. The art of optical illusion is an abstract art that unites scientific theories and modern art, where its artists have benefited from scientific data for the production of designs and plastic solutions depends on color, space and shape, and the art of optical illusion has many fields; the most important of which is the field of interior design, which is the field of innovation and searching for the most suitable solutions that can be followed to reach the goal that represents in the best choice for interior furnishing and decoration, emphasizing on a piece of different furnishings and how to employ the art of optical illusion in its design and

decoration to achieve the spatial depth and breadth of limited space rooms (Al-Zamil, 2017).

As optical illusion can be considered as a manifestation of the creative form of space where this art is based on some sensory tricks in the process of visual perception and resulting in the vision pulse in order to create a kind of "mobile vacuum sense", which is nothing but a smudge of camouflage and trick that has been allocated by the eye has been assigned to other body organs, which corresponds to the scientific definition of the optical trick in that it deceived the whole visual system of the viewer from the eye to the brain.

Research Problem:

The lack of internal comfort for the occupants of the functional space is what motivated the thinking of how to access creative design solutions by taking advantage of the theories of optical illusion and implementing them in the interior design by studying the effect of visual dazzling significance in the interior design to create innovative design approaches in internal architecture, in addition to exploring the diverse applications of this art in other visual arts fields. Accordingly, the problem of the research is summarized in the extent of using of optical illusion in the development of vacuum solutions and applying them in

contemporary interior design.

Research Aims:

– Monitoring the most important intellectual concepts of the art of optical illusion and its impact on contemporary interior design.
– Developing new indicators of optical illusion based on the aesthetic concepts of the art of optical illusion.

Research Importance:

– Taking advantage of the techniques of the art of optical illusion in solving the internal design problems.
– Employing the art of optical illusion and its aesthetic and functional values in contemporary interior design.

Research Limits:

– Spatial limits - development new designs in the interior spaces.
– Temporal limits - modern art trends in the 20th century.
– Objective limits - intellectual concepts in the methods of optical illusion art.

Definitions:

Illusion: means in the language "to show something other than the hidden, and also means the trick".

Whereas, it is the act that makes things, shapes or colors seen or recognized in a false and different from their original and unlike their natural state using the mathematical rules. However, the optical art called of this name for its dependence on the visual properties of the eye.

The school of optical illusion is composed of two parts: optical which means visual and art which means art and the meaning of the total means visual art, but the common is the art of optical illusion (Samaher Fallatah, 2008).

Effect: affect, impact on, impact, influence, influenced by, the accident affected his health, this does not affect the.

Influenced on; persuaded; turned his conviction; my friend affects him and affects me.

Dazzling: dazzle; dazzling; impressive; dazed; it is the middle of the day; bright light.

Arabic Dictionary (https://www.almaany.com/).

Interior Design: is the organization of relations between the basics and internal elements within a coherent and harmonious macro unit within three-dimensional patterns, which is aimed at the functional and aesthetic aspects, and is also expressed by the set of elements and basics that are linked together in a temporal and spatial relationship in internal space. Design is a creative and creative process, and the ideas and results of this process are diverse and varied. Where the

technical action extracts what is hidden in the natural thing and turns it into what is visible in the things made and different materials (Rashad, Ahmad, 2011).

Contemporary: is belonging to the present time or something related to the current era, Hasan Fathi said: "in order for the architectural work to be relevant to the era, and therefore contemporary it must be part of all the details of daily life with all its clamor and activity and must be consistent with the rhythm of the universe and the present stage of scientific knowledge, and mechanical and its close relationship to architectural design and planning" (Alsayed, Waleed, 2008).

Literature Review

The art of optical illusion is one of the modern art trends that emerged in the early of the fifties of the 20th century as a result of scientific and technological development and the spread of means of propaganda, publishing and television. The artists of this direction invested in motion, optics and Gestalt theory to create a affecting impression on the surface of the image, which reflects the concepts of that trend on many areas of the arts, and this art is based on the optical illusion of the sense of sight, and usually refers to the illusion of relevancies and spatial relationships, dimensions and distances, which it seems they really are things in front of the beholder Jaglarz, (Anna , 2015).

The optical illusion is a form of abstract art where it is an extension of Geometrical Abstraction (ZoïKapoula,Alexandre Lang ,2015) whereas the optical illusion happened as a result of tightening the geometric regulation, which in some respects depends on the sensory perspective, while some geometric forms are smaller in scale while others are contrasted, the result of this organization is generated by a general sense of movement (Marwa Hassan, 2011).

It turns out that the art of optical illusion depends on the use of mathematical rules of plastic creativity, which inspires the aesthetic values of movement, silence, depth and prominence in the painting, even though it is flat surface.

In addition, the art of optical illusion shows that science and art throughout history are interdependent and enlightening each other. The interior designer has been able to summarize his ideas and strengthen his perceptions through scientific thinking and cognitive concepts based on some scientific ideas and spatial theories, and some scientific concepts such as straightening a line starting of a sequence point. The interior

designer explained how to put an idea in content that can be absorbed and understood, whereas the science gave the interior designer the tools of thought and technical drafting tools, but the tool remains a mean, not an end.

The interior designer need creative works in order to achieve important cultural, aesthetic and functional values not only in the content of the work, but in the forming construction, designers have interested in different stages in the sensory perception and the sensory facts and they have showed great attention in such relations (Nicholas Wade, , 1988).

Intellectual Concepts of Optical illusion

The art of optical illusion is one of the art trends that focused primarily on visual sensations and its impact on the viewer's eye. "This trend was based on the study of the results of the Gestalt theory, which emphasized that the sense of shapes is based on the logical system of the different images that the senses receive and perceive fully or partly by deletion and addition depending on the nature of the field surrounding the artwork. Therefore, color, shape, place, space and situation have a special nature in the process of perception (Mahmoud Amhar, 1996)". However, the mind of the viewer tends to recognize a group of forms that have regulation and does not tend in contrast to a group of contradictory forms and it follows the laws of regulation for example of convergence and similarity and others, also the art of optical illusion interested in motion and optics, which the visual artists have benefited from the impact left in the viewer's eye by the artworks. The artists started with their first attempts, which were limited to the use of black and white colors, whereas the sharpness of the contrast between the two colors leads to the interaction of these opposite areas, which makes the viewer to feel motion. After that, the artists evolved to achieve this visual illusion using cold and warm colors; the cold colors appear as if they are back warded, while the warm colors appear to be forwarded, and these two attempts are considered to have been practiced for a long time in the beginnings of the art of optical illusion. In which the movement of elements is perceived by the viewer through the sense of sight, resulting from the fluctuation of the vision through the interference of the fixed system by creating the movement of deception through the convergence and farness between distances and colors contrast and the repetition of shapes, lines and colors, as well as difference in sizes, whether increase or decrease or both. After that, the scope of these visual experiments has expanded so that the increase of geometric structures, the contiguity of

lines and the distribution of flat and deep-colored colors lead to various phenomena such as correlations, spikes, color glare, diffusion, overlapping, contraction and expansion. As a result of the optical mix, the whole ambiguity and the permanent fluctuation of the forming elements, the retina becomes irritated and convulsed so that the viewer becomes a partner in the painting (Mahmoud Amhar, 1996)

However, the art of optical deception does not depend on the sense of sight only in the process of perception, but also depends on the human brain in the recording and imaging of the forming elements, and there are many processes carried out by the human brain after recording elements on the retina; the brain may recognize the forming elements in a certain position that leads to a certain meaning then we recognize it in a different meaning though these elements are the same but it is resulted from changing the angle of the seeing. As that the presence of light is the essential condition for the work of the eye as a sense of vision to see shapes and things, which means that the process of perceiving objects and shapes depends on the light that reflects it. In other words, when the viewer see things, the light reflected from their surface becomes a chemical energy in the retinal nerve cells, and then the visual nerve transforms it to the brain to translate it into knowledge that identified by type, size and distance and that what the eye is seen (Najm Askar, 2014).

The Principles and Laws of the Art of Optical Illusion

1- Elements used in the art of optical illusion (color – line - shape) are selected with precision and distributed within the interior space of the design work to achieve the highest effect of deception (Amira Kadry, 2008).

2- Emphasis on the events of the deception movement and the spatial depth, despite the stability of the used elements by some of the sensory tricks in the perception of the used shapes and elements.

3- Repetition of elements and colors in simple and complex structures to create a kind of motion rhythm (Dalia Hassanin, 2010).

4- Full contrast between black and white to maximize visual effects and use different colors.

There are many types of visual tricks that have multiple techniques that used for achieving, including:

1- Tricks related to colors:
The human eye sees the colors in a variable way

according to the surroundings, where when we looking at a particular position we see a color or several colors, but this is not the truth, and there are three examples of tricks related to colors:

The first example: Illusion of Pacman invented by "Jeremy Hinton

If we follow the circular motion of the ball in the following figure, which moves clockwise, we will find a pink ball, but if we stared at one of the pink balls static for two seconds we will see a green ball rotate instead of the pink ball, then we have to stared at the center of the circle (at the + mark) and wait for 4 or 5 seconds and we will see that all the pink balls disappeared and the green ball will remain appearing.
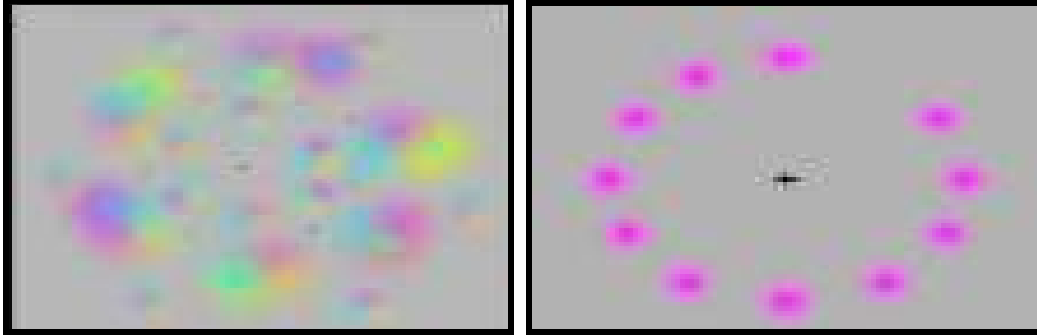

Figure (1)

The second example: Illusion of Pacman square of contrasting colors (Scintillating Grid)

It's hard to know how many black points are in this box because these black points are white just after the eye has moved to another point in the box, and so on, and that they are hard to count, and this can be explained scientifically by that these black points are not existed in the box and can be verified by covering one of the black straps by hand; this can be explained by the fact that the human eye is unable to move between two contrasting colors because of the sharp contrast between them. Therefore, the eyes were deceived by this contrasting and the eyes will see what is not existed.
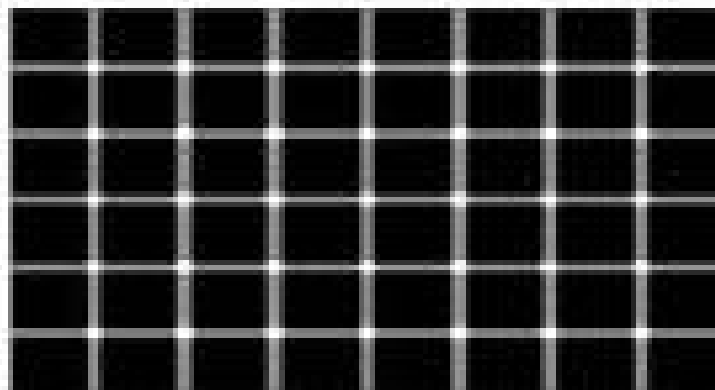

Figure (2): Scintillating Grid

2- Tricks related to engineering "Roger Penrose"

This shape is called the "Penrose triangle" related to the mathematician Roger Penrose, who drew this form and published it in the British Journal of Physiology in 1958. This geometrical form can only be achieved by drawing on paper through two geometric dimensions, and it is impossible to actualize it in three dimensions; it is a form of geometric tricks.

3- Tricks related to picture motion (3 dimensions animated picture trick)

If we stared at the center of the next figure and then moved our heads forward and back many times to see that the two rings revolve one against the other direction, but that is not so, the two rings are fixed and do not rotate in any direction, and we can make sure of that by repeating the attempt staring at the circles below the center, so we will see that they are in complete inactive.

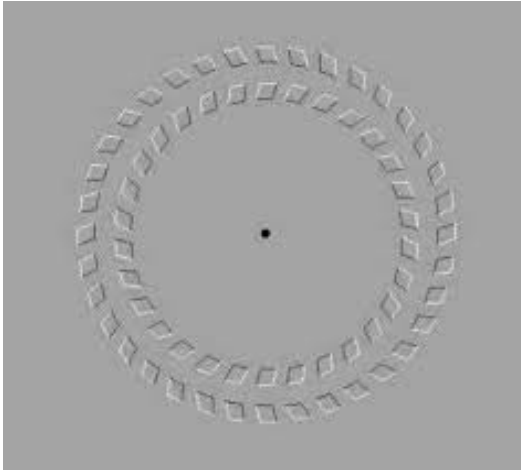

Figure (3): Roger Penrose trick

Figure 4 3 dimensions animated picture trick

4- **Tricks related to sizes and measurements (Millar Lyar trick)**

If we take the following example, we will see that the line on the left (fig. 1) is longer than the line on the right (fig. 2), but the opposite is true; the two lines are quite equal and we can verify this by measuring. The arrows that limit the ends of the two straight segments suggest to our eyes that one of the two pieces is longer than the other, a wrong brain analysis resulting from optical illusion.
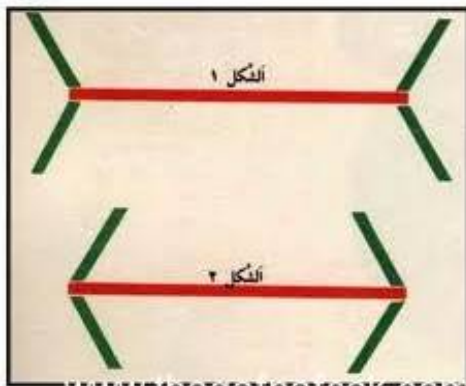

Figure (5): Tricks related to sizes and measurements

The Impact of the Art of Optical illusion on Interior Design:

1- Features of Interior Design in the Twentieth Century

The twentieth century is the beginning of the emergence of the philosophical view of the interior designers, where the designs were characterized by new visions associated with many of the modern intellectual developments, in addition to the scientific development and technological progress that prevailed in modern times, and has been affected by the development of many of the modern artistic trends: Cubism, Surrealism, Abstractism, Futurism, Kinetic Art, Optical illusion and others. As a result of the

change in intellectual concepts, many new forms of furniture and wallpaper emerged, in which designers used their artistic expressions, relying on the new technologies and new intellectual concepts that emerged in the century. However, these designers moved away from the visual transport of natural forms and moved to create innovative designs linking the interior designer and the concepts of his age with all the cultural, scientific, economic, technical and other factors, and their desire to achieve a balanced relationship between the life of the individual and the requirements of the age as an urgent need in light of rapid developments. As a result of the impact of these trends on the concepts of the era appeared many of the designs of furniture, "we may find that sometimes depend on the repetition of natural elements with all the relationships of linear and color and spatial, and sometimes find others are based on simplification and transformation of the elements by maintaining the flow of lines and their relationship to each other in order to achieve rhythm and harmony, and we may find them sometimes rely on the summary and abstraction of the elements into simple geometric shapes in order to achieve coherence and balance (Amal Saeed Sultan, , 2001). Whereas the interior designers of the twentieth century did not ignored the importance of raw material in the production of their designs and access to the largest segment of the society in which they live, they went to meet the requirements of the age and the need of people to carry out their work.

2- The Contemporary Art of Optical illusion

Since the late 1920s and early 1930s, this art has been deeply rooted in the Bauhaus school, where a number of members of the school undertook a number of researches into the visual phenomenon. In the 1940s, some of the scattered models of optical illusion emerged.

However, it was not of the modern arts until the early 1950s, which it became a journalistic phenomenon when one of the American journalists called it a popular expression, Op Art or Visual Art. The artists have set up an exhibition entitled "Responding Eyes". Since then, the art of optical illusion has been the representative of one of the modern artistic trends, and this was done by its founder Victor Farasl (Samaher Fallatah, , 2008).

Nevertheless, the art of optical art illusion was not to appear suddenly by a group of artists, but it is a development of the abstract trend, which is the origin of many of the trends of modern art such as interior design and the adoption of different aesthetic values such as balance, rhythm, contrast

and depth.

3- The Art of Optical illusion and Its Relation to the Interior Design

Many interior designers have been influenced by the art of optical illusion and have implemented their designs in many art works, and this has been the principle of experimentation and taking advantage of this trend, and to meet the needs of the recipient and his desire to adorn and embellish, which helped to allow these designers to express their intellectual concepts. The artists of optical illusion have moved away from transforming manifestations of the external world and focused their attention on the eye and the mind in the visual responses, and they tried to attract the eye of the viewer in order to understand the difference between shapes and colors, so the interior designer found in these concepts new approaches to uncover what is unusual in his artistic formulation. Which resulted modern aesthetic formulations, whereas the designers benefited from scientific studies and theories that focused on visual phenomena, tricks and illusion that have an impact on perception in the formulation of their configurations by organizing the elements, so that the shape is interchanged with the ground or the wall and rely on the convergence and spacing between the units, or interference with a static system, or dependence on motion variation between shapes, as well as the use of the nature of the materials from which they are formulated, which are characterized by light properties such as reflection, refraction and light dispersion in the creation of many deceptive systems Zainab Ahmad Mansour , 1990. P.17..

4- The Impact of the Visual Dazzling in the Interior Design

The art of optical illusion has an importance impact on the visual dazzle of the interior designers, which has enriched their minds with many tricks and ways of visual enjoyment by using different forms and images of optical illusion, which paving the way for them to develop creative artistic visions from simple sources and to create visual aesthetics using modern technology.

Figure (6): A piece of furniture showing the visual optical deception in the use of undulating lines in the design of the outer surface.

The world is living in a surreal dream that resulted from the technological development that spread in the whole world. There is not a day when we do not hear about the invention of a sophisticated technological machine or more sophisticated and intelligent than its predecessors, which contributed greatly and effectively to the development of the art of optical illusion using computer and modern devices and electronic programs of optical illusion.

However, with the increasing progress of technology and means of communication; the special identity of the designer gradually fade, so it is not clear the Arab style of the West Here, and in such case the role of the interior designer is important in maintaining the design identity on the one hand and the corresponding technical progress on the other hand and open the way to reflect on tricks and new visual paintings in the different arts such as photography, sculpture, painting, interior design and architecture.
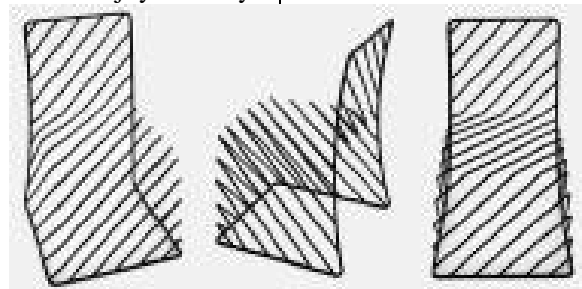
Figure (7): Design a chair using a wire to look like a two-dimensional drawing while it is three-dimensional.

Optical Illusion as a Challenge to Interior Designers

The type and dimension of challenges that facing the art fields in general including the interior design in particular are the important introduction to identify ways to confront them, as the world is changing rapidly and what challenges that resulted from this changing, new opportunities

for achievement have emerged, and the center of these changes was data, communication and the digital revolution, so it is must to unite efforts in order to enter the interior design into the information age, and it is must to use of joint efforts in order to confront the challenges as required of keeping up with scientific and technological development and opening into human civilization and the positive interaction with it, in addition to strengthening the interior designers identity which allows them to be creative in development.

Analysis of the first design of the optical line of the curved line:

This design is based on a linear perspective using curved lines and notes that it increases the sensation of the instantaneous amplitude, which is more conscious than the first arc line. At first glance, one senses a feeling of movement towards the narrower depth as the interior becomes more deeply felt. The design also shows the full contrast between black and white chromatography, which has a greater impact on visual illusion and the sense of flat design as if it were a third dimension.

Figure **(8): Linear perspective using curved lines**

Analysis of the second design of visual geometric deception:

The design based on the color perspective using one color and its gradations. It can be seen that the design adopts the horizontal lines, which give a sense of the lateral width; also it contains the slanted lines towards the center, which inspires movement towards the inward, thus increasing the sense of depth. The design shows that it has a third dimension. The use of blue color, which is a cold color and has a significant impact in the depth and width, where the design is based on the gradient from the light on the boundaries of the design to the dark whenever it was going inward, which confirm of the sense of depth and width.

Analysis of the third design color illusion:

Color and light are the most visual elements in the process of optical illusion; without light, colors do not be seen. As they are the most important influences on which the theory of optical illusion

is based and which are the main elements in all types and methods of deception in interior design.

Figure **(9): Design based on color perspective**

However, it is noted that the use of color helped to create a state of the illusion of depth that is not real and helps color perception of the width and narrowness in the internal spaces through the intensity of color.

Figure (10): color illusion

Results

1. Optical illusion is the extension or evolution of many artistic methods that appeared at different time periods.
2. The employment of mathematical sciences in plastic arts has created a new vision in interior design through the use of digital technology.
3. Optical illusion applications achieve an aesthetic view of interior design.

Recommendations

1. Study the aesthetics of optical illusion in-

depth in the field of interior design.

2. The development of new experimental techniques more sophisticated in the art of optical illusion.

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