Design Techniques for Ambiguity in Historical and Contemporary Interiors

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ABSTRACT

In the process of perceiving, man identifies distinct features of space with the help of different senses such as sight, touch and smell. In the next step, by merging and integrating these different sensory methods with imagination and previous experience, reaching a distinct perception of the space would be possible. In architectural space, all elements and components, colors, forms and shapes, size, scale and proportion, as well as various combinations of these, would affect perception. They address all senses of the observer, and produce different meanings and feelings, such as the more complex feelings of anxiety and fear, drama or security, duality or happiness through space. It can be said that, the intention and purpose of all architectural works is to support and stimulate human feelings and sometimes to take man out of ordinary life. While architectural design may necessarily have a degree of ambiguity, the explicit creation of ambiguous space with the aim of provoking human feelings and generating an instant affective experience of anxiety or the pleasure of discovery, can also be identified in some outstanding design approaches throughout history. It can be construed that, the more unusual or ambiguous features a design offers, the more engaging the space becomes, rendering the perceptual process active.

This qualitative study aims to shed light on certain unconventional design approaches and techniques that would intentionally create diversity in space perception, such as duality, ambiguity and complexity. It seeks to explore how such effects are created in space, and in what ways they affect the readings of the identity of the space and on the generation of feelings and meanings. The study proceeds through literature survey on related concepts and issues, as well as through analysis of relevant examples. It aims

to accumulate a concise range of criteria, tools and techniques that can be derived from theoretical sources as well as from historical and contemporary case studies.

Keywords: Design Approaches and Techniques, Spatial Ambiguity, Complexity, Space Perception, Experience, Design Elements, Interior Space

ÖZ

Mekanın algılanması sürecinde, kullanıcılar, bulundukları mekanın farklı özelliklerini; görme, dokunma ve koku alma gibi farklı duyuların yardımıyla algılamaktadır. Bunun ötesinde, bu farklı duyusal yöntemlerin hayal gücü ve deneyimlerle birleşip bütünleşmesi ile mekanın farklı bir algısına ulaşılır. Mimari mekanlarda, tüm elemanlar, renkler, formlar, şekiller, ölçü, ölçek ve oran, aynı zamanda bunların farklı birleşimleri algıyı etkiler ve böylece kullanıcıya tüm hislerin ulaşması sağlanır. Bunun yanında farklı anlamlar ve hisler de bu birleşimle sağlanabilmektedir. Örneğin, alanda karmaşık kaygı veya korku, dram veya güven, ikilik veya mutluluk hissedilebilmektedir. Bu bağlamda, tüm mimari eserlerin amacı ve niyeti, insan duygularını desteklemek, teşvik etmek ve de insanı sıradan yaşamdan uzaklaştırmaktır. Mimari tasarımın bir dereceye kadar mutlak belirsizliği olsa da, insan duygularını kışkırtmak ve kaygı duygusuyla etkili deneyimi veya keşif zevkini yaratmak amacıyla, belirsiz alan istenerek yaratılabilmektedir. Tarih boyunca bazı seçkin tasarımlarda bu yaklaşımı görmek mümkündür. Bir tasarımın sunduğu sıra dışı veya belirsiz özelliklerin, algı sürecini aktif hale getirerek, mekânın daha ilgi çekici hale gelmesini sağlamaktadır.

Bu çalışma, mekan algısında kasıtlı olarak çeşitlilik yaratacak olan bazı ikilik, belirsizlik ve karmaşıklık hissi gibi alışılmamış tasarım yaklaşımlarına ve tekniklerine ışık tutmayı hedeflemektedir. Bu yaklaşım ve teknikler, mekân kimliğinin okunması veya hislerin ve anlamların yaratılması üzerine olabileceğini ayrıca bu yaratılan etkilerinin neler olabileceği araştırılmıştır yapılan araştırma, ilgili kavram ve konuların literatür taraması ve benzer örneklerin analiziyle kurgulanmıştır. Teorik kaynaklardan,

tarihi ve çağdaş örneklerden yararlanılıp oluşturulan kriterler ve tekniklerle özlü bir ölçüt yelpazesi biriktirmek hedefindedir.

Anahtar Kelimeler: Tasarım Yaklaşımları ve Teknikleri, Mekânsal Belirsizlik, Karmaşıklık, Mekan Algısı, Deneyim, Tasarım Elemanları, İç Mekanlar

DEDICATION

To my beloved family
For their endless love and support…

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INTRODUCTION

1.1 Context, Issues and Orientation of the Study

Architectural space has a profound impact on human experiences. The relations humans and space evolve as an individual perception process based on human incentives and experiences. This relation begins with basic need of man for shelter and continues with giving meaning to the surrounding environment. Fundamentally, the engagement of man with physical space is as a result of tendency and interaction between man and adapted objects in the environment. The emotional interaction of human being with physical space entails differentiation of experience based on understanding of the environment and aspects of immediate experience and specific space related feelings. Various relations between meaningful objects can establish different immediate experiences. Hence, in the field of architecture different design approaches can be applied in order to attempt to this idea. As Pallasmaa expressed,

> In memorable experiences of architecture, space matter and time fuse into one single dimension, into the basic substance of being, that penetrates the consciousness. We identify ourselves with this space, this place, this moment and these dimensions as they become ingredients of our very existence. Architecture is the art of mediation and reconciliation (Pallasmaa, J., 2012, p 72).

The perception of physical environment is an important issue that could dramatically affect the interaction of man with outside world. For instance, a blind person who was blind since birth and suddenly gain sight after an operation, cannot understand the inestimable world which we see it as commonplace. He gets distracted by oppressive

anarchy of shapes and colors and materials, a mash of visual senses which does not have any perceptible relevance with each other leads him to endless confusion. Just with drastic effort he gradually can learn how to diagnose and categorize objects and understand the notion of phrases such as ‘space’ and ‘shape’ (M.von Senden, 1960).

The social sciences achieved to the fact that they can understand space as relative arrangements of human and the objects in the environment. However, if it is accepted that the creation of the spaces is based on the relationship of different objects and their interaction with each other, then the space cannot be imagined without human bodies. Hence, if it is considered that the things perceived through the human body are not only objects but the spaces between objects, it can be assumed that in everyday activities, through this physical perceiving, human beings connect numerous objects together and form the spaces (Martina Löw, 2006).

Furthermore, the human body has a physical presence in the space, it can be observed from outside world and it is following laws of physical world. However, mind is not a matter that exists in physical world, hence, it is not following the mechanical rules. It can be derived from this fact that, human beings live two parallel statuses; one that affect the physical body and the other that affect the mind and mental states. It can be said that, these statuses of man occur through the perceptual experiences of outside world. From this perspective, the process of perceptual experience is a complex process that leads to an awareness of the outside world and the world within man. It is the process that directs to a comprehensive identification of environmental stimuli in order to achieve to meaningful experiences.

Sensory receptors as the fundamental of human perception, receive basic information from the surrounding environment and transmit them to the brain. Development of this perception process ends with the recognition of some of the phenomena of the universe. Hence, despite many psychological and philosophical studies that have been done on the human's mind and perception, still there is not a comprehensive explanation of the relation between brain and conscious experiences as well as the boundary between the real world and the mental world (Oslon, M. H., & Hergenhahn, B. R., 2012). However, the sum of all the interpretations shows that, perceptual experience provides a direct and immediate contact with physical world and in the following instance, it plays a key role in understanding and identifying architectural space. Ultimately, understanding and interpretation of physical world is a very individual process that depends on the man's perception of world, degree of imagination as well as the past experiences in memory. Hence, depending on how human identifies and interacts with the space, he/she will have a different interpretation of that space.

The human mind can be more prosperous in the spaces that allow the imagination to flourish, being joyful, and it is more interested in complex and dramatic spaces. Vice versa, in neutral spaces, it remains inactive. Moreover, if it is considered that, there is no physical space, but its existence has the capability to accommodate physical and spiritual subjects, then the imaginations, thoughts and dreams would grow in the spaces which provide ambiguous and mysterious atmosphere in order to extremely manipulate visual perception and generate intense senses and emotions.

Design for ambiguity is about manipulating spatial features towards interesting and complex effects. It can be argued that the more unconventional or unusual features a design offers, the more engaging the space and the more active perception become. Ambiguity can be considered as a positive value that can turn an ordinary space to an interesting, unusual and charming place that provokes human senses and provides unusual spatial experiences and deeper space engagement of man with that space.

1.2 Problem Statement

Today, there is a new sense of beauty that is developing in the field of architecture which is derived from a very complex, ambiguous spirit of the nature. Its reflection in the realm of architecture is the replacement static and conventional forms with new and complex designs. Accordingly, it can be interpreted that in all architectural works there is a degree of complexity, ambiguity and manipulation of perception. However ambiguity and complexity work along a very delicate boundary that which differentiates from confusion, chaos and irregularity. The definition of ambiguity and complexity as positive design value is based on the equilibrium between different components and systems of order, and the legibility of such diverse elements related through various different principles. Design for ambiguity aims to produce unconventional striking places, while the main aim of some of such extreme architectural works is to take man out of everyday routine and chaos. It aims to provide distinct experiences of excitement through manipulating of perception by creating enigmatic, abnormal and complex atmospheres. Meanwhile, the significant intention of such designs is to create complex and ambiguous architectural spaces while respecting to the balance between order and complexity.

As it is mentioned, every design intervention is oriented towards generating a particular experience or perception. However, the study of approaches for ambiguity is an interesting and challenging issue that allows gaining insight into extreme cases of manipulation of perception.

Accordingly, there are many studies which illustrate the complexity in the realm of architecture. However ambiguity appears to be less explored as design guidelines and as possible effects in experience of interior space. There is lack of effective studies on the issue of designed manipulation of perception and the techniques that are used in order to create ambiguous spaces, atmospheres and effects, as well as its influence on space identity in the field of interior architecture. Hence, it can be construed that, 'Design techniques for ambiguity' refers to those approaches and techniques which bear potential to manipulate, alter, or even deceive perception, but also stimulate active engagement with space.

1.3 Aims and Objectives

The main intention of the study is to explore different perspectives and cases so as to find out and establish a concise list of design tools that bear potential to manipulate perception. It is based on a theoretical research on human perception from philosophical and architectural point of view, as well as on the descriptive analysis of a series of ambiguous 'extreme' spatial designs.

The theoretical framework aims to identify key notions, features and issues of interior space as well as elements and components that are correlated with human perception, and point to the role of spatial ambiguity in perception of space.

In the context of case studies, the study aims to attain this goal through a brief survey on a range of extraordinary cases, and analyze respective design approaches and their effects on human perception so as to investigate how these employ various design tools to create ambiguity in architectural spaces. The current research's purpose is to illustrate spatial ambiguity by way of analysis of some selected spcific historical examples as well as study of a range of contemporary cases, such as the works of the design professional Philippe Starck. This will also enrich and conretise the range of design tools and techniques.

It is expected that the result of the research may help clarify the borders between "normal" and "ambiguous", 'known' and 'surprising' in order to help to figure out design techniques, tools and/or criteria that draw attention to space and ensure intense engagement with space.

1.4 Research Questions

This study intends to address and seek answers to the following research questions:

- What might be the principal characteristics of ambiguity in architectural space that can be derived from theoretical sources?
- What would be the principal features of space that may produce altered space perceptions?
- What might be the principal design techniques for ambiguity, and how are they used to manipulate space perception?
- What might be the experiential potentials of ambiguity in interior space?

1.5 Research Methodology

This study is a qualitative research that involves three phases:

The first phase starts with a literature survey that is derived from diverse literature sources, books and articles. Literature review is oriented and expected to yield data that, help to find out the principles of unconventional design approaches and techniques, and/or dominant effects that are used to create ambiguous space identity. This is also relevant to the study and understanding of the mechanisms of conscious and unconscious experiences as well as mechanism of human perception, with respect to ambiguity as positive value in design and in experience.

In the second phase, the outcome of first phase is presented as an accumulated list of design techniques/criteria for manipulating perception with regard to ambiguity. Furthermore, this list of techniques is used in the third phase of research by way of analyzing of relevant examples.

The third phase includes the study of relevant examples/cases that are selected from theoretical sources as well as the cases that are taken from internet sample collections. One section of this phase includes special cases of architectural works from different historical periods, showing how space design has manipulated perception, demonstrating that ambiguity has been a valid value of design in history as well. The second section involves the collection and analysis of contemporary design cases, choosing the cases that provide extreme spatial experiences, ambiguity or even misperception. This section also focuses on the works of Philippe Starck as one of the current pioneers in designing ambigious and complex interior architectural spaces.

Hence in order to achieve to the aim of the research, several case studies of historical and contemporary interiors showing unconventional approaches, are used and analyzed according to the obtain and enrich the list of design criteria, tools and techniques in order to find out and understand how perception can be manipulated.

The outcomes of these phases will illuminate approaches for ambiguity by discussing and classifying design interventions and eventually lead to certain conclusions about effects of design interventions for spatial ambiguity on perception and space identity.

1.6 Outline of the Study

This study is proposed in five chapters that can be summarized as follows:

Chapter one: The first section of the study, introduces the main issues and context of the subject, the definition of the research problem, the main aim of the research, the research methodology, and potential and limitation of the study. It also includes the outline of the chapters.

Chapter two: This chapter is oriented towards a theoretical framework, and intends to shed light on the definition of immediate experience, perception and its mechanism in human mind from architectural and philosophical point of view.

Chapter three: This chapter study the elements and components of interior space and their correlations, and based on this framework, the chapter also discusses unconventional and conventional approaches in the field of architecture, so as to derive a list of design criteria and/or techniques for ambiguity.

Chapter four: This chapter discusses a collection of relevant examples, and analyzes the historical and contemporary interiors in view of ambiguity according to the list of criteria that is derived from the previous chapter as well as the method that is used to response to the defined research problem.

Chapter five: The last section includes the summary of the findings of this study, and presents conclusions that can be derived from this study, as well as introduces issues and recommendations for further research.

1.7 Potentials and Limitations of the Study

One of the limitations of the present study is related to the theoretical framework. While the subject of the human perception is investigated from the architectural and philosophical perspective, this study is not an all-inclusive one, and focuses on space perception through extreme design cases. In addition, it should be mentioned that the mechanisms in analyzing human perception in terms of environmental psychology is not fully covered in the current research and this issue may be a focus for further research.

On the other hand, the selection of case studies is oriented towards illustrating the main idea of correlations between manipulative design techniques and possibilities of perception and experience of space. Hence this research is necessarily limited as it focuses only on a selection of cases - those with extraordinary and astonishing features in historical and contemporary interiors. Further studies may find many similar and different cases, and identify still other prominent techniques.

The principal potential of this study is in that it explores an architectural concept – namely ambiguity – in relation to perception and experience of interior space, as well as deliberate design approach. It thereby contributes to identifying some of the mechanisms, tools and techniques of ambiguity as a positive spatial value.

Chapter 2

TOWARDS A THEORETICAL FRAMEWORK: KEY CONCEPTS AS GROUNDS FOR UNDERSTANDING AMBIGUITY IN DESIGN AND EXPERIENCE

2.1 The Concept of 'Space' in Philosophy

So far, several theories have been proposed about 'space' and its definition. Despite the common understanding of the term, it seems that there is no absolute consensus about the definition of space in academic debates. The ancient concept of space, was related to the Egyptian and Indian civilizations, in which the world had a structural unity (Jammer, M., 2013). Furthermore, space was also considered as a systematic phenomenon, which was a kind of mythical form that arose from human imagination. Lately, two intellectual attitudes were formed around the explanation of space; one is founded on Plato's idea which defines space as a constant, indestructible universe that everything was going to be placed within this space. The other one is Aristotle's definition where he defines space as a 'place' that could be considered as a part of the universal space. He expounds the space as a geometrical content and expresses it in geometric shapes. In contrast, Aristotle consider the space as a vacuum ready to be filled with things, a vacant lot which in order to be exist, it should be closed around, therefore there is always an end to it (Jammer, M., 2013). Giordano Bruno criticized Aristotle's explanation of space and claimed that,

> For our part, we do no posit the [existence] of an empty space, in the sense that there would be nothing in it that exists in act, but [we affirm] at list that

> space is that which is necessarily contained sometimes one body, sometimes another, […] Indeed, it is our opinion that it is an infinite being, and there exists nothing within which there is not something. So then, we define the void as space or boundary within which bodies exist; but it is not all that which is nothing in it (Vermeir, K., & Regier, J., 2016- p 118).

According to Bruno's definition, space is understood through the things inside and it converts to surrounding environment or space between the things. He believed that Space is a set of relationships between objects and it is not necessary to be enclosed thus it can be infinite (Vermeir, K., & Regier, J., 2016)

In the late middle Ages and the Renaissance, the foundations of Euclidean principles began to reemerge. In the art works, Judo played an important role in the evolution of the concept of space, in which he created a new way of organizing and presenting space with the use of Euclidean perspective (Jammer, M., 2013). During the Renaissance period, Plato's definition was completed by definition of Newton, such as the concept of three-dimensional space, which consisting of bodies and events in a four-dimensional space-time (Norberg-Schulz, C. - 1971).

In the seventeenth and eighteenth centuries, Baroque and Renaissance empiricism created a more dynamic concept of space, which was more complicated and organized. After the Renaissance, the metaphysical concepts of space were gradually separated from the physical meanings of the space, and more attention was paid to its physical aspects, and in the field of science, the concept of space was more focused. The philosophical aspects of concept of space are rooted in the theories of Newton and Descartes (Norberg-Schulz, C. - 1971).

In twentieth century, the concept of space gradually started to be discussed in the social sciences. Henri Lefebvre describes modern architecture as an abstract notion of space –homogeneous, fragmented and at the same time, geometrical and visual. He describes space as a social and political product, and the provision of social and psychological contexts for space is the most direct approach of modern sciences. Lefebvre develops a theory which would create a unification between three levels of space: physical, mental, and social levels and he considers form, function and structure as the main features of space. (Lefebvre, H., & Nicholson-Smith, D., 1991).

One of the main issues in creation of physical space is the existence of man within the space. Man lives in architectural space, and thinks about space and tries to create the space. People's relationship with architectural space is far more complex than it is with other works of art. It can be said that, people experience architectural space both practically – as lived, and inwardly. Another issue that has to be considered is the concept of time and its relation with space. Different from art, in architecture where the continuity of time is latent in this manner, experience occurs by the movement of human within the space. Therefore, architecture in its physical meaning, can be lived and traversed. Hence in perceiving architectural space, a viewer needs to move inside the space in order to observe it from different directions; it is obvious that this movement takes time. Thus time becomes the fourth dimension in the process of space perception (Giedion, S. - 1967).

2.2 The Concept of 'Space' in Architecture

The notion of 'space' is one of the fundamental concepts in architecture, and many architects and thinkers of different periods have presented various definitions and conceptions on this issue. It can be said that, architecture is a spatial artwork that

expresses itself through space. Hence, the nominal and visual aspects of architecture are the most specific features of space. As in Bruno's description, architecture is the art of creating space and "it is essential for both the definition and appreciation of architecture" (Zevi, B., Gendel, M., & Barry, J. A., 1957).

The most important feature of modern architecture is the introduction of a new definition for the concept of space. According to this concept, space is a three dimensional context in which objects are placed within it and have relative orientation and position with each other. It can be interpreted that, space as the essence of every architectural work has no definite shape and its visual form, its dimensions, nature and its quality of light, are entirely depend on its limitations, which are defined by the elements and components that creating the general form (Norberg-Schulz, C. - 1971). Accordingly when space begins to be enclosed and organized by these elements, architecture starts to be created. Francis Ching believes that the leaner, planar and volumetric elements are the main components in architecture. Hence in defining space in most architectural works there are two factors of forms and spaces that help create differences: "These differences reflect in a sense, the degree of importance of these forms and spaces and the functional, formal and symbolic roles they play in their organization" (Ching, F. D., 2014, p 358).

In the book *Existence, Space & Architecture*, Norberg-Schultz, mentions 5 concepts of space that describe different features of architectural space; the 'Physical environment', the 'natural' or 'biological' environment, where the immediate human perception and orientation happens, the concept of 'cognitive space' that is related to practical understanding of space, the constant image of infinite universe in human

mind, and ‘logical space’ that the rational relationships between different things are created. ‘Architectural space’ is a humanly designed and expressive artistic space that has a close relation with these five concepts. In this classification, it can be observed that issues gradually tend to change from objective to subjective matters. Norberg-Schultz, considers the space as an arena where the universe starts to emerge within it and can be defined only for human being, it is something internal and not visible from the outside (Norberg-Schulz, C. - 1971).

Consequently, space is a primary form and structure that fills with the objects. Space allows the people within to interact with the objects and identify their shape, value, and the relation between them. However, objects that are placed in space, are not only identified by perceiving their represented properties, but they become meaningful by the actions exerted on them. The outcome of this action is the generation of an image that is the origin of existence of objects in human mind and constitute of spatial experiences. Norberg-Schulz’s definition of space-oriented experiences is that space presents "a dimension of human existence and not merely a dimension of thought and perception, essential for orientation and action in the environment." So, this space-oriented experiences are based on psychological processes and recognition that established through perception (Norberg-Schulz, C. - 1971).

Therefore, it can be said that, what makes space different from a vacant volume is the quality of that space and all the related objects within it. On the other hand, the quality of space can only be achieved and identified through human perception. Thus, what transforms the architectural space from a mere volume to a meaningful context is the presence of human being and his/her understanding and interpretation of space that is

based on the personal awareness, human experiences and cultural backgrounds (the author in an unpublished article for the course ARCH 524).

2.3 Existence and Architectural Space

In general framework of thinking, the main aim of architectural space is to provide maximum functionality, tranquility and aesthetic values for human life. However, there is no doubt that, beyond its physical values, architecture has a profound relation with human's existential realm and mental issues. Architectural space is not only considered as a pure shelter that prepares safety and comfort, but it is a mediator that connect the outside world to human consciousness. In addition, architecture envelopes, is a haven for man's creative mind that help to blossom imagination, create memories, experiences and structuring different interpretation of physical world. It seeks to acknowledge that, the main role of architectural works is to concentrate on mental aspects and the nature of existence, as Jean Paul Sartre stressed: "Essences and facts are incommensurable, and one who begins his inquiry with facts will never arrive at essences. […] understanding is not a quality coming to human reality from the outside, it is its characteristic way of existing" (Sartre, J. P., 2000, p 9). Hence, the real essence of every work of architecture is not derived from theoretical thinking but rather it is an outcome of man's desire for self-consciousness and cognition of the world outside (Bhatt, R. (Ed.), 2013).

There is no doubt that, architecture provokes and stimulates emotional reactions. In the words of Vitruvius, "Architecture is the substance of delight" (Pollio, V., 1914, p 53). The emotional responses that arise through the experience of architectural space come about as the result of perceiving color, texture, light, material and sounds of space. Hence, when an observer enters to the space, sensory experiences generate and

trigger some feelings that are the outcome of perception of general features that space carries (Bille, M., & Sorensen, T. F. (Eds.), 2016).

An early study on the issue of human senses in architecture that brought phenomenology to contemporary architectural debates is the series of articles with the title, *Question of Perception* by Steven Holl, Juhani Pallasmaa and Alberto Pérez-Gómez, published in 1994. This article sheds light on the importance of imagination, human experience and the notion of existence in architecture. In this book, Alberto Perez-Gomez considered architecture as a poetic phenomenon that explains itself through its pure existence without any mediator. Afterward, Pallasmaa challenges the old vision of architectural experience that emphasized the role of eye in the process of perception. He stresses the importance of a multi-sensory approach in the matter of experience and presents the idea of non-visual senses that lead man into space and bring him the sense of devotion. Steven Holl, starts the article enlarging "sensitized consciousness" and points out the essence of architecture as the medium that generates all the senses by letting them to freely flow in the space (Holl, S., Pallasmaa, J., & Gómez, A. P., 2006).

The analogy among poetry and architecture can help illuminate some of the operations of architecture. If it is believed that poetry takes abstraction to reality, then it can be derived that architecture is a transition from abstraction to reality. Architecture converts transcendental feelings that lie behind the lines - to a tangible space. As different people can have different interpretations of a poem, the audiences of an architectural work can also experience different feelings in a physical space. The rhythms in poetry can be reflected in space through generating a harmonic dancing of

lines that are humming the song of life. As Gaston Bachelard stressed: "… we cover the universe with drawings we have lived. These drawings need not be exact. They need only to be totalized on the mod of our inner space. […] Space calls for action, and before action, the imagination is at work" (Bachelard, G., 1994, p 45).

One of the fundamental common factors between poetry and architecture is the factor of transparency. It is one of the main principles of existence and that is, permanent movement and evolution from materiality to spirituality. It can be observed that, throughout the history of architecture, gradually gave more emphasis to spatiality of space, in other words, over time, transparency in architecture became more important. Heidegger describes architecture a true, real and visible art-work that connects space to human existence. Architecture is the poet of worthy spaces that are offered to human beings in order to create them a better life (Leach, N. (1997).

It is possible to conceive that, architecture is not only a structure that is constructing physical world, moreover, it is a place that forms the inner world of human beings. As a consequence, the poetic features of architecture that consist of memories, existence, and all human based feelings and interpretations, can solely be understood through insight, empathy and individual interaction with architectural space. This perspective construes that the architectural space is meaningful only when it emerges with human existence and the dweller's self-consciousness (an unpublished article for the course ARCH 524).

2.4 Human Relations with Architectural Space

Since the experience of architecture is an all-encompassing human experience and is considered as a container for its contents, then there is an immediate relationship

between man and his environment. This process is developed and is based on specific attributes and characteristics that space and perceiver carry, and could have a profound effect on the identity of architectural space. Therefore, people establish and maintain a continuous interactive relationship with space: they change the space and are being changed by space. They move and act within space and through this movement give meaning to that space, they convert different components of space into meaningful indications or even try to enhance meaningful indication of space (Alexander, C., 1979).

As mentioned, humans have a profound attachment to space which comes from the need for understanding space and creating (social) relations. Human beings continuously attempt to create a relationship with objects and other people. So that physiologically they try to reconcile and adapt with objects around. Since all human activities are done within space, it can be said that space is not only an arena for communication between people and between them with the environment. It is also a comprehensive form of any communication and interaction that helps generate personal identity of individuals as well as the identity of space. Spatial identity is part of the infrastructure of the individual personality of man and it is as the result of his general knowledge of the physical world (Gupta, A., & Ferguson, J., 1992).

Harold Proshansky (1983) emphasized the importance of a balanced relationship between individual spatial identity and the characteristics of the external environment. He defined “place-identity” as man’s interaction with place under the consideration of the concept of ‘self’. In the definition of Proshansky, place-identity is a “pot-pourri of memories, conceptions, interpretations, ideas, and related feelings about specific

physical settings, as well as types of settings" (Proshansky, H. M., Fabian, A. K., & Kaminoff, R., 1983). In this regard, space will be meaningful and identifiable for people when they can consider both 'space' and 'self' as independent beings which interact with each other.

According to Louis I. Kahn space is not only a living 'soul' but also it is an expression of human's need for 'being-in-the-world'. Kahn describes 'ego' as a link between architecture and what is considered as the essence of architecture. He defines architecture as a place where all human desires and ambitions are fulfilled (Kahn, L. I. – 2001).

In the book, *"Architecture and the Crisis of Modern Science",* Alberto Pérez-Gómez defines the Architecture which is based on the human sense and experiences of a place: "[The human body] is the locus of all formulations about the world; it not only occupies space and time but consists of spatiality and temporality… its experience is therefore "geometrical". The [extension of this] beyond the bodies spatiality constitutes the thrust of architectural design, the Creation of an order resonant with the body's own" (Gómez, A. P. – 1983, p 3).

Martin Heidegger is one of the pioneers that emphasize the fundamental existential relation between human body and physical space. He pointed out the unification of building's behavior and man's thought: "When we speak of man and space, it sounds as though man stood on one side, space on the other. Yet space is not something that faces man. It is neither an external object nor an inner experience. It is not that there are men, and over and above the space […]" (Heidegger, M., 1971, p 154).

There is no doubt that the existence of human being is not separated from space. Yet, furthermore, it is in a close relationship with human consciousness, in a way that a 'lived space' could encompass meanings and special features remaining from the people who lived in that space. Thus, space is not something passive, rather, it can bring joy or cause grief and anxiety, give power or attenuates, cause unity or separation and could be insecure or provide safety. Hence, the relation between man and architectural space is either amicable or destructive (Pallasmaa, J., 2013).

Steven Holl emphasizes the role of sensory perceptions on perceiving and understanding of environment and creation of mental images in memory of the audience. He explains architecture as an art work that "more fully than other forms, engages the immediacy of our sensory perceptions". He believes that "architecture, by unifying foreground, middle ground and distant views, tie perspective to detail and material to space" (Holl, S., Pallasmaa, J., & Gómez, A. P., 2006, p 41).

Beyond the physical aspects of building, there are memories of place which are derived from integration of complicated functions and simple physical forms, an experience that remains in memory. As Zumthor (1999) illustrated, this memory of a place is something which develops, saying: "There was once a time when I experienced architecture without even thinking about it" and when he describes "particular door handle" that seems "like a special sign of entry into a world of different moods and smells" (Zumthor, P. - 1999). This relation between human body, environment, and imagination is frequently missing from today's architectural spaces, and this prevents man's ability to experience and remember a place. However with respect to the creative intention in architecture Zumthor mentioned: "The architect must look for

rational constructions and forms for edges and joints, for the points where surfaces intersect and different materials meet. These formal details determine the sensitive transitions within the larger proportion of the building" (Zumthor, P. – 1999, p 16). Accordingly, architecture integrates the qualitative aspects, sensory perception and design features in respect of human being and his/her existence. Architecture brings together our picture of ideal life and our identity into the space, to create a place which we can experience and always remember.

2.4.1 Mechanisms of Sensory Perception

Senses are the most essential elements that connect human beings to the outside world. They make men aware of the immediate world and the existence of man within this world. The Rationalist philosophers such as Rene Descartes believed that these senses cannot be a strong bases for the awareness of the outside world. In contrast, the Empiricist such as David Hume believed that, human mind and various contents within the mind comes from senses and the information that senses gather from the outside world (Smith, B. C., 2013).

Hume (1978), divided human perception into two kind, *impression* that comes from feelings and desires of man, and *ideas* that are outcome of these impressions in thoughts. He differentiated impression into *impressions of sensation* that include feelings that derived from human senses such as pain, joy and etc., and *impressions of reflection* such as emotions, ambition and sensations that generate in reaction to ideas. Hume, considers the origins of all human perceptions in experience and the perception of emotional phenomena and does not recognize any kind of perception that is not the outcome of sensory experience (Hume, D., 1978).

Due to the fact that the five senses are the only way of man's relationship with the outside world, especially in a period that reality and virtuality have begun to merge and technology has arrived at a point that easily deceive human's five senses, understanding the mechanism of senses in the process of perception becomes a very important issue. Hence, it can be said that perception is the process of organizing and interpreting sensory information in order to develop a meaningful understanding of the environment (Tye, M. - 1997).

Combination of different sensory perceptions caused by various environmental factors, leads to creation of the concept of space. In terms of brain mechanisms, perceptual categorization is the result of interactions between human senses and motor systems which is recognizable in a dynamic structure of both sensory data and creation of meaning. However it can be said that without memory system, perceptual categorization and conceptualization cannot reconcile and transfer the meanings (Edelman, G. M. - 2004). Franz Brentano claims, mental statuses of human beings do not actually exist, however they have an "intentional existence" in mind. Meanwhile, the human senses are considered as the main interface between man and the universe. As soon as he/she starts to see or touch or smell or even hear or taste the object, the image of the object, based on information that were received from the senses, forms in the mind. Perception, interprets the information that was gathered by the sensory system and gives meaning to them (Brentano, F., 2012). According to Pallasmaa, architecture relies on human thought, perception and intellectual creation by using all sensory perceptions. "It is evident that 'life-enhancing' architecture has to address all the senses simultaneously and fuse our image of self with our experience of the world" (Pallasmaa, J. - 2012).

2.4.2 The Concept of 'Immediate Experience'

Conceptually, experience is most relevant to human sensory perception. During the experience of built space, human's sensory perception and man's consciousness as well as pre-unconscious, lead to a series of experience within the space and record them in memory. Bergson claimed that, there are two types of human experiences; immediate experience that directly perceive the stimuli, it is subjective and relates to our immediate sensory system. However mediate experience gathers information by measuring and understanding stimuli, an objective process that is based on immediate perception. A person that says "I hear sound of a bird" actually hear only the sound. The sound itself is perceived immediately however, the causes of the sound is not what he immediately perceive, it is perceived mediately. The person may not see the bird at all however recognize the bird only from the sound of the bird (Bergson, H., & Pogson, F. L. (2001).

Pallasmaa, in the book, *The embodied image: imagination and imagery in architecture*, in terms of quality, considered memory and imagination as parts of an equal value for human experience. He mentions that architectural experience is a multi-sensory experience in which, qualities of material, space and scale are measured not only with eyes, but with ears, nose, skin, language, skeleton and muscles (Pallasmaa, J. - 2011).

In the other hand, George Berkeley, shows that human's five senses are separated from each other, and there is no sensory connection between them. Therefore, what is perceived by sight does not have same quality of sound or smell or touch. However human being still immediately perceives something by sound, and mediately perceives

it by sight or any other senses. Human beings have an ability to combine separate senses and bring out something new – senses are mutually complementary. Despite to the mediate objects which are done by mind, the immediate objects are not done in the same manner. The mediate ones are as a result of what human mind gathered by immediate sensory perception (Pappas, G. S. - 1987). The term ‘sense of place’ could be defined as a ‘feeling of perception’, ‘a symbol’ that indicates specific place which carries distinctive features that some geographic places have and some do not. According to Tuan (2001), space could transform to the place with knowledge that is gained by experiences. People recognize the ‘sense of place’ through; ‘experience-express-imagine-know the place in which they live’. (Qazimi, S., p. 307, 2014) The physical existence of architectural spaces represents defined location where they have ability to provide valuable sense of place.

2.4.3 Body and Perception

The perception of man from the outside world and his spiritual qualities has long been studied and discussed by different philosophers. Also the relationship between mind and body is one of the issues that has come to the attention of philosophers and thinkers with the onset of philosophical thinking and human intention of self-knowledge.

There are three classification of theories for the concept of perception and mind. In the first place the “dualist” theory stated that the mind and body are separate things. They believed that human being is a combination of materialistic ‘body’ and non-materialistic ‘mind’. In the second place “materialist” theory argued that man is completely made up of something physical, they had materialistic interpretation of mind. In the third place, “attribute” theoty, rejected both Dualism and Materialism

theories. According to this theory, despite the physical body of man, there is a non-physical status of ‘mind’ that is superior to material ones.

In this regard, with Descartes' philosophy, this issue became the focus of attention. Descartes’s theory of “dualism” is based on the intrinsic contradiction between mind and body. By distinguishing between these two ‘essences’, he also differentiated the two philosophical schools of ‘empiricism’ and ‘rationalism’. Later, Descartes, established the argument of ‘Cogito’ that explains the existence of ego. In the words of Descartes, “I find here that thought is an attribute that belongs to me; it alone cannot be separated from me. I am, I exist, that is certain … I know that I exist, and I inquire what I am, I whom I know to exist.” Under the principles of Descartes, the mind and thought are inseparable, and basically the mind is nothing but thought, and there is no truth beyond it, however he insists on the idea that, none of the mind and body can directly affect the each other (Descartes, R., 1993). One of the consequences deriving from Descartes' philosophy, and in particular from its theory of “dualism”, is the expansion of materialism which seeks to confront this theory and formulate other explanations.

In the materialistic notion of mind, every attribute of sensory experience is a result of action and reaction of electrochemical cells within the brain in return to stimulation from the sense organs. Accordingly, the mental experience is directly related to the physical brain and any mental changes could cause alterations in brain status (Smythies, J. R., 1994).

Gilbert Ryle (1949), criticizing the historical theory of body-mind that differs "physical existence" which is a matter based state that deals with time and space from "mental existence" that deals with time and it is based on conciseness. Ryle claimed that, mind can only examined through the behaviors that can be studied scientifically and rationally. Accordingly, for any mental event occurring in an organism, there is a specific status in brain that provoke specific mental state. Based on this idea, mental status and brain status are two different interpretation of one fact, although, in language they are expressed in two ways (Ryle, G., 1984). However, this question still remained - that if human beings can only recognize what would be occurring inside the mind through the self-consciousness, then how the external physical world that is perceived through mental experience, can be meaningful and understandable.

To response to this question, Kant (1781) posed the concept of "direct realism" that refers to the idea of immediate perception and "indirect realism" that explains as the picture of the real objects reflected in the brain. He argued that, there are two different real worlds; the "nouminal" and the "phenomenal" worlds. The first one is the physical world outside the body and through the pure source of light it reflects in the eye. The second one is the replica of the real world that perceives through sense organs and reflects in the internal consciousness of human brain. Hence, the world outside is not the actual world but it is the reflection of itself in the mind and can have a different interpretation based on each observer (figure 1). According to Kant, the world of mind and the real world can achieve to cognition and wisdom only if they can communicate and interact with each other (Kant, I., 1998).

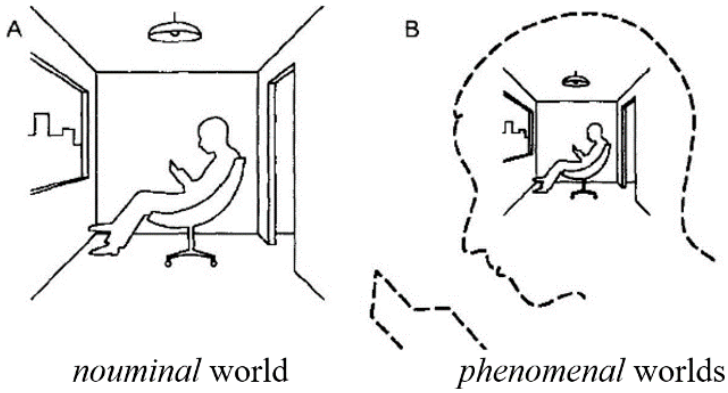

Figure 1: “nouminal” and “phenomenal” worlds (URL 1)

2.4.4 Phenomenological Theory of Perception

Several studies over the centuries challenged the theories of human perception and posed the question of whether the observed world is real and belongs to the idea of “direct realism” or it is an “indirect realism” that is reflected as a picture in the consciousness which is transmitted through the human senses to the brain. This issue is one of the significant concerns of the nature of perception through recent centuries (Michell, J, 2010).

The Phenomenological theory which addresses perceptual experience as an “intentional” phenomena, is in contrasts with rational materialistic theory that deals with scientific, and mechanical aspects of perception. The Phenomenological approach posed a new definition to the problem of perception; in this approach, the perception of the ‘outer’ world is not only a copy of the existing objects, but rather it is a harmonious combination of visible and invisible parts of objects that create a meaningful understanding of external world (Lehar, S. M., 2003).

Franz Brentano (2012), in the book, *Psychology from an empirical standpoint*, presented the concept of “intentionality” and classified mental process of perception

into three levels: “Judgement” that refers to the action of accepting or rejecting an object or a mental status, “Presentation” that applies to all physical objects that appear to observer and it is the necessity of conscious perception, and “Phenomena of interest” that refers to all desires, decisions and determinations’. He emphasizes that all these three levels are necessarily conscious and they are based on the “intentional” existence of an object within them. In other words, all the acceptance, rejection, wishing and the other mental status can belong to one object (Brentano, F., 2012).

Phenomenological practice also mentions that, man doesn’t perceive the physical objects as a single two dimensional visible surface, rather the objects are perceived as three dimensional volumes in the extend of their invisible components. In the other words, the objects are perceived not only by their color, shape, size but by their weight, content, relations with the surrounding objects and etc. Therefore it can be said that, perception of the real world leads to the development of a three dimensional volumetric mental images (Lehar, S. M., 2003).

Mental images derive their essential features from perception of reality. Hence, in fact, there are many similarities between mental ‘image’ and ‘perception’ of an object. When an external object perceived, the internal replica of that object starts to generate in the brain. The mental image therefore, can be explained as the creation process of internal existence that carries similar physical features of the external object. However, it is necessary to mention that, the generation of a mental image does not necessarily always need immediate perception of the external object (Borst, G., & Kosslyn, S. M., 2008).

Amodal Perception

Albert Michotte, introduced the notion of "Amodal" perception as the reason for three dimensional thought of mind. This notion indicates that a three dimensional object can be perceived as a single whole in the absence of its physical components. Amodal image is related to the immediate experience of physical object that automatically occurs through the mental image of three dimensional stimulus based on its past experience in the mind. Amadol perception is the linkage between perceptual and cognitive experience. Yet it is the very first step of mental imagery that creates solidarity between immediate experience of real world and imagination of human mind (Figure 2).

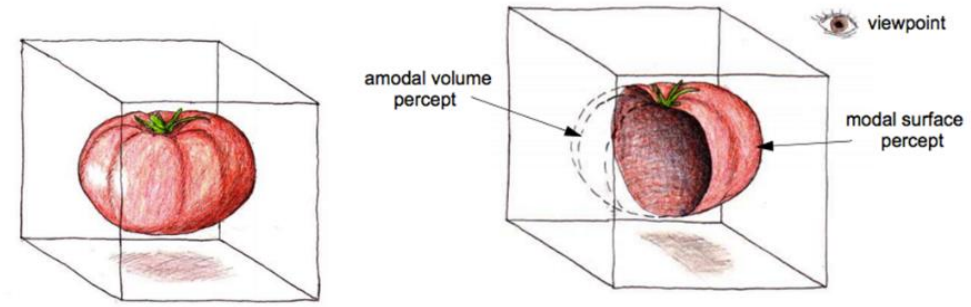

Figure 2: Concept of Amodal perception (URL 2)

According to the concept of Amodal perception, that part of the world which is out of our view and is behind the head, is a spatial volume that is perceived in an Amodal manner. Therefore, the hidden spatial world behind the head is composed of several mental images, extracted from past experience of man from the now-hidden objects. That is why people easily can reach to the objects that are placed on the surface behind them, without the needing to see the exact location of those objects ((Michotte, A., 2017).

As it is mentioned before, the perceptual world is more than a mere copy of the real world. However, in order to be a meaningful delegation of physical world, it is also necessary to present the rules and laws of the physical world. Hence, it is not only the visual properties of objects that are being perceived, but also the essential physical laws that the objects follow could be perceived by the observer. Understanding the specific properties of perceived object can help to observer to identify and predict their behavior under different circumstances. Accordingly it can be derived that the mental images of the physical world can be manipulated through voluntary changes of physical properties of objects. In order to have a clear mental image it is necessary to have an explicit stimulus, otherwise the mental image would become an illusion. As it is seen in figure 3.A, the invisible part of the object can be simply completed by straightforward following of the lines and the similarity between the hidden parts and the visible sections. However in figure 3.B, the combination of lines defining the object is more ambiguous in a way that the continuity of the edges of the object, and its definition, is uncertain (Lehar, S. M., 2003).

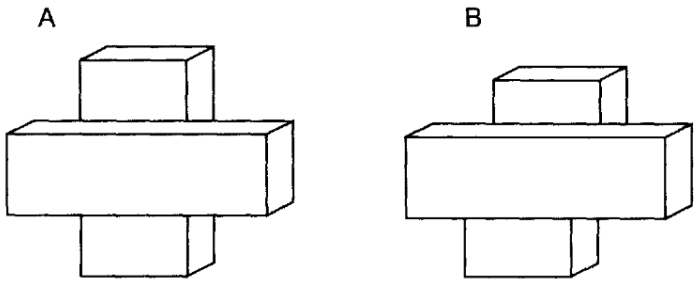

Figure 3: A, B- Clear and ambiguous Amodal perception (Lehar, S. M., 2003)

It is possible to interpret from this that, architecture would generate an intricate feelings such as different experiences of motion, texture, harmony, color, form, light and shadow, and through the perception of these factors, they become the tools for

immediate measuring and understanding the outside world. Hence in order to understand how perception could be manipulated it is necessary to look at the principles, elements and components of design and their composition and relations as well as the principles of visual perception such as principles of Gestalt theory.

2.4.5 Gestalt Theories of Perception

The Gestalt Movement led by its main exponents, Max Wertheimer (1880 – 1943), Kurt Koffka (1886 – 1941) and Wolfgang Köhler (1887 – 1967) was developed in Germany in the nineteenth century and had "a dominating influence on German psychology" (Murray, David J., 1995).

This movement generally concentrated on the effect on human perception and the relations and interaction of grouped objects and the correlations of objects of different sizes and forms with each other and surrounding environment. The theory based on the tendency of visual perception to group objects in organizations, and assess the relationships between objects and their environment. In the field of perception, Gestalt theory manifested that, perception is the result of intricate interaction in brain through different stimuli. Accordingly, perception is generated through a combination of four elements: attention, feelings, past experiences and meaning. The 'whole' (group) hence, is always perceived before its separate components. After the perception of the whole, the perception of the components can be easily achieved. As Wertheimer (1938) mentioned in his manifesto: "There are wholes, the behavior of which is not determined by that of their individual elements, but where the part-processes are themselves determined by the intrinsic nature of the whole. It is the hope of Gestalt to determine the nature of such wholes." Thus, it can be said that, human perception tend to perceive separate objects within their surrounding (Ellis, W. D., (2013).

In the article '*Physical Gestalten,* Köhler (1920) stressed on "the visual field", pointed out that within every 'visual field' an observer can differentiate thousands of colors, tones, textures, but that the observer does not perceive each of these as separate elements, instead he/she connects different elements and objects of the visual field and arranges them into a group of elements to perceive them as a whole (Ellis, W. D., (2013).

Gestalt Principles

Gestalt psychologists believe that 'Gestalt' has a special impression that organizes issues and matters in the certain forms and structures and establish the essential basis for visual perception and insight.

In 1923, Wertheimer propounded the idea of "organization of perceptual forms" in which he generated the 'laws of Gestalt', showing that objects tend be perceived not individually but as a part of a whole organization and explaining why and how this occurs.

Several laws as principles are elaborated in this theory, and served in bellow:

- **Proximity Principle**

  According to the law of proximity objects that are near to each other tend to be perceived as congregated into the group that located close to them (Figure 4).

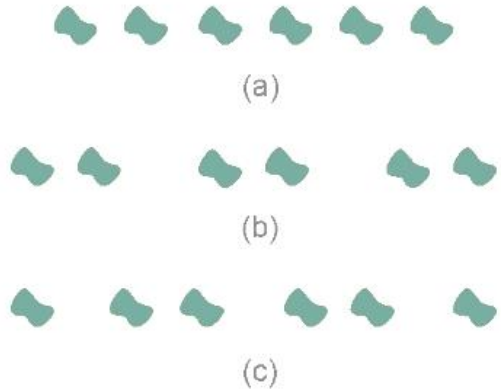

Figure 4: Proximity principle (Todorovic, D., 2008)

- **Common Fate Principle**

  This law illustrates that if the objects move (orientation, direction) together, then they will tend to be perceived as a single group (Figure 5).

Figure 5: Common fate principle (Todorovic, D., 2008)

- **Principle of Similarity**

  According to this law objects that have similar attributes such as color, shape, texture, etc. tend to perceived as one group (Figure 6).

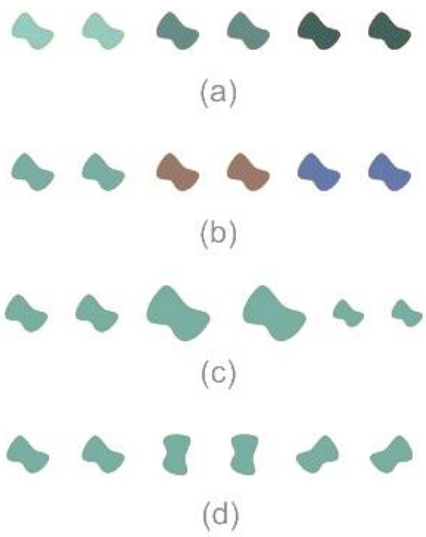

Figure 6: Principle of similarity (Todorovic, D., 2008)

- **The Factor of Continuity**

  Objects that are oriented linearly and have several other branches, the branch that is in the direction of the main path, tend to be perceived as the continuation of that path (Figure7).

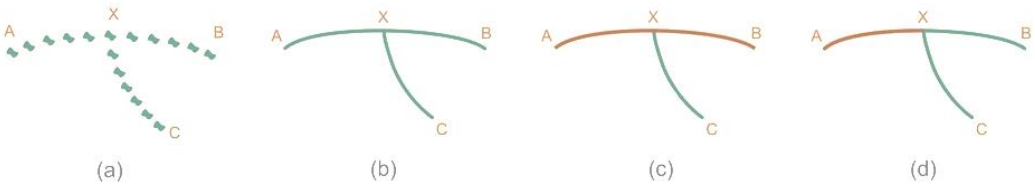

Figure 7: The factor of continuity (Todorovic, D., 2008)

- **Closure Principle**

  Objects tend to be perceived as a group if they are part of a single shape. Note that the gap between the objects may be perceived as closed and the shape imagined as a seamless shape (Figure 8).

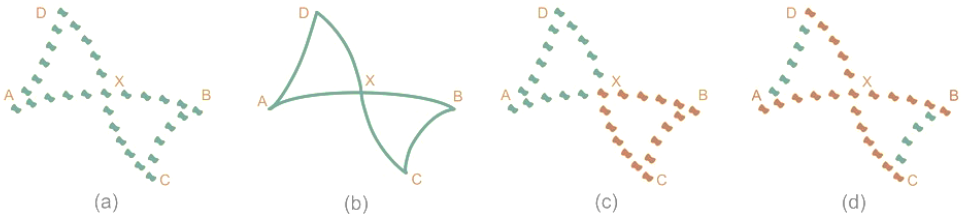

Figure 8: Closure principle (Todorovic, D., 2008)

- **Good Configuration Principle**

  According to this principle if there are two series of objects which one series are belong to more complex arrangement, the series of objects that are part of the more simple, balanced and unified arrangement, tend to be perceived together (Figure 9).

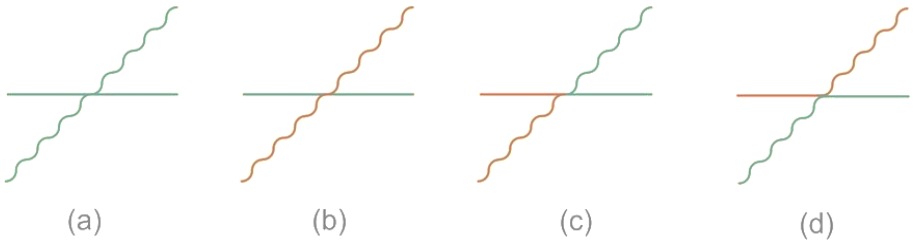

Figure 9: Good configuration principle (Todorovic, D., 2008)

- **Past Experience Factor**

  Objects are tend to be perceived together if they were frequently together in the memories of the observer (Wertheimer, M., 1923), (Figure 10).

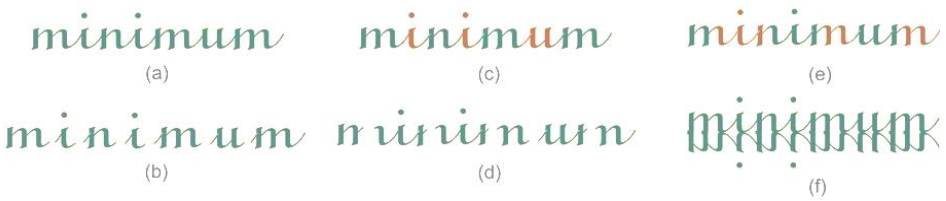

Figure 10: Past experience factor (Todorovic, D., 2008)

However, the perceptual process of mind is not only dependent on grouping principles, but it is also based on two other factors of form and meaning. In other words, objects contain a set of components, and groups but, furthermore, they are also perceived as a form in juxtaposition of other forms and indicant of one or more meanings related to the meaning of the other objects around. The form of physical characteristics has priority to the form of grouping and the meaning has priority to the shape of objects. However the form of grouping can affect the general shape of the objects. As an example in figure 11, there are several rows of squares that the inner arrangement is done according to similarity principle. In this arrangement the most similar squares perceive as a single group. The outer arrangement is again due to the principle of similarity that means, the equal patterns tend to be perceived as a whole group. However in figure 11a and 11b, the whole is tend to be perceived as rectangular rows than the small squares or the big outer square, and in the figure 11c the whole tend to be perceived as a whole big square rather than the small squares (Boudewijnse, G. J., 2004).

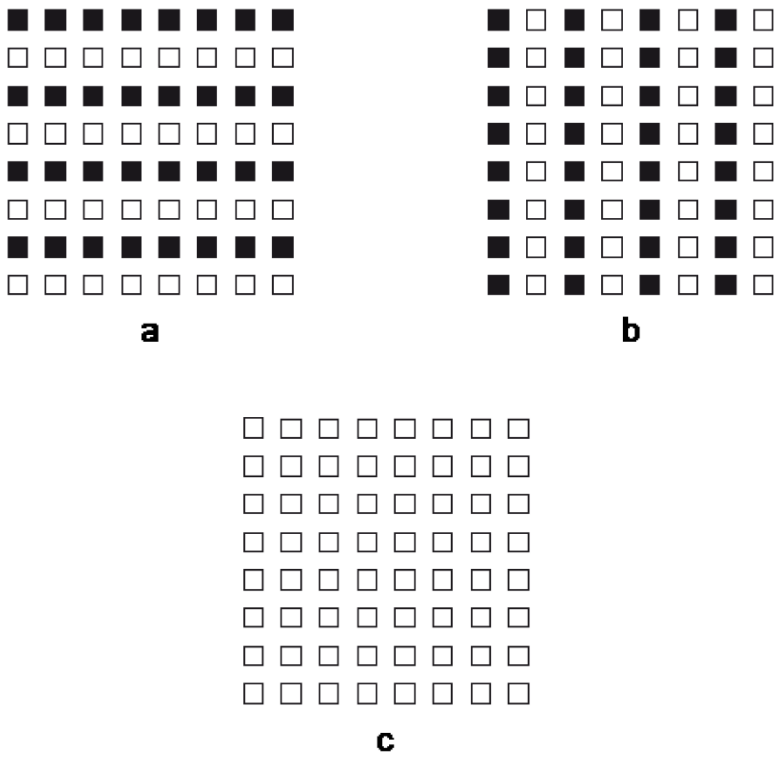

Figure 11: a, b, c- Small squares within the whole organization (Pinna, B., 2010).

Furthermore, it can be said that not only the inner components affect the whole form but also the characteristic of the single elements can influence the perception of whole form. In figure 12, the direction of inner elements affect the direction of the component. Hence, in figure 12a, the vertical arrangement of concave shapes and horizontal arrangement of convex shapes are perceived different than the figure12b, where the shapes are arranged conversely (Pinna, B., 2010).

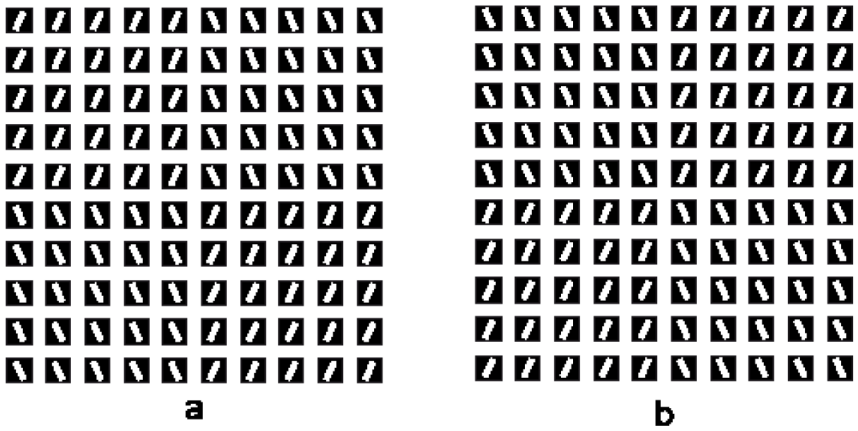

Figure 12: a, b- The illusion of concave and convex shapes (Ehrenstein, W. H., & Ehrenstein, A., 1999)

One of the main concerns of Gestalt theory was to understand how the main characteristics of the objects can be perceived immediately despite to their various aspects and perceptional conditions. For instance, in the figure 13a the shapes are immediately understandable, despite to their size, and rotation. Also in figure 13b and 13c, the shapes are still immediately distinguishable, despite to their distortion and disorganization, and even in figure 13d, not only the shapes are still recognized but also their distortion are understandable. According to Gibson, this recognition is due to the principle of invariant which is the foundation for the concept of meaning in perception. Invariant in the process of perception refers to the directive interpretation and recognition of the outside world without any mediator or prior experiences (Gibson, J. J., 2014).

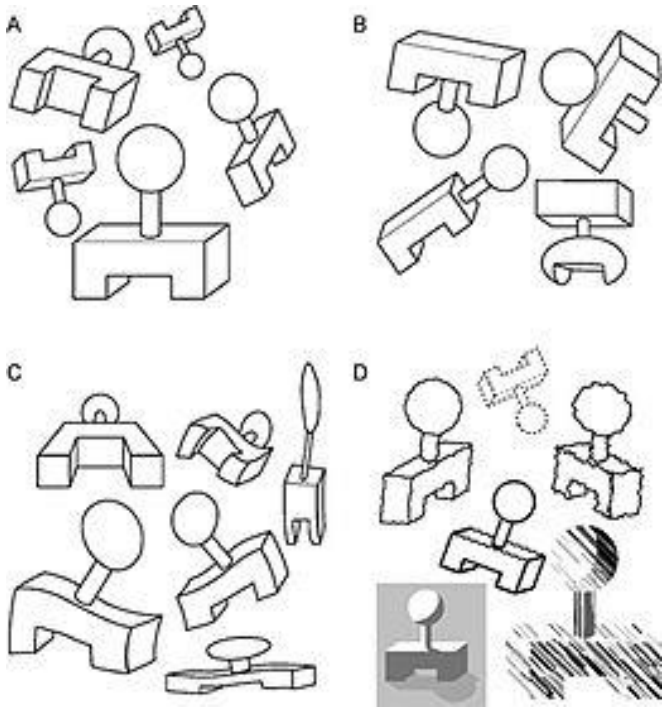

Figure 13: a, b, c, d- Invariant perception of objects (Lehar, S. M., 2003)

Within the framework of meaning in perception process, any object can be in juxtaposition with any other object and create meaningful visual perception. The "perceptual meaning" occurs through 'amodal' and 'modal' perception of world. In this regard, the 'amodal' perception refers to the perception of object as whole even if some parts of object is invisible, and 'modal' perception refers to the clear perception of whole object (Pinna, B., 2010).

One of the famous figures introduced by Gestalt psychology, and shows the amodal perception of objects, is The Kanizsa Triangle (figure 14), that consists of two different parts (images). Despite the fact that these pieces are not interconnected, however, their layout, in the mind, has created a third (white triangle) shape that does not actually exist, but our mind clearly sees it. As well as, in the physical world, there are also many phenomena that are established in the mind by being in contact with other phenomena; The Kanizsa Triangle is a very simple but effective kind of such

phenomena. As Kurt Kuffka, stated in his famous manifest, “the whole is *something else* than the sum of its parts", just as listening to a symphony orchestra, it's more than a combination of different notes performed by its musicians. The song has a specific quality as a whole that is different from its constituents. The figure shows that visual system has an ability to hypostatize perceptual entity that is driven from incomplete visual stimuli. The generation of this aspect of perception is one the most important achievements of Gestalt psychology (Koffka, K., 1935).

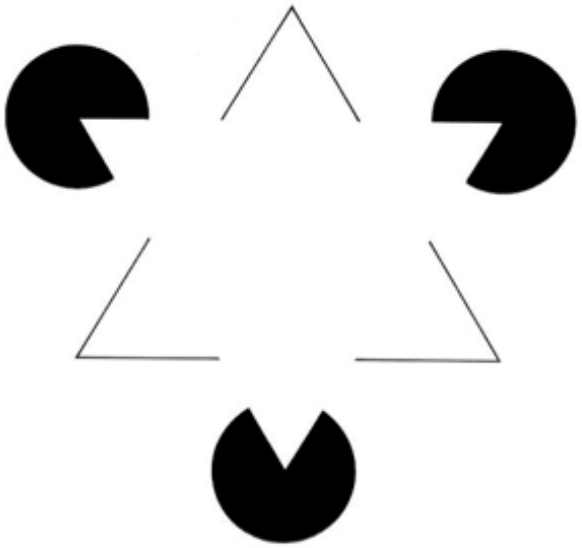

Figure 14: Kanizsa Triangle (URL 3)

It can be said that, the Gestalt theory is an aggregation of general properties of an object and/or group which is beyond the numerical sum of its constituent parts. These features include quality-shape or a quality that is beyond all of the sensory data. For example, the meaning of any musical tone in a melody is determined by its relation with the whole melody. Accordingly it can be stated that, while sensory elements may be continually changing, human perception of the surrounding environment is a

“general" constant experience that does not exist in the sub-sections of that whole. Therefore, there may be a difference between the ‘real’ perception features, and their sensory stimulation properties. For this reason, perception cannot be understood as the sum of a number of sensory elements or aggregated parts. Perception rather represents a general characteristic, a form or a gestalt that disappears in a reductive attempt. Therefore, Gestalt movement’s phenomenological approach in the discovery of the laws of psychology is to directly study and focus on the perceptual experience of human beings (Smith, B., 1988). It offers clear principles according which the types and relations of elements and objects in the environment may be analyzed and expectations about the predominantly visual perception formed. Furthermore, it opens up on devising, and understanding, design techniques in keeping with some distinct intention, be it clarity, simplicity, purity, or on the other extreme – visual interest, complexity, ambiguity. The difference would be in the way that the various components and systems employed in a composition are correlated: straightforward and keeping with one dominant rule, or by way of less expected juxtaposition, overlapping of diverse systems, contrasting entities, etc., which do not propose one dominant reading or meaning, but are open to alternate readings and perceptions and tend to shift from one meaning to another.

2.5 Summary: Theoretical Perspectives on Space and Perception

Table 1. ‘Theoretical perspectives on space and perception’ aims to sum up the key issues derived from the survey of philosophy and architecture theory. In this chapter following. It illustrates some dominant views on space and studies of the mechanisms of sensory perception, including Gestalt and phenomenological approaches in order to provide an analytical ground to identify techniques for designs that build up on ambiguity, complexity and contradiction.

Table 1: Theoretical perspectives on space and perception

Name / Approaches	**Concepts / relations**	**Key words**	**Elements / mechanisms of perception**
Plato	- Space as constant, indestructible universe - Indirect experience - Perception as an instant phenomenon	- Difference of knowledge from perception - Sensory awareness of external stimuli - Being, becoming, emphasis as three level of reality - Memory and imagination	- Five senses
Aristotle	- Space as place	- Space as vacant lot - Necessity of considering boundary for space - There is an end for space	- Enclosure - Geometrical content with geometric shapes
Giordano Bruno	- Space	- Space in relation with objects and bodies - Infinite space	- Objects that form space
Descartes	- Dualism - Cogito	- Existence of ego - Contradiction between mind and body - Unification between Mind and thought	- Mind and body as two essences of perception
Immanuel Kant	- Direct / indirect realism - Immediate perception	- “nouminal” world or physical world outside the body - “phenomenal” world or replica of the real world	- Pure source of light - Sense organs - Internal consciousness
Hume	- Sensory experience - Impression & Ideas	- Sensation, emotion - Impressions of sensation - Impressions of reflection	- Human senses

Name / Approaches	Concepts / relations	Key words	Elements / mechanisms of perception
Henri Bergson	- Immediate – mediated experience	- Direct perception - Subjective and Objective process of perception - continuity of immediate experience	- Immediate sensory system
Henri Lefebvre	- Space / architecture - lived space/ substance / materiality	- Physical, mental, and social levels - Function and structure as main features of space	- Homogeneous & fragmented - Geometrical - Visual
Martin Heidegger	- Intentional perception - Direct realism - Nonrepresent-ational perception	- Spatial existence - Interpretation of physical world - Distinction between Being and entities - Poetic existence - Close relation between space and human existence	- perception is possible through ambient light - Self-consciousness - Essence of time
Gaston Bachelard	- Poetics of space - Space and action - Inner space	- Memory and imagination - Unification of senses - Essence of complexity - Co-operation between real and unreal - Formal imagination - Material imagination	- Human mind as the essence of imagination
Pollio Vitruvius	- Bodily experience of Space	- Sensory experiences - Human senses - Emotional responses - Delight and pleasure	- Color, texture, light, material and sounds
Norberg-Schulz	- Existential space - Architectural space	- Object-character - Permanent objects - Immediate perception	- Center - Place - Direction - Area

Name / Approaches	Concepts / relations	Key words	Elements / mechanisms of perception
Juhani Pallasmaa	- Multi-sensory experience of space - space as medium	- Non-visual senses - Sensory perception - Mental images of space - Emotive import - Collaboration of the senses	- Materials, objects, scale, light, color - Meaning - Atmosphere
Perez-Gomez	- Thought - Immediate/ mediated perception	- Existential meaning - Pure existence without any mediator	- Importance of light in perception
Phenomenology	- Perception as “intentional” phenomena - Perceptual experience	- Three dimensional mental images - Interaction of internal existence and external object	- Objects as three dimensional volumes
Gestalt theory	- Visual perception	- Relations -Principles: Similarity, Common Fate, Proximity, Continuity, Good configuration, Past experience	- Order - Figure ground

Chapter 3

AMBIGUITY AND THE AFFECTIVE POTENTIAL OF ARCHITECTURAL SPACE: DESIGN AS PERCEPTION MANIPULATION PRACTICE

The concept of ambiguity in architectural space is a controversial one: it has both positive and negative connotations. According to Antoni Vidler, today's spatial experience in the urban environment has become rather controversial and ~~the~~ ambiguity is implicated at various levels: in the buildings that have been left, in the dark, cold and empty parking lots and crowded, confusing multi-storey shopping malls, all are the new-fashioned tradition of late eighteenth century's culture. The notions of links between anxiety and ambiguity come from the short stories of E.T.A Hoffman and Edgar Allan Poe, where ambiguity is shown to lie in a contrast between known and unknown, a conflict between preserved, homey interior and traumatic experience of something alien (Vidler, A., 1992).

Within nineteenth century, socio-economic changes resulted from society's tendency toward the capitalist system. Fast relocation of population and the growth of cities, brought on a social alienation in which the individuals were no longer familiar with their place of birth, even their past memories, lost in the chaos of the present life. The sudden displacement created new communities consisting of strangers who lost their identity, alien to each other and unfamiliar with their new place of living. The sense of

estrangement, in this case, build on the dichotomy between something temporary and permanent, the duality between the present and the future, and the confusion among the past and today, which are accompanied by depression and anxiety. The new model of anxiety, eventually revealed itself in the big cities conflated with social crises, pandemic diseases, the symptoms such as agoraphobia, claustrophobia and all other disasters of capitalist cities. As Heidegger pointed out, the result of such a social tensions is a modern "homelessness" where it seems that there is no place for human to call it home and this is the reason why human beings are constantly looking for a place to make themselves secure (Gauthier, D. J., 2004).

This overall situation finds critical expression in art in the form of the Avant-Garde, as the modernists believe that if the world wants to be alienated and away from its natural path, then the solution to combat this, is through the deliberate creation of abnormal things. Hence, for surrealists, futurist, expressionists and all Avant-guard artists, abnormality is an ambiguous situation between dream and awakening. As Baudrillard explained, it is a duality between actual and fictional world that "creates the effect of seduction". In his opinion, ambiguity can be seen in "dual" and "polar" relations that they could affect the social rules and meanings. Thus, it can be said that, the tendency toward the creation of confusing and shocking situations was a clear sign of the modern artists; the intentional, aesthetic response to the modern trauma remains from World War II (Baudrillard, J., & Singer, B., 1990).

With respect to architectural design, this conception of ambiguity in space and its links with anxiety found its meaning first in the notion of 'home' where 'home' was supposed to create security but became haunted by alien features. Then the traditional

city - a secure place for life to develop, was invaded by chaotic modernity; producing an antithetic condition that provokes confusion and deception (Vidler, A., 1992). As a result of this tendency, architecture became an arena for diverse expressions that let people access more specific and dynamic experiences of exaggerated feelings of fear, anxiety, joy and excitement.

In terms of design this perspective reveals various space-related features that lead to immediate engagement with space. Many contemporary examples are based on manipulating of perception through obliterating boundaries, altering certain accustomed proportions, whimsical use of transparency, creating seduction, and many other manipulating techniques. The mental conditions and consciousness of such kind of experiences can start from the feeling of uncertainty, which arises from immediate sensing and feeling of the altered presence or the absence of something expected or familiar and finding instead circumstances and situations that deviate from the accustomed. These would be felt and understood as experiential occasions that have therefore the power to mobilize and activate perception (Öztürk, M. N., 2010).

From Robert Venturi's point of view, 'complexity' refers to architecture's physical shape and content. Complexity and ambiguity in architecture would be the outcome of the paradox between what comes into the perception and what it pretends to be. In joseph Albert's explanation it is a "discrepancy between physical fact and psychic effect". For Venturi, architecture is not the only a set of technique and technological processes. He believes that buildings don't have a single form and philosophy, they are not a machine, which only includes a set of technological and mechanical issues. Rather, buildings are very complex and contain contradictory elements, each carrying

a set of profound meanings that cannot be ignored or eliminated (Venturi, R., 1977). In fact, it can be said that creating an illusory and ambient space, and ambiguity, builds up on more complexity in architectural space – so as to provoke momentary or permanent state of duality, deception and manipulation. According to the previous studies, human senses can be manipulated and the mind can be made to doubt what it sees through various ways. As Karsten Harries stated, "In order to doubt we must be able to conceive of the possibility that something may be different from the way it presents itself to us. Essential to doubt is the contrast between what is and what appears to be" (Harries, K., 1973, p 49).

Hence, in order to manipulate reality and create contradictory possibilities and doubt in the interpretation of reality, it is necessary to find solutions and methods that could cause diversity of visual impressions. Design for ambiguity would be about establishing a specific form of experience and provoking different meanings and impressions within space – generating diverse systems of order and inspiring the perceiving mind to decipher these. Therefore, this thesis aims to explore a range of design techniques that create extraordinary ambiguous spaces, and thereby raise awareness to the meanings of space, and generate interest and exploration in deciphering feelings and meanings.

3.1 Interior Architectural Space: Elements, Components, Correlations and Principles

The main challenge of architectural design is to suggest various solutions for human existence by way of solving functional requirements and asserting order for purposes of comfort in all of its aspects. The main intention of this part is to identify and study the principal design tools effective in interior space - elements and components of

interior space and their relations – with respect to ambiguity. In keeping with the aims of this current research, the focus will be on understanding perceptual quality - what kinds of conditions, spatial features and expression would stimulate human perception, and affect the feelings and interpretations related to the architectural work especially with regard of understanding the role and effects of ambiguity in interior space.

It can be said that the principles in architectural design are not constant parameters. Design principles and effects would change according to the purpose and motivation and intentions of the architect. Accordingly, it can be conceived that, these design principles are employed to architectural elements and components and more or less follow Gestalt theory in that they take / consider the composition as a whole that can neither be separated from its components nor perceived solely as an aggregation of its components.

As it is mentioned, the major goal of a design is to devise elements and components and create such interrelationships between them so as to achieve a coherent design work - composition. Hence, in the following, some of the main design elements and components are listed and studied in order to find out their principal role and relations between them and the way they could affect the whole composition.

3.1.1 Enclosure

When an interior space is entered, it gives a sense of enclosure. The feeling of shelter is due to the boundaries that are defined through the architectural elements such as floor, walls and ceiling that define the limits and detach the interior space of a building from the surrounding environment. The enclosure system consist of walls, floors, ceilings in particular correlations and form. These correlations involve and define the

openings as an important part of the spatial definition. As architectural components - doors and windows – these together with solid surfaces define the interior space, as well as differentiate spatial components. These generally combine through various structural systems in order to create three-dimensional volumes. However, these elements are more than mere tools for showing the limits of space. Their shape, form, their surface features and treatment, and all the openings that are created by them, generate the specific characteristic and quality of that space. Architectural spaces can be differentiated into two types, they are either introverted that their focus is on inside, or extroverted that are open to outside, along with all possible expressions in-between. Openings, as they start to get bigger in size, transform the feeling of enclosure that is provided by exterior walls.

However, the degree of enclosure is not only based on the size and number of openings. In other words, the reduction or elimination or continuation of the defined elements of space could create a space which is open to exterior. As an example the continuation of ground or a corner wall to the outside or elimination of corners and presence of wall, ground and ceiling as the common elements of interior and exterior, can create sense of continuity (Von Meiss, P., 2013). Therefore, the notion of design of an interior is more than a resolution of functions – it also offers diverse perceptual possibilities. Hence, during the design process the architect should be aware of all architectural features and potential of space in order to increase the spatial quality of that space.

While the exterior walls are the separator of interior atmosphere from the exterior environments, the interior walls shape the general form of interior space and control the interior environment and orientation. Both interior and exterior walls can be in

combination with openings such as doors and windows. It can be said that, exterior and interior openings are transition tool that connect different spaces to each other, while one of them connect the interior to the outside environment, the other one, conjoin interior spaces and shape movement within the building.

3.1.2 Openings

While (exterior) walls provide boundary and privacy for the interior of a building, openings such as doors and windows are the key components of building that define the interior spaces and spatial correlations. They bring natural light into space, provide transition between various spaces and connect interior to exterior environment and thereby enrich the spatial experience of observer. Openings such as doors offer pass-way from one space to another and affect the direction and movement in space, as well as perceptual sequences. According to size and proportion within the enclosure they could change the visual and spatial quality of space. Windows are the elements that could carry different meanings, they can be a bright point on the surface during the day and a dark void at night. The dimensions of windows are directly related to their proportion to wall surface as well human dimensions. Design, following an intention, manipulates elements according to such considerations, so that the shape, form and size of the openings could influence visual connection and the emotional response of observer and change the perception of enclosure. In terms of space enclosure, the effects of the size of openings, may emphasize an absence of walls and provide extension between inside and outside.

Another component of architectural space that could define spatial quality is the stairs. Stairs are three-dimensional forms and their vertical movement can enhance the three-dimensional experience of space. Stairs can be either as a part of wall or treated as a

freestanding sculpture. In both cases, they can help in defining the orientation, of the path and directions of movement and perception within the space, as well as of the interrelations among different spaces and levels. It can be conceived that, the all these components of architectural space have potential to specify the characteristic of space, as well as improve the quality of enclosure and provide distinct spatial experience. (Koolhas, R., 2014).

3.1.3 Spatial Form

As Ben Shahn described, "Form is the visible shape of content," thus what man sees as a particular shape or group of shapes, his/her mind tries to understand it as a form of the whole content. Form is a term that carry several meanings. It may relate to a physical element such as table or a bag in relation with that table or it can refer to an action of something. However, in design, form refers to the way of organizing of elements within the composition in order to create a coherent final work. From this perspective, form refers to the external and internal content of a structure that uses different principles of design to create unity and order. Form has a close relation with different compositional features of elements such as: position that shows the location of a form within composition, orientation that shows the direction of form, and the position of vision, that refers to the degree of constancy of a form. It can be demonstrated that, when a two-dimensional object is located within a sheet of white paper, it starts to affect the white spaces around it. Similarly in the spatial three-dimensional world, three-dimensional form / volume/ object/ mass can influence its surrounding and starts to redefine its boundaries (Arnheim, R., 1974).

Effects of volumetric or spatial form can be opened up for analysis in various respects. Geometry is one such important tool for analysis. ‘Shape’ is defined as the very first

property of even a two-dimensional line, plane or, more complex, of three-dimensional volume that immediately perceived. It can stimulate the perception and provoke emotions in observer. Shape is specify into **geometric shapes** and **organic shapes**. Geometric shapes that consist of primary shapes – triangle, square, circle, and their variations, all defined by way of **surface, lines, and points** (figure 15). In contrast, organic shapes such as found in the human body, animals, etc. is generated gradually and does not follow pure geometry (figure 16). Both primary shapes and organic shapes can be transformed into Abstract shapes and be reduced to their primitive essence, in order to express distinction, or emphasize a specific idea. The degree of legibility of shape is based on the visual contrast of figure and ground. The effects of configuration start from two-dimensional shapes, and lead to three-dimensional form – volume and mass. The quality of mass is directly related to the balance between shapes and forms as whole to its content through various elements and principles of architectural design (Ching, F. D., & Binggeli, C., 2018).

Figure 15: Vanna Venturi House – Composition of primary shapes Robert Venturi – 1964 - United States (URL 4)

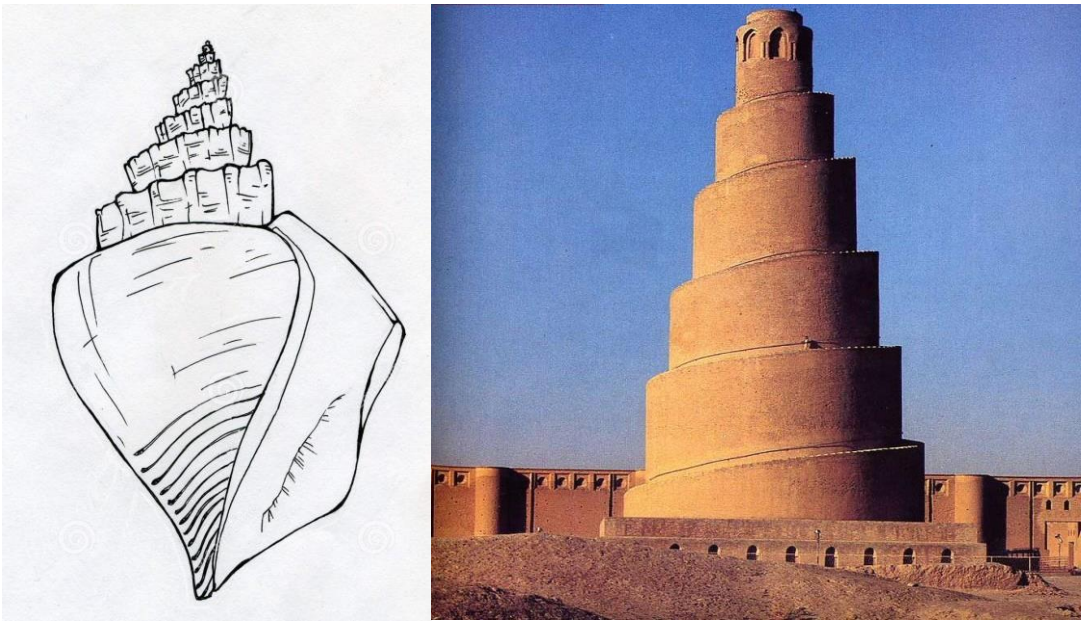

Figure 16: Spiral minaret great mosque of samarra - Organic shape of minaret inspired by shape of sea shell - 848- Iraq (URL 5)

3.1.4 Furniture, Furnishing and Objects in Space

Furniture and furnishings are important design elements in the field of interior architecture. They are act as a mediator between activities and space, and connect space to the people that live within it. The furnishing methods and styles vary

according to the function of space. They offer specific expressions for each functional type, from private and residential through to commercial, cultural, public, or governmental. In addition to functionality of furniture, it defines the interior characteristics of space by contributing to the spatial organization, but also by way of the scale, form, shape, surface properties and style in its design. One of the determining parameters for the form and scale of furniture is generally according to human factors and ergonomics. In other words, the dimensions of human body and nature of the activity of man can influence the proportion, height and distance of objects and furniture within the space. The arrangement of objects and furniture pieces in the space defines the spatial orientation and create general structure of space. However, within these parameters there are endless possibilities for design expressions. Accordingly, various arrangements of furniture can affect the human perception through influencing the sense of continuity and unity and harmony in space. Furniture is not only occupies space but it also establishes an interaction between itself and the enclosure. Hence, the importance of furniture pieces in space is not only about their form, but the form of space that is filled by objects (Abercrombie, S., 2018). Thereby furniture and furnishing presents still another design tool – a relatively independent system that may introduce ambiguity, visual interest, contrast and accents to the perceptual field. It can produce and lead to diverse readings and understanding of space (figure 17, 18, and 19).

Figure 17: SS 2016 Prada men's show - Sense of continiouty by ceiling and furniture design- AMO -2016- Italy (URL 6)

Figure 18: Therme Vals - Combination of furniture and lighting- Peter Zumthor- 1996 – Switzerland (URL 7)

Figure 19: Google Campus- Integration of fun and functionality- - Evolution Design- 2013- Dublin, Ireland (URL 8)

3.1.5 Lighting Systems and Fixtures

There is no doubt that light is the very essential of visual perception. Without light the perception of shape, color, space, and physical environment is impossible. However, light is something more than an element that enables the eye to perceive the environment, it is a fundamental for man's experiences. Light also effects the human perception of material and texture of objects, and vice versa, it can influenced by the brightness of objects. As an example, direct light and shadow play could exaggerate physical features of texture and dimmed light could reduce the three-dimensional characteristics of texture. In general, objects can be seen when their surface reflect the light that shines at them. Hence the brightness of objects, depends on their physical features such as their shape, texture and color. In overall, all degrees of brightness could influence and create depth in both space and an object, hence, the more and object is brighter the more it is close to the source of light and vice versa. Then, it can be said that, the diffusion of brightness could help to distinguish different positions

and orientation of objects within space. The similarity factor in grouping principle can also be considered for the brightness of objects, in a way that, the objects with similar brightness can be perceived as a group of similar objects through their resemblance of spatial orientation (Arnheim, R., 1974). On the other hand, in order to understanding the three-dimensional form of space as well as objects, it is necessary to consider the role of shadow in design process. In this regard, shadow and darkness are not only an absence of light, but they are essential for creating a harmonic interior space.

On the other hand interior lighting systems and fixtures can help identifying the space and navigating, and performing whiting it. Lighting fixtures and systems as physical presence present an important component in interior space and can be designed, again as a relatively independent organization according to separate principles – adding a new layer of complexity and possibilities for perception to the interior space (figure 20, 21 and 22).

Figure 20: Couvent de la Tourette - Natural spot lights created game of light and shadow - Le Corbusier – 1957 – France (URL 9)

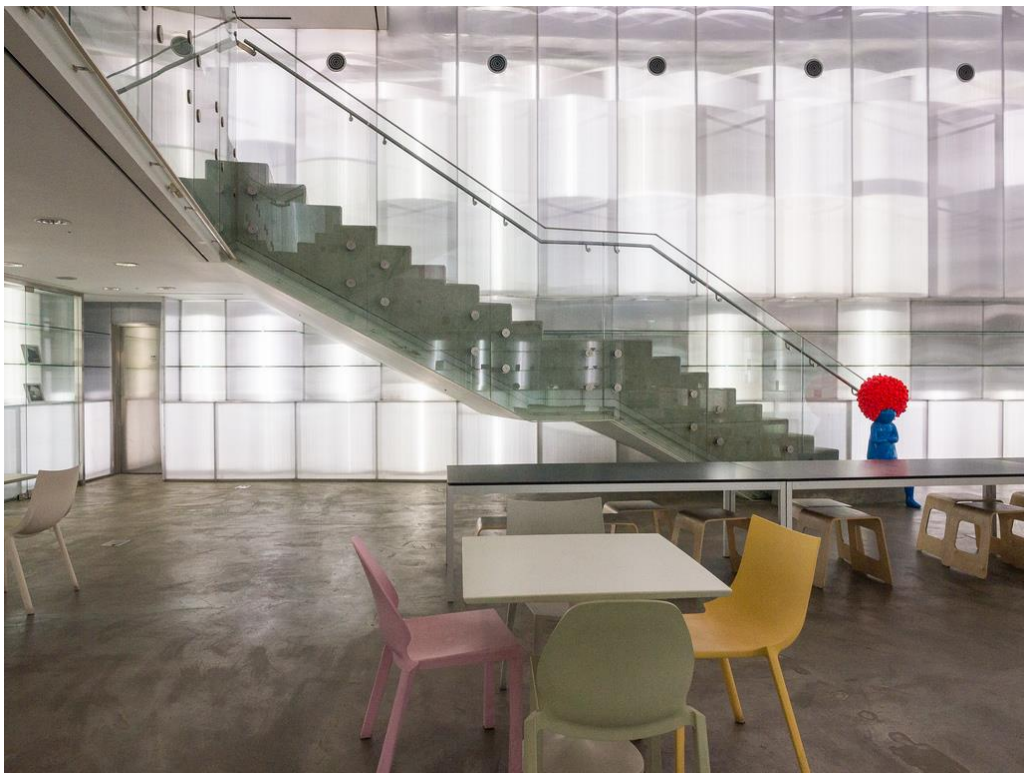

Figure 21: Seoul National University Museum Of Art - Homogeneous interior lighting- Rem Koolhaas- 2005- Korea (URL 10)

Figure 22: The Chapel of St. Ignatius - Creating visual impression by various lighting systems - Steven Holl - 1997 – USA (URL 11)

3.1.6 Surface Treatment – Materials, Color, Texture, and Pattern

Human sight has the ability to distinguish and identify different materials, textures and colors and their visual properties. Accordingly these parameters may have effects on the reading of space. In others word, the visual properties of object can provoke different feelings of joy or anxiety, comfort or discomfort, pleasure or sorrow.

It can be said that, human vision not only recognizes objects but also sees and differentiates materials. However, the process of perception of material and texture is largely an unconscious process that is based on the experiences that man had through touching, smelling and seeing (Adelson, E. H., 2001). One another important issue of materials is their functionality. Norman (2002) explains the various functions that materials could have, “Glass is for seeing through, and for breaking. Wood is normally

used for solidity, opacity, support, or carving… ", yet, alongside the function of surface treatments, the impression that each of these treatments could have on the observer has to be considered in order to achieve to a comprehensive sensory experience (Karana, E., 2010).

The special qualities and features of surfaces refer to the texture, color and material of the enclosure elements as well as to the objects and components characterizing the space. The surface treatments of objects, and components and their relations and position within the space could affect perception and raise awareness of that space. Texture can be used to explain the roughness or softness and characteristics of surface. It can be specified into tactile texture that can be touched in real world, and visual texture that is based on visual perception and it can be either real or illusory. The same quality can also be considered for color of surfaces. Color is a quality that help the viewer to easily distinguish and identify the object from its surrounding. It can be said that the individual perception of color of objects and surfaces are directly related to the light and properties of rays that comes from the object to the eye of observer. Any changes in objects color can be derived from the type of light source and the presence of adjoining colors. As an example white light can emphasize warm colors and decrease the effect of cool colors. Therefore, perception of colors can be altered by either the amount of radiation of light, the angle of object and hue of the light (Von Meiss, P., 2013).

Material, color, texture, pattern can each be employed relative independently on each other and also regarding the other underlying principles of a composition. They present design tools that can provoke different possibilities for perceiving a space.

In design, especially when spatial complexity and ambiguity are aimed at, surface treatment can become an important tool – shifting emphasis in a composition, contradicting overall organizational principles, accentuating unexpected areas.

3.1.7 Composition and Order

Order can only be meaningful when it is made legible in comparison with disorder and anarchy. As Heinrich Tessenow stressed, "Order is always more or less miserable … but you have to take the world as it is, and for that a certain intelligence is required" hence, architecture is a sum of sequence and juxtaposition of elements in order to inflict order to man's living area (Tessenow, H., 1989). There are several systems of organization with various ordering principles. **The linear system** contains of several spaces that are repeated in a sequential linear organization. **The axial system** relates to a straight central line that contributes in organizing elements and components of space and defines direction and pass way in space. **The central system** contains of several subspaces grouped around a central space that is generally distributer of paths and movements within the whole space. **The grid system** relates to the several forms and spaces within the whole space that their relationship and position is based on a regulated grid pattern (Ching, F. D., 2014). However, each of these can be employed in a cross-breed with the others, and endless possibilities for organizing different groups of elements according to different systems are potent tools in generating ambiguous readings of interior space. Each of these can be organized in a complex and relatively autonomous system of order. The notion of order in the overall composition results in the fitting and superimposition of these various systems.

3.1.8 Principles of Correlation

Symmetry is a correlation type that directly refers to the mirror of object or building or balanced distribution of elements and forms within space in lateral (mirror), vertical

or horizontal arrangement. **Hierarchy**, is a complex form of order that arrange the element according to their importance in composition. To achieve to hierarchy it is not necessary to merely change the sizes but through changing the position of elements in relation with context the hierarchy can be created. Through this principle it is possible to identify primary and secondary elements, by way of dominance and focus some elements become primary and secondary - to be discovered in perception. **Rhythm as a principle** is based on the movement and repetition of forms, objects, patterns, shapes or size according to its specific order. **Transformation**, is based on the repletion of a form while it is gradually changing in size or form or direction without the loss of its unity (Wong, W., 1993).

Each of these systems can be mixed, superimposed, interpenetrated with any of the others – with the effects on the clarity, complexity, or ambiguity for perception generated in this.

3.1.9 Grouping in Space

It is the process of creating a larger composition through alignment of small sections. It is rooted in Gestalt principles of proximity, similarity, common fate, repetition and unifying and the aim is to provide order and unity in composition. Human's inherent desire is to combine and assemble elements in order to perceive it as a whole. In this regard, individual perception starts with grouping and integrating different parts in order to create an understandable final image. In interior spaces, elements, objects, components and furniture pieces tend to joining together into a sets or groups in order to create an intelligible spatial form (Goldstein, E. B., 2009).

3.1.10 Balance

It is one of the key and hard to apply principles that happens when contrary pressures and different visual weights are in harmony and equilibrium. It can be applied in three different ways. Symmetrical balance occur when the solution for balance of visual weights is mirroring on of the weights through central and vertical axis. This type of balance is steady and stable. Another type of balance is asymmetrical balance is the arrangement of weights through vertical axis and create more dynamic solution. This type of balance occur through combination of various design elements such as color, shape, scale, material and etc. It is a common solution in architectural works. The third form of balance is radial balance that all elements organize around a main central point. It is mostly found in nature. In order to achieve to the aesthetic ambitions, functionality and comfort in space it is necessary to organize the elements of design such as surface treatments, shape, size as well as the components of architectural space in a maximum visual balance and equilibrium (Von Meiss, P., 2013).

3.1.11 Contrast

Contrast gives an immediate characteristic to one element and seek to emphasize a particular section from the rest of composition or contradiction between two elements. It can be achieved through various expressions such as solid and void, brightness and darkness, light and shadow, different sizes, softness or roughness and etc. it can be considered as a figure-ground principle. It can be said that, while the nature of man is to looking for order and hierarchy in every visual field, contrast can be a key element that catch the intention through specific part of space (Locher, P. J., Stappers, P. J., & Overbeeke, K., 1998). In general the relations of contrast will raise attention to both of the entities, as well as the overall perceptual interest in the spatial composition.

3.1.12 Figure-Ground

The visual field of man is composed of various inharmonious components that vary in size, shape, material and color. In order to better understand the world outside, the human brain tries to differentiate this visual field into two groups of positive components that can be called ‘figure’, and negative components that serve as ‘background’ of the figure. The understanding and interpretation of man from external world is based on the way of interaction of figure and ground within the visual field. This phenomenon is one of the important issues in the field of visual perception. It is important for any visual field to have a readable figure and ground. Therefore, for instance any change in the proportion of the figure and its ground may cause ambiguity in its readability. As an example in the figure 23, the letter ‘a’ is easily understanding as figure in relation to its dark background, yet, the larger the letter becomes, its proportion to the ground become more ambiguous, and eventually the figure and its background are not distinguishable anymore, to the extent that their roles in the relation switch.

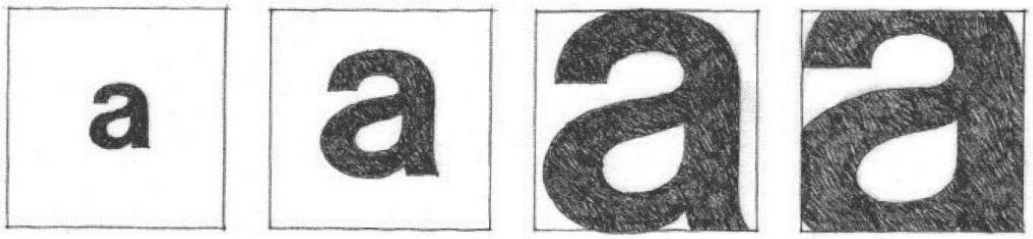

Figure 23: The problem of figure/ground – (Ching, F. D., 2014)

Accordingly, it can be construed that, the figure as a positive elements has to be alongside the background as its field in order to be understandable. Therefore, figure/background are not only the opposite components but also they work together to create the reality of physical world.

In architecture, if we consider the components of forms and space as a figure/ground relation, then it can be said that, reality of architecture can be shaped and created through its various elements, and principles. In the scale of the built envelope, the tendency is toward the reading of walls and objects as ‘figure’ that are positive components and the empty ‘space’ in-between as mere background. However, space too can be considered as figure that has shape. In the interior space different elements such as interior walls, furniture and light systems can defined as a form (figure) within the space (ground) or stand as boundaries that define the spatial volume within the building (Ching, F. D., 2014).

3.1.13 Proportion and Scale

To talk of proportion is to talk of ratio between different elements. It comes from man’s desire to control and understand space through a specific rational system. The aim of using proportion is to create order and meaning in composition by organizing a set of visual relations between different elements, and with people. The principle of proportion is related to the measurement of objects within the whole composition. There are two methods of using proportion, one is the standard proportion that is based on human experiences of environment. As an example, the current standard thinking is that a door should be designed according to the average height of man, and if the door designed larger or smaller that its standard size, it feels abnormal. However, standards vary for different periods, and are also dependent on the space and the respective style.

The second method is according to human body and the perfect ratio between different parts of body. The proportion principle in this regard, comes from universal dimensions and forms of human body. Also, scale is directly related to proportion

principle, however, while proportion addresses to the ratio between elements in composition, scale relates with the standard size of components themselves. Deliberately changing of standard size of elements in a composition could affect human perception and generate different meanings and feelings in design (Ruskin, J., 1885). Scale can be differentiated into three types. The ‘mechanical’ scale refers to the standard dimensions of objects. ‘Visual’ scale is explained as the size that an object appears to have in relation with surrounding objects. As an example a big conference table in a small room can seems to be out of scale because of the proportion of space. The visual scale of objects can be relative, so that, an object can be perceived as a small scale item in a group of bigger objects, yet, it can be appeared as a large object in group of smaller items. ‘Human’ scale is based on the scale of objects or space in comparison to human dimensions. As an example, if a space or group of objects make the man feels uncomfortable because of their small sizes, then it can be said that that objects and space are out of human scale. The relation of various types of scale is not a single and limited relationship. Interior elements, objects, and components can be in a simultaneous relation with whole space, or each other or with the people within space (Ching, F. D., & Binggeli, C., 2018).

3.2 Summary: Interior Space as Design Issue - Elements, Principles, Order, Composition

Table 2. ‘Interior space as design issue: elements, principles, order, composition’ aims to summarize and articulate a descriptive and analytical framework of components and elements of interior architecture and the key principles and concepts listed according to the main theoretical sources of this subject.

Table 2: 'Interior space as design issue: elements, principles, order, and composition'

Name / Approaches	**Concepts / Relations**	**Key–words**	**Design elements and principles**
Norberg-Schulz	- Space-oriented experiences - Existential space - Mass and space	- Three dimensional context - Immediate human perception	- Visual form, dimensions and quality of light - Scale - Composition - Centre - Path - Grid
Francis Ching	- Form and space - Enclosure - Bodily experience of Space - Order & Legibility - Composition and Order	- Volume - Line - Plane - Light - Surfaces - Vertical elements - Solid and void - Circulation - Leaner, superficial and volumetric elements - Functional, formal and symbolic roles of space	- Shape - Surfaces - Texture - Furniture -Fixtures - Color - Organizations Central, Radial, Linear, Grid organizations - Proportion and scale - Mechanical and Visual scale - Order - Hierarchy - Rhythm
Pierre Von Meiss	- Perception - Multi-sensory experience of space - Multi-sensory experience of space	- Enclosure - Objects - Openings - Light and Shadow - Materials - Perceptual possibilities - Harmony and equilibrium - Movement of body within space - Spatiality of objects	- Volume - Enclosure / openings /surface - Proportion - Order - Symmetrical / Asymmetrical Balance - Contrast - Complexity - Coherence - Symmetry - Figure- Ground

Name / Approaches	Concepts / Relations	Key–words	Design elements and principles
Rudolf Arnheim	- Immediate perception of space - Orientation - Position	- Visual perception - Light - Transparency - Movement - Spatial form - Depth - Expression - Surfaces	- Volume - Mass - Grouping - Furniture and fixtures - Color and texture

3.3 Deriving Techniques for Ambiguity from Artistic Experimentations: Avant-Garde Art

Many of the recent studies and theories of perception show ambiguity as property of many situations in the physical world that can affect the human brain as well as the human perception. Such studies serve as the main basis for several modernist artistic movements in recent history.

The terms and notions of ‘ambiguity’ and ‘contradiction/ complexity’ are among the main characteristics and values in modern painting and literature. In this regard, some Avant-Garde movements such as Expressionism, Op art, Pop art and Surrealism are the pioneers of expressing modern human conditions and existential drama by exploring some techniques in order to create perceptual ambiguity. In architectural theory it is perhaps Venturi that pioneers in arguing for ‘complexity’ rather than ‘simplicity’ as major quality of modern architecture. He explains: “I am for richness of meaning rather than clarity of meaning” (Venturi, R., 1977).

This opens the paths for understanding ‘designed’ ambiguity as a quality of space that generates interest, allows for different possible readings and interpretations of space,

and also raises the intensity of experience of architectural works. On the other hand, from recent studies on perception it can be derived that human beings have an ability to manipulate the perceptual understanding of physical world by creating even relatively freely (hallucination) images of the real world.

The ending of the World War II led to some political, economic and technological changes that were interrelated with the social structure. The result of such changes was the creation of a global thinking that announced the message of salvation and the freedom of ideas and opinions. As argued in the lecture '*Existentialism is Humanism*', Jean-Paul Sartre's philosophy is that "existence precedes essence - or, if you will, that we must begin from the subjective" (Sartre, J. P., 1948, p 20). This is a very common thought of existentialism in the post-war era that considered man as a creature who is detached from real world and can live only through art. The years after the war were the period that Modern art started to expand and the public began to be in a close relation with it. Following these revelations in Europe, similarly, in the United States, the elimination and reversal of solid social-political systems began, which resulted in the formation of Avant-Guard leading groups, especially in the field of art. It can be said that, Western art of the early Twentieth century, with the help of avant-garde movements, could achieve a historical self-consciousness that led to a kind of self-criticism and transformation of the direction and function of art in that era. The avant-garde, a group with common ideals and values, is dominated by their radical lifestyle and thinking. It refers to the group of people who have used the most advanced forms – experimental and provocative methods or themes in their art-works and have often been the pioneer of new movements. The term is associated with theory of "Art for art

sake", whose priority is to extend the boundaries of aesthetic experiences (Lucie-Smith, E., 1995).

There is no doubt that art and human's very experiences are not separate and divided. Hence, one of the most common thinking about the relation of art and life is one which takes it that the profound job of an artist is to reflect life in art. Hence the growing ambiguity, chaos, dilemma and complexity of real life at that period were to be taken in and applied into the meaning of an art-work, set within the discipline according to the unique characteristic of 'self' and unending imagination. According to this belief, man's understanding of reality cannot be complete and it has always some limitations. Therefore, there is a boundary between what is perceived and what is real and in this regard an art work is considered as a mediator between what humans wish the real world to be and what it is indeed. However, when this point of view is criticized with more existential thinking about the actual world, a new definition can be presented to the relation of art and real world in the words of Jackson Pollock: "Painting is a state of being". Hence the important issue is not the final image of art work but the process of creation itself as a part of life, and this process is the main concern of every art work (Corrigan, R. W., 1973).

Accordingly, while the European art movements such as Impressionism, Post Impressionism, Cubism, Constructivism, and various forms of abstract art had a particular interpretation of the design elements such as light, color, movement, composition, depth, and abstraction as means of representing reality, Avant-guard movements experimented freely and tried to combine these elements of art and design with the ambiguity and chaos of life, as well as with the controversial and illogical

inner feelings and imaginations. The result was creation of a boundary between art and real life. The Avant-Guard artist stopped ‘representing’ the reality, and asserted a superior reality that arises from the inner world; an originality and innovation, which is a product of creativity and ingenuity of the artist. In all these art works of Avant-Guard schools and artistic movements that have continued from the early 20th century to the mid-20th century, there is very little visual representation of the outside world. Rather, there is either ‘pure form’ such as the works of Cubists, Abstract artists and Constructivists, or ‘expression of feelings’ through form and color such as the works of Fauvists or Expressionists. However, following this period, these definitions of art were criticized by artists such as belonging to Pop art, and they called for a return to the reality of physical world, especially social reality, as art was to include political and economic issues (Lucie-Smith, E., 1977).

3.3.1 Pop Art as Source for Presentational Techniques

The term pop art encompasses a wide range of artistic activities and styles. The common factor of all these activities was their reliance on mass media and popular culture. Pop art is rooted in Dadaism and raised against abstract expressionism movement. The traditional idea behind the Dada movement was to focus on the "idea behind the artwork", instead of paying attention to mere final product. Pop artists also followed this manner of Dadaists and concentrated on the effect that an artwork can have on people rather than on the work itself. The content of Pop art creation illustrated the familiarity and presence of the everyday life to the public. It can be said that while Pop Art was welcomed among many artists during the mid-20th century, it is Robert Rauschenberg and Jasper Johns who are the forerunners of the neo-Dadaism movement and they are the ones that deeply influenced the American pop art movement. Jasper John’s main concern was the way that people would perceive and

understand an art work. He did not try to differentiate the object and matter in his works. Jasper John believed that every piece of art work represent its own reality. Figure 23, shows one of Jasper John's paintings called "Target with four faces". This painting directly refers to a very familiar and neutral element (Target) that is immediately understandable. Using the ordinary objects let the painter to be free in transferring his message through various levels.

Figure 24: 'Target with four faces' - Jasper John- 1955 (URL 12)

Unlike John's paintings, Robert Rauschenberg's art works were the combination of real objects and painting (Figure 25). He used collage as the main language that is the combination of painting and photographic silkscreen printing. His artworks are the reflection of consumerism, mass production, designed objects, advertising and modern

communication techniques. He stated that “painting is more like the real world if it's made out the real world” (Piper, D., & Rawson, P. S., 1995).

Figure 25: 'First Landing Jump’- Robert Rauschenberg- 1961 (URL 13)

Pop artists’ main ideology was to create a form of art which can immediately transfer its meaning to the audience. To achieve to this idea, they tried to use new methods such as using acrylic painting, collage and silkscreen printing in a large scale paintings, banners, and monuments. By putting aside the common structure in the painting composition, they created a kind of integrated form. This coherent and comprehensive level embraces all the canvas, as if it seems to go even further, to the outside of its boundaries. They also tried to color their artworks by using mass media products such as comic books, magazines, cartoons and many other visual sources that are the symbol

of consumerism and popular culture in that period. As an example in Tom Wesselmann's painting called '- *Still Life No.34'* (Figure 26), the combination of collage pieces with the painting of background and the curve lines and bright colors impress the perception and create a dynamic perspective in the painting. The brightness of these objects that are the symbol of everyday life are very mesmerizing that demonstrates the 20th century's 'American dream'.

Figure 26: Still Life No.34- Tom Wesselmann- 1963 (URL 14)

As well as, in James Rosenquist's painting (Figure 27), he shows John F. Kennedy's smiling face in combination with a piece of cake and Chevrolet car- both are the symbols of consumerism- by putting these three items together, within a very large scale banner he seeks to point out that all of these are nothing but seductive packages that are ready to sell to post-war Americans.

Figure 27: ‘President Elect’ - James Rosenquist- 1960 (URL 15)

Another example of the expressive power of an unconventional mix of elements and play with scale in a composition is the work of Claes Oldenburg, the Pop artist who is famous for his odd art products that are something between sculpture and painting.

Oldenburg’s artworks have a sense of irony and inconsistency. His tendency is toward the creation of outsized scale 3D artworks and playing with the common material of objects. As an example he is created the hard objects such as toilet out of fabric and a soft objects such as cigarette out of a hard plaster (Figure 28-29-30).

Claes Oldenburg is the first artist who tried to modify everyday objects to the scale of monuments and brought them into the landscape (Arnason, H. H., & Mansfield, E., 1986).

Figure 28: ‘Soft Toilet’- Oldenburg- 1961 (URL 16)

Figure 29: ‘Half Scale’- Claes Oldenburg- 1973-75 (URL 17)

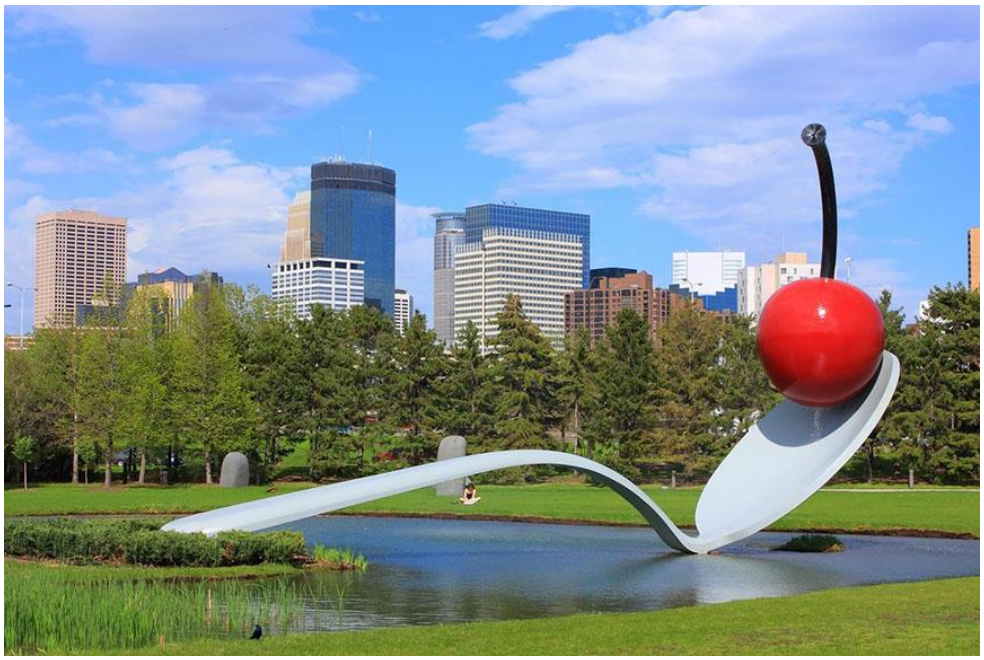

Figure 30: ‘Spoonbridge and Cherry’ - Claes Oldenburg and Coosje Van Bruggen- 1985-1988 (URL 18)

The tendency of these artists are more towards the things that represent the real life of the people, not only the narratives that shows their individual concerns. Indeed, this was, in fact, an answer to the expectation of the American audiences of the 50th century who recognized the missing point of the familiar elements in every visual art works. The response to the audience's demand during this decade is the main reason that allow the critics to name the movement as "Pop Art" or " the art of popular culture” (Fineberg, J. D., 2000).

It can be perceived that, the visual elements and art works in Pop art movement sought to tell the audience that all these piece of arts are real, and what can be more real than reality itself. Hence, the Pop artists use unconventional presentational techniques, and employ special means so as to express their critical view on the everyday and consumer society. Furthermore these artists frequently employ unexpected and surprising juxtapositions and relations between objects, as well as objects and context. They play

with accustomed scale and proportions – achieving striking new images with the purpose of raising awareness of the public to these social and cultural issues. This way the art work can be viewed as composition 'designed' for such effects that strikingly manipulate attention and perception.

3.3.2 Op Art

Through many centuries one of the main concerns of artists was the mechanism of human perception and they have been always looking for the ways to manipulate the perception of the observer. In 1950 new field of interest occurred due to difficulties and needs of that time. This technological and psychological interest resulted the emergence of movement that called Optical art. This art by getting the abstracted patterns and integrating it with contrast technique of foreground and background, usually black and white for a perfect contrast, is produced and achieved effects that are visually confusing and playing with the perception of the eye.

It can be said that, Op art and Kinetic art share their field of interest in the beginning. However, Op artists are very interested of virtual movement, while kinetic artists rely on real motion in their works. Op art became famous through a gallery exhibition of both art works in Denise Rene in 1955. The term was become more popular when it is written in one of the articles of the Time magazine in 1964. However Op art was very well-known many years before by the artworks of Victor Vasarely, who is the first artist that invented some unfamiliar perceptual issues during 1930 (Parola, R., 1996), (figure 31).

Figure 31: Etudes Bauhaus A - Victor Vasarely- 1929 (URL 19)

The perception, and hence possibilities of creating illusion of motion, has been studied by both neuroscientists and artists – such as in the Op Art movement. During the 1965, Op art artists have explored juxtaposition of paradoxical elements that could manipulate perception by repetition of simple elements such as parallel lines that could generate the sense of movement. Painters such as Brigitte Louis Riley, created some artworks based on visual error through repeating units, changing sizes and intervals, colors and shadows. These artists tried to bring together a series of symmetrical lines, shapes, and bright colors to give a sense of movement, vibrating, flicking and flashing to the observer (figure 32).

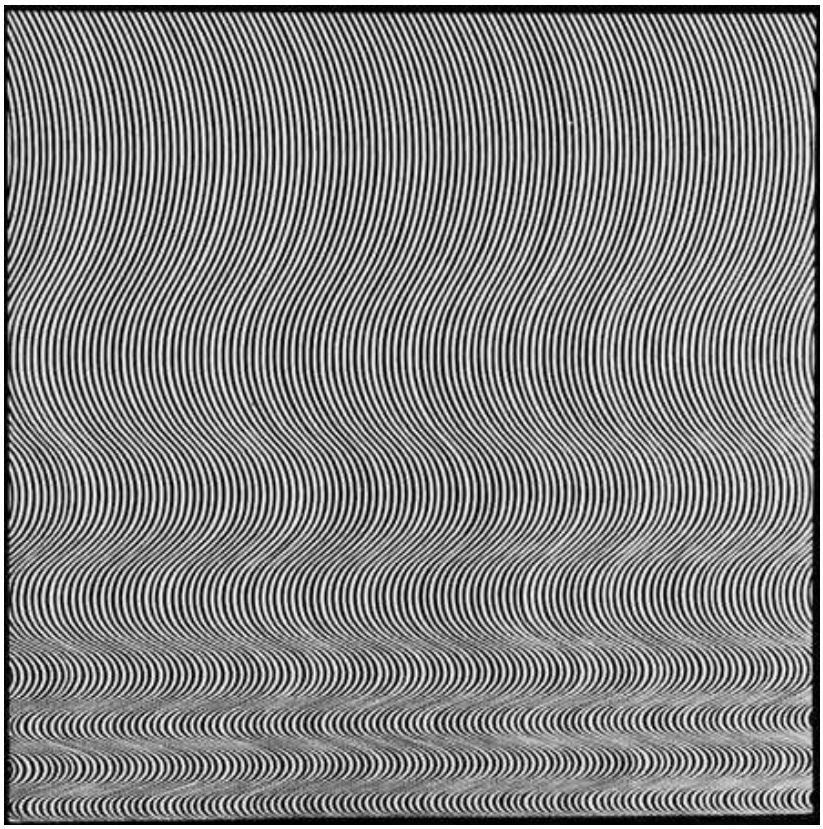

Figure 32: Fall- Bridget Riley, 1963 (URL 20)

These works of the Op Art movement drew a worldwide attention right after the celebration in the survey exhibition in 1965 at the Museum of Modern Art in New York. This event made Op art so popular that it became effective in fashion and media as well as on other kinds of art. Many people at the time believed that Op art could be very fitted and suitable for the era that has advanced in many technological fields and science (Parola, R., 1996).

In general, it can be said that, Op art is in close relation with geometric abstraction, and it is rooted in either the ancient techniques of trompe l'oeil (deception of eye) and Anamorphosis (the art of distracted objects that become understandable from a specific vantage point) or it is the abstract form of Pop art. It is a kind of painting or other form of art that uses visual illusions and optical errors as primary expressive tools. It is based

on the relation of figure and ground and juxtaposition of opposite images. Nevertheless, there are three types of Op artworks: the first one is the static artworks that are based on the movement of light and propensity of eye to create image immediately after watching to high contrast black and white images (figure 33). Second type of optical artworks are the one that floating in the air and their movement is very randomly. The weightlessness is a tool that is used from ancient period to create manipulation of perception. The best example of these types of artworks are the mobile objects of Alexander Calder (figure 34). The third type is the artworks that are acts through light or electromagnets. Getulio Alviani is one of the artist that use light and aluminum surfaces in order to create optical illusion (Zanker, J. M., 2004), (figure 35).

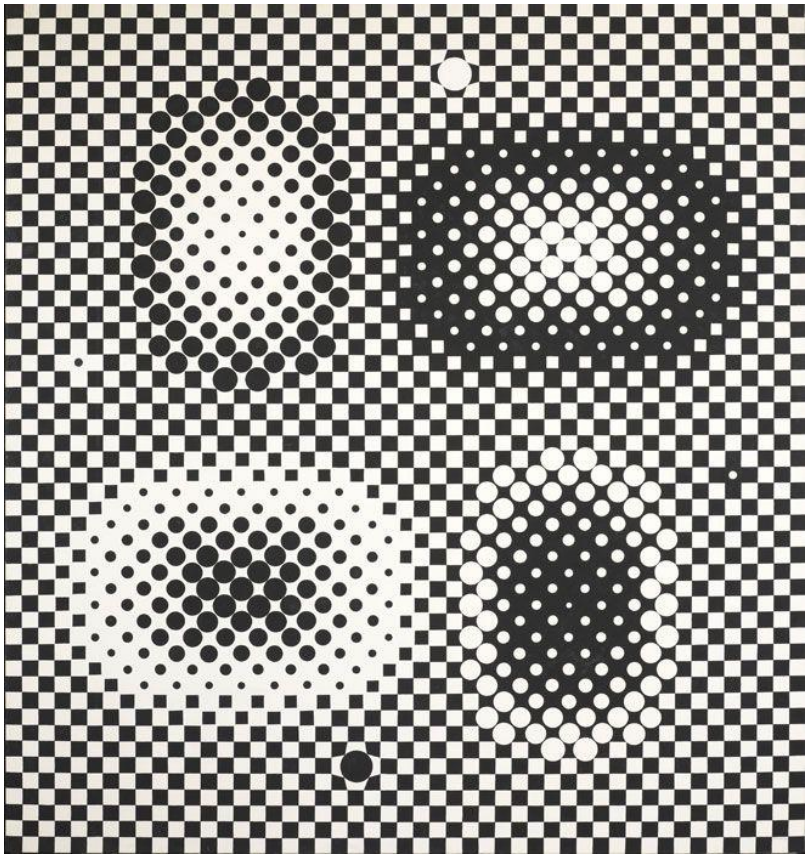

Figure 33: Metagalaxy - Victor Vasarely- 1959 (URL 21)

Figure 34: Mobile objects- Alexander Calder – 1932 (URL 22)

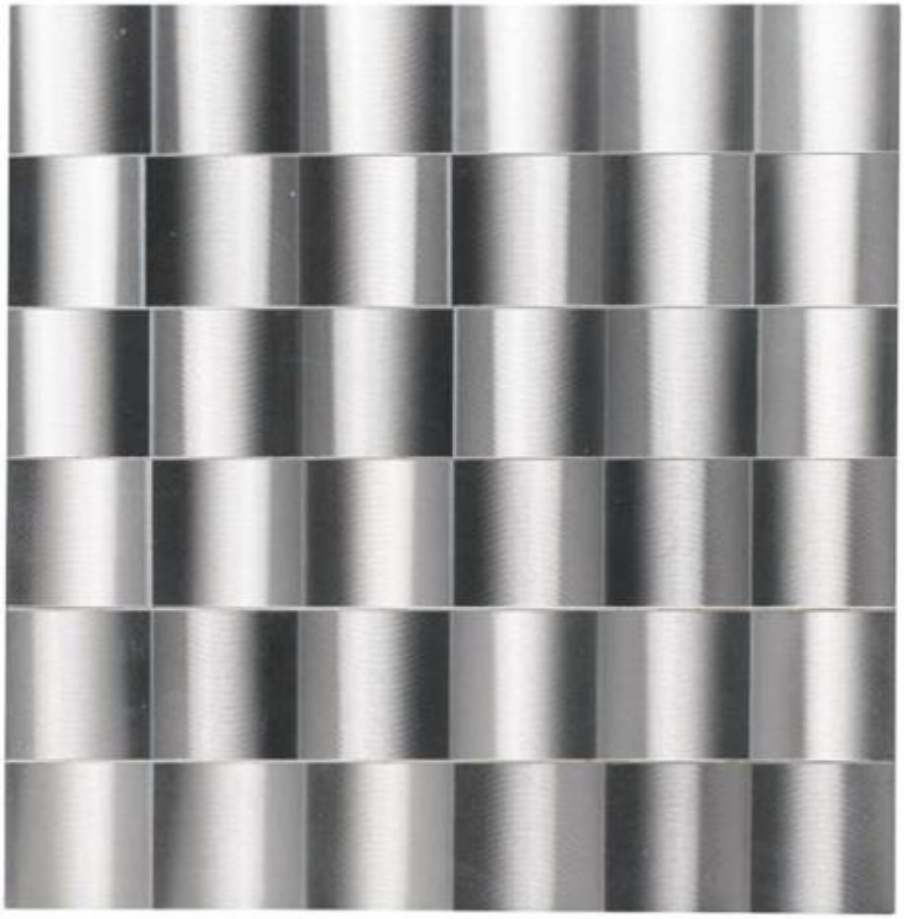

Figure 35: Superficie a testura vibratile- Getulio Alviani- 1962–1975 (URL 23)

In the figure-ground, the edges of one of figure become more dominant, thus, the figure can be differentiable from its ground. However, figure and ground becomes more ambiguous when the edge of both figure and ground carry equal values. For instance, in one of the artwork of Escher, called *The sky and the sea II*, the equal impression of figure and ground manipulating the perception and creating an ambiguous situation (figure 36).

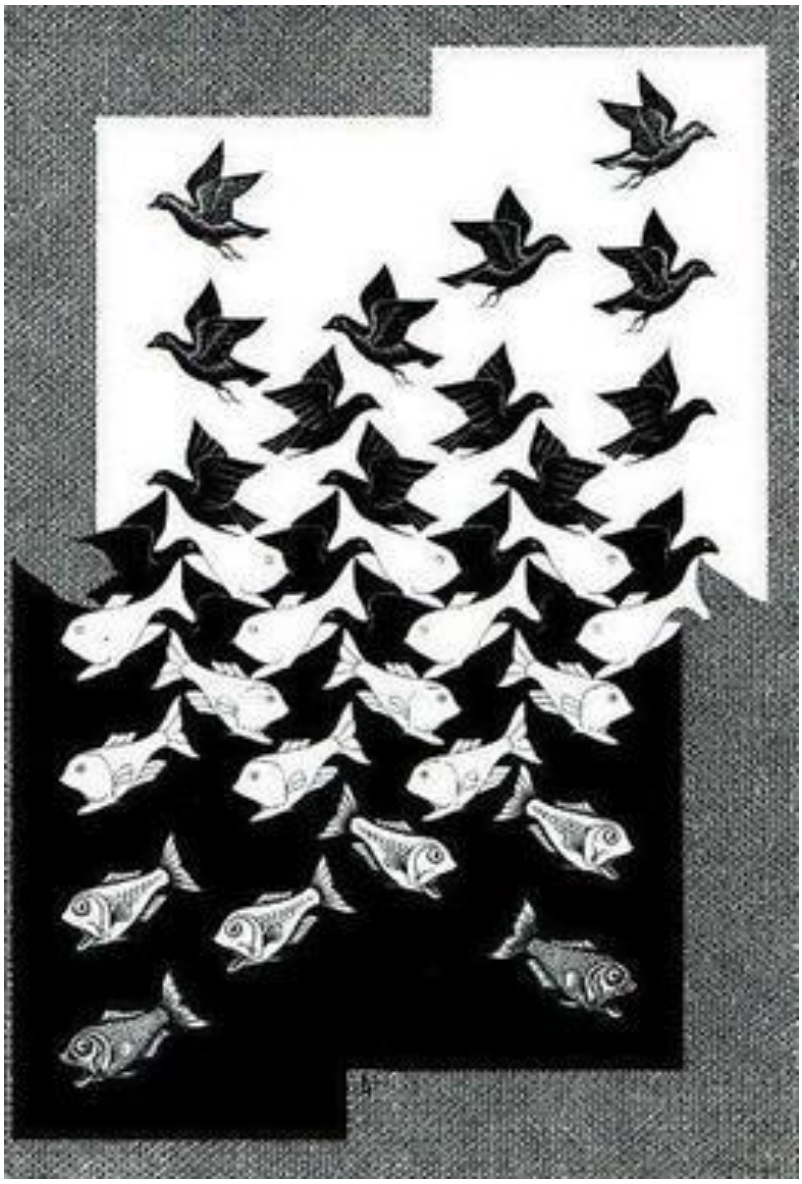

Figure 36: The sky and the sea II- Escher – 1938 (URL 24)

Escher's main intention was toward the creation of various contrasts discovering logically and physically impossible situations presented visually believable in his art works. In this regard he tried to combine two-dimensional elements together with three-dimensional figures in order to create extraordinary compositions.

The paintings of endless staircases are the examples that show how this artist tried to challenge the common logic and laws of gravity. In these paintings there is a focal point that is the center for improbable communication and it is displaying some instances of ordinary life of people within extraordinary surrealistic frameworks (figure 37).

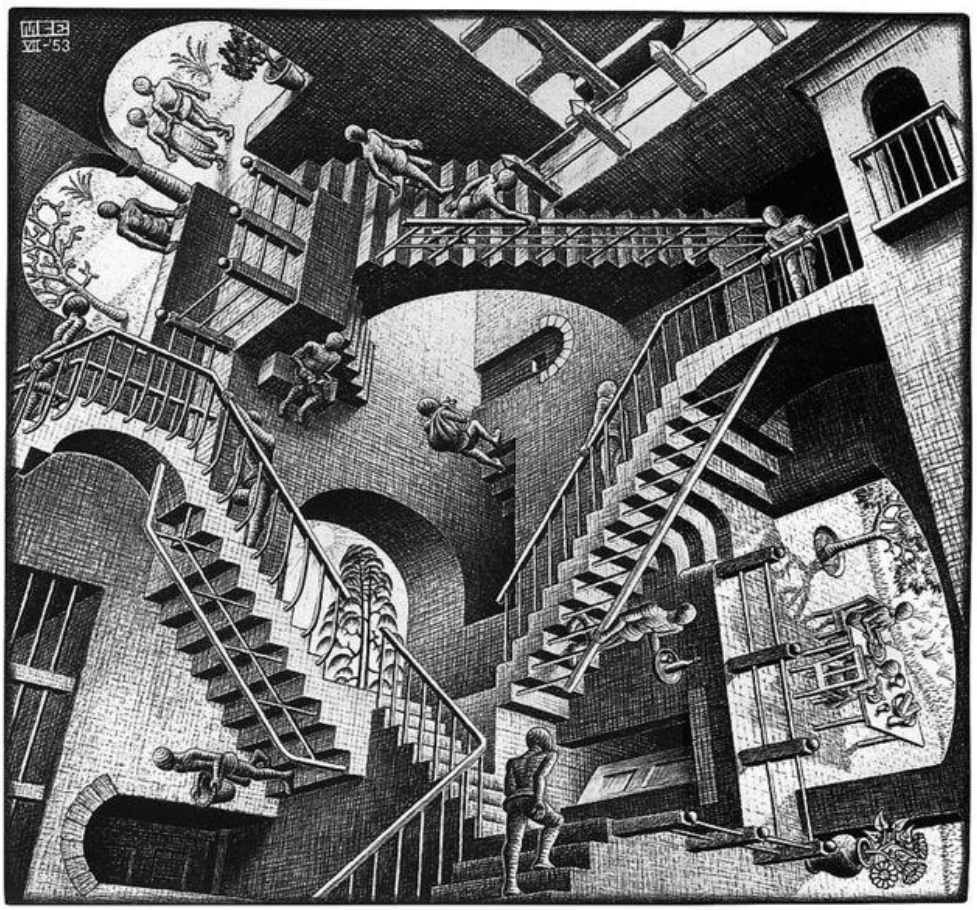

Figure 37: Relativity, M. C. Escher- 1953 (URL 25)

While during the Renaissance period the linear perspective is invented to create visual illusion of depth ‘penetrating’ walls, Op artists such as Victor Vasarely used these techniques to manipulate the perception by painting pictures that intend to come out of the frame like a balloons (figure 38).

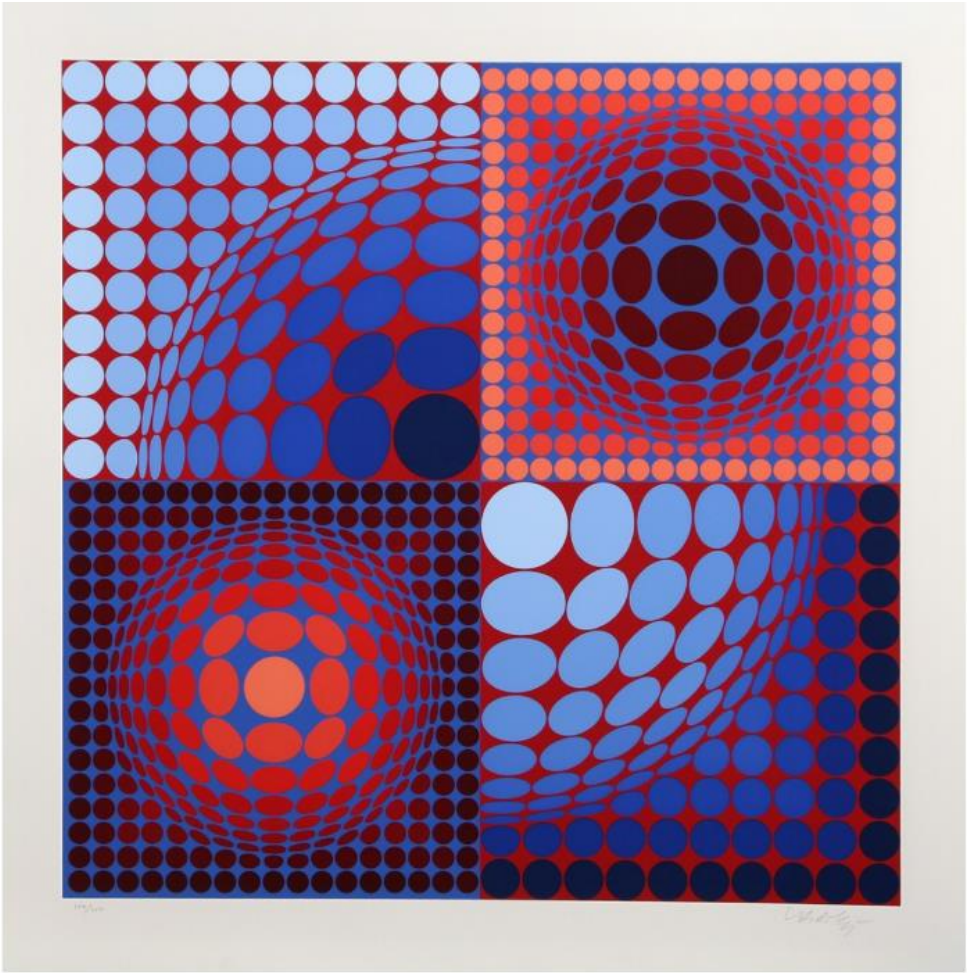

Figure 38: Novega, ca. Victor Vasarely- 1980 (URL 26)

According to neuroscience studies, the eyes tend to become absorbed into the areas with high contrast. High contrast images attract the attention of observer more than the pictures with low contrast. As an example, the perception of black color on the white background is different than its perception on the gray background, in the first one the color seems darker with higher contrast (Huang, M., 2009). In the more contemporary

examples of op art, Carlos Cruz-Diez, created an artwork that by staring at the blue and white lined square, suddenly the yellow color starts to appear, that is as a result of the combination of blue color with black color and its effect on the retina (figure 39).

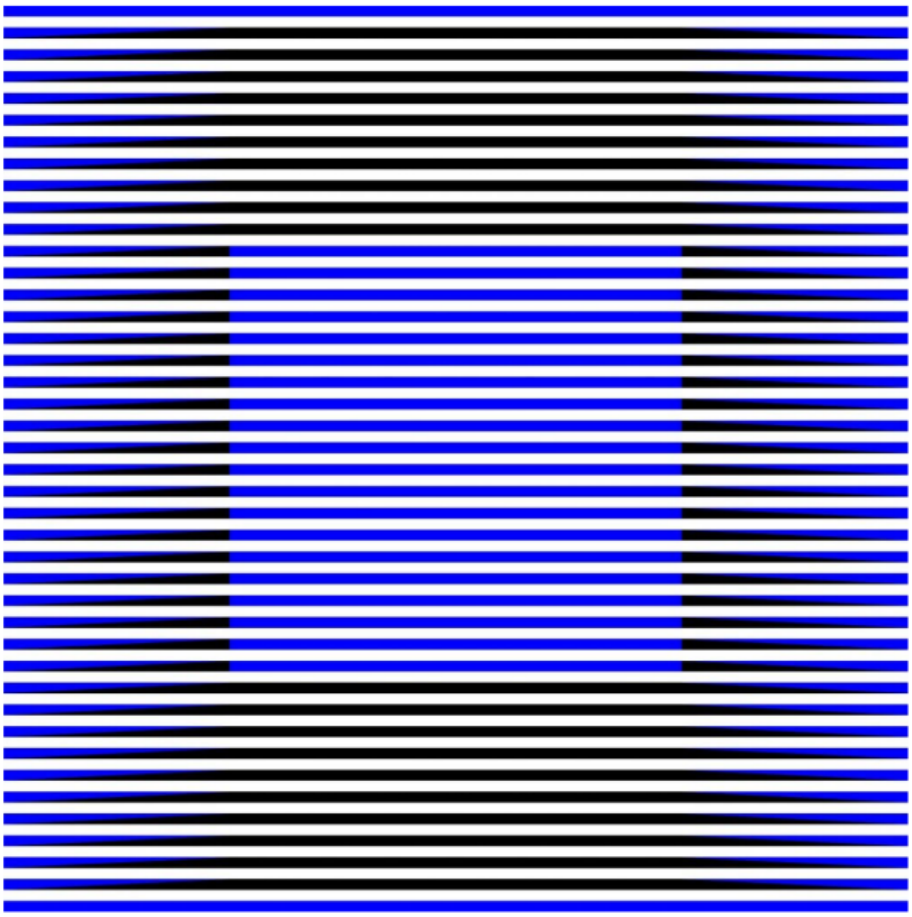

Figure 39: Induction du Jaune Panam A - Carlos Cruz-Diez- 2010 (URL 27)

It can be derived from all these examples of Op arts that, while the artists are investigating the mechanism of perception, the scientists are looking for their answers in Optical artworks. Nevertheless, both of them agree that human visual mechanism is not a mere replica of the outside world but it can perceive something beyond the reality.

3.3.3 Surrealism

Surrealism is an art movement that started since early 19th century in France. During this period some artists are tried to establish an art movement that is based the human unconscious. They believed that conscious mind always tries to limit the power of creativity and imagination due to its cultural taboos and judgments, hence, the only way to flourish the imagination is to allow the man's subconscious to express itself. Their emphasis on imagination and high form of reality brought them closer to the school of Romanticism, with the difference that they were looking for the source of their creativity in everyday life of the people. As Andre Breton, explained in his first Surrealist Manifesto, "It tends to destroy the other psychic mechanisms and to substitute itself for them in the solution of life's principal problems" (Breton, A., 1969). The main issue for Surrealist artists was to generate their artworks that go beyond the real world and show the inner concerns and anxieties of artist through mysterious and odd visual impressions. They tried to demonstrate the everyday life in its most dreamy way in order to confront the anxiety and depression raised from First World War.

The Tilled Field by Joan Miro, is one of the first surrealistic paintings which demonstrate the political position of Spain in 19th century. The painting is full of symbolic elements that shows the ideal Spain that is not under the domination of the dictator's government. The painting is full of vivid colors and objects that remind the free ideal Spain (figure 40).

Figure 40: The Tilled Field - Joan Miro – 1924 (URL 28)

The deformation and unusual behavior of the common objects are some of the techniques that the surrealist artists used to create extraordinary visual images. For instance, The ‘Persistence of Memory’ by Salvador Dali, is a highly surrealist expression of reality. In this painting, the key- objects measuring time – the watches are not flat as they are expected, but they are melting in the middle of a dream world (figure 41).

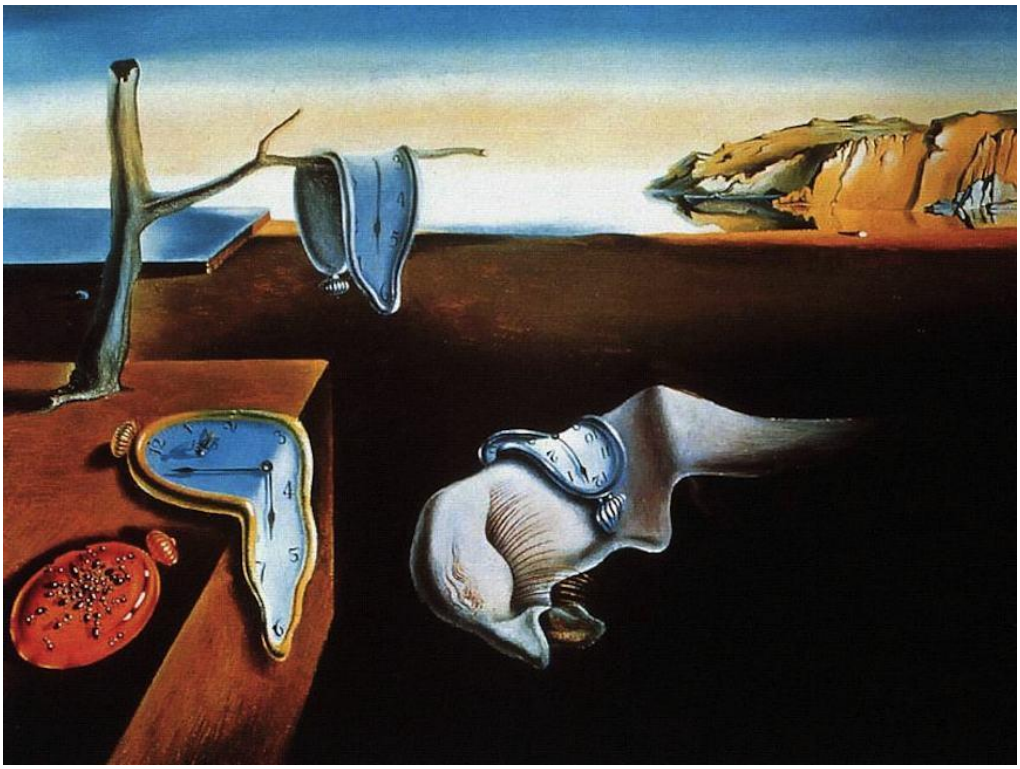

Figure 41: The Persistence of Memory- Salvador Dali- 1931 (URL 29)

The Great Masturbator is another early art work of Dali that considered as a self-portrait, shows the artists desire in demonstrating the unconscious situation of man in a surreal landscape, together with the ambitious elements such erotic figure of a woman and festivity in the middle of desert (figure 42). It can be said that, in Dali's paintings, all the three-dimensional objects are fragile with saturated colors that illustrated their super-realistic and imaginary quality.

Figure 42: The Great Masturbator - - Salvador Dali- 1929 (URL 30)

One of the major characteristics of surreal artworks are their tendency to break up conventional perception in order to provoke different emotions and senses. As an example, in an artwork of René Magritte, he is illustrated familiar things such as bed, comb, soup etc. in a very unusual proportions that creates sense of confusion and incongruity (figure 43). His intention was to create ambiguous images that are hidden behind the reality of lives. In his words, his unconventional artworks are “a defiance of common senses” (Allmer, P., 2009).

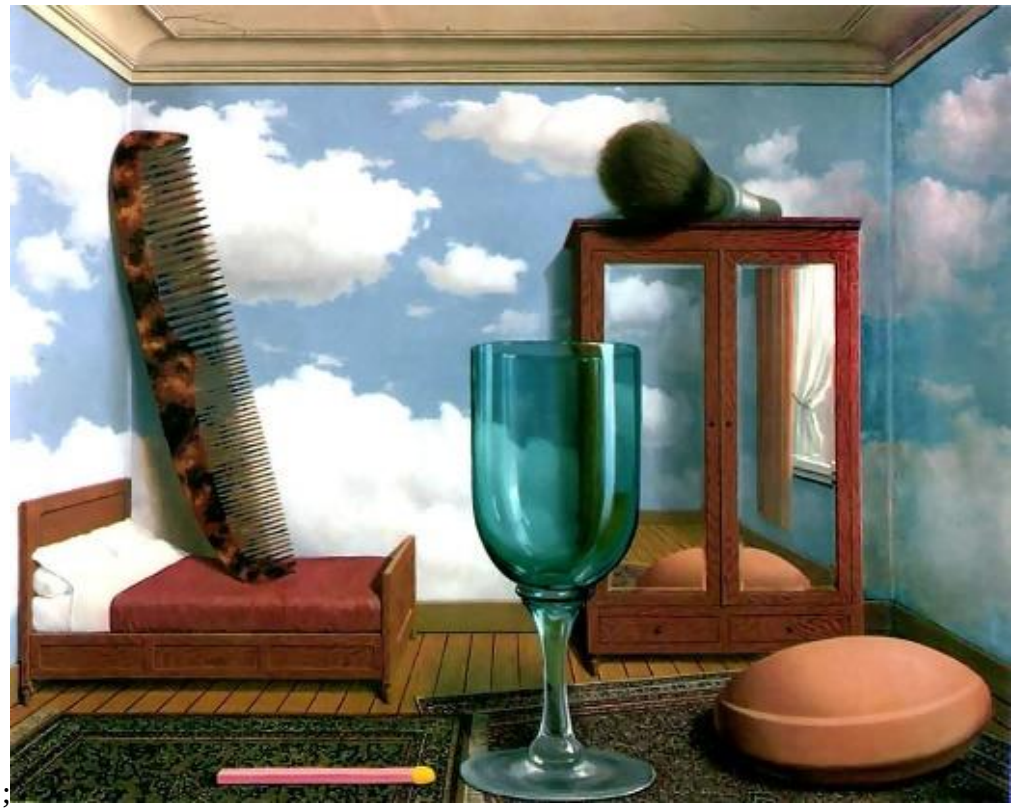
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Figure 43: Personal Values- Rene Magritte- 1952 (URL 31)

In another artwork of Rene Magritte, that later became one of iconic image of this movement, he is pictured a simple pipe and stated that “This is not a pipe”, hence, he distinguished the indication from meaning and through this painting, he challenged the knowledge of spectator, (figure 44), (Allmer, P., 2009).

Figure 44: The Treachery of Images - René Magritte – 1948 (URL 32)

In can be conclude that, in surrealism, artist are attempted to show a hyper-real form of everyday life by using various techniques such as deforming the shape of familiar objects, playing with scale of elements, using of saturated colors, in order to manipulate perception and challenge the human knowledge and interpretation of real world.

3.4 Summary: The Concept of Ambiguity as Positive Design Value

Table 3 seeks to list and organize various theories about ambiguity and art movements that use different techniques for ambiguity in their artworks. Also the table illustrates their main concepts, and ideas, as well as the elements and principles that they used in order to create ambiguity and manipulation of perception.

Table 3: The concept of ambiguity as positive design value

Name / Approaches	Concept / Relations	Key words	Elements / tools/ principles
Jean Baudrillard	- Duality between real and virtual world	- Generate seduction, contradiction, duality	- Contradictory relations - Dual and Polar relations
Robert Venturi	- Complexity in physical shape and content - Contradictory elements	- Complexity - Contradiction - Richness of meaning - Paradox in perception - Optical illusion	- Composition - Diverse elements - Shapes - Structure - Texture - Material
Antony Vidler	- Sense of estrangement - Anxiety - Producing an antithetic condition that provokes confusion and deception	- Contradiction between homely and unhomely - Contrast between familiar and unfamiliar things - Dark and abandoned spaces	- Volumes - Masses - Materials - Textures
Pop art	- Mass media - Popular culture - Manipulating attention and perception - Blurring boundaries between ordinary objects and art	- Ordinary objects - Unconventional mix of elements - Unexpected and surprising juxtapositions of objects and relations - Creating a dynamic perspective	- Playing with scale - Reversing customary qualities and materials - Unusual Proportions - Bright colors - Combination of collage pieces with the painting - Playing with the common material of objects - Creating objects in the scale of monuments

Name / Approaches	Concept / Relations	Key words	Elements / tools/ principles
Op art	- Manipulation of visual perception - Producing visual error - Visual illusion - 2D-3D illusion, - Illusion of movement	- Sense of movement, flashing and vibrating - Juxtaposition of paradoxical elements - Geometric abstraction - Visually confusing and playing with the perception of the eye	- Geometrical shapes - Foreground & background - Repetition of similar elements - Unusual Size - Intervals - Bright colors - Light and shadows - Symmetrical lines - Shapes/ deformation - Black and white colors - Abstracted patterns - Using techniques of trompe l'oeil and Anamorphosis - Weightlessness - Light or electromagnets - Movement of light and propensity of eye
Surrealism	- Human unconscious - Emphasis on imagination - Unconventional perception - Hyper-reality - Demonstrate the everyday life in its most dreamy way	- Mysterious and odd visual impressions - Sense of confusion of real and imaginary, reality and dream - Unusual behavior of the common objects	- Playing with Scale - Deformation /transformation of familiar things - Unusual proportion

3.5 Ambiguity in Design: A Tentative List of Aspects, Principal Approaches, Elements, Tools and Techniques

Based on the study of literature so far it can be derived that in order to achieve a coherent whole, design relies on various systems and principles of order and organization. However, along with straightforward, clearly ordered and well defined spaces, design may seek to generate complex interior spaces. This is so because complexity and ambiguity play a special role in stimulating the perception and taking the attention of observer toward the space. Hence while there is no doubt that every architectural work has a degree of cohesion, and unity and conjunction that are legible are appreciated, ambiguity may also be construed as positive value in design and experience. Exploring the endless variety of correlations between elements and components that may follow diverse principles, and seeking to create ever new combinations, each with different perceptual qualities, ambiguity is a quality that could extremely stimulate perception, raise attention to space and provoke various emotions. Ambiguity is also a spatial quality that evidently requires special design approaches. It is essential to study and find out what might be the diverse methods and techniques in meeting such intentions.

Principally these involve the use and combination of systems of order and principles in innovative ways, employing architectural elements in unexpected correlations – i.e. in such a way that they could alter and stimulate perception – and ambiguity appears as one such essential mechanism. Therefore, in the following section a tentative list of such principal tools and techniques is compiled based on and conjoining the research findings so far. It can be construed that all of these are based on and focus on correlations – both as the elements and tools in design techniques, and as the complex

effects in perception of space. All of these can be taken as means to raise the awareness to space and generate conditions as possibilities for different readings of space.

Design for ambiguity is generated relying on the principal elements and components that formulate interior space and its perceptual effects.

3.5.1 Interior Elements and Components

- enclosure and openings
- furniture, furnishing
- lighting systems and fixtures
- objects
- Surface treatment – materials: color texture and pattern

3.5.2 The Principal Design Intentions – Aspects of Ambiguity

It can be defined as Follows:

- Manipulating the reading of space
- Manipulating the interpretations
- Creating visual complexity
- Exaggerating scale, or other properties of elements
- Creating unexpected correlations among elements
- Generating sudden and surprising discoveries for the observer

3.5.3 The Tools and Techniques for Ambiguity

Employ and Involve the Following:

- Applying more than one principle / system of design
- Mixing, juxtaposing, superimposing controversial forms,
- Playing with the visual qualities and definition of space and objects
- Employing means of optical illusion

These above general approaches find more concrete design guidelines in the context of composition/order / form, scale and proportion, articulation and surface treatment – which may be taken as the major tools in interior design.

Hence concerning the overall composition, the ordering systems and principles employed to correlate elements and components, as well as the very relations between some of these different principles and systems – allow identifying various methods and techniques of dealing with them in order to create ambiguity and contradiction in space.

3.5.4 Composition and Order

- Introducing more than one system of order in unexpected juxtapositions – such as for instance applying more than one organizational system (grid-central-radial- linear-axial) to space, so that these systems are superimposed and work simultaneously, and the main system is not distinguishable, in a way that the composition can looks as a central organization from one angle, and grid organization from another point so it can be ambiguous.
- Treating various interior elements and components as different systems and coordinating these in complex ways
- Manipulating the interpretations of the observer by ways of mixing principles (such as symmetry, hierarchy, rhythm) and shifting among these for different systems of elements
- Introducing unexpected arrangement or foreign elements into the composition, as an example the use of diagonal elements could be ambiguous in a spaces that are designed through grid system of arrangement.

- Bringing dissimilar element in the group of similar elements. In this manner dissimilar element is still within the group but has different impression on the observer.
- Generating the sense of manipulation and complexity by unexpected overlapping or subtracting of spatial form.

3.5.5 Articulation of Relations

Applying more than one principle of design that could increase the visual weight and create complexity in space, however they can be in balance with each other.

- Using contrasting elements such as irregular shapes in contrast with regular ones or the objects with unusual scale and proportion or unusual hierarchical composition that could create chaos within balance can take attention and give the feeling of complexity, duality and confusion.

3.5.6 Scale / Proportion

Altering the scale of certain objects in a composition can also create divers feelings of confusion and ambiguity. Alteration can be either between elements or in relation with human scale.

Correlations between elements:

- In this manner modifying the proportion of one or group of elements in juxtaposition with the other elements of that group can deceive the perception of observer.
- Also playing with the scale of elements and exaggerating in the size of objects and elements within the space in order to create an unexpected situation and destruction of perception.

Correlations with human body:

- Changing the standard scale and distance of objects, that are in direct relation with human scale can provoke different feelings of fear, ambiguity and duality.
- Enhancing or reducing perceptual and perspectival deformation in form such as depth or scale or distance

3.5.7 Articulation Means and Surface Treatment – Materials: Color Texture and Pattern

Pattern and texture of surfaces are rendering device that can directly affect human perception of space:

- Unexpectedly changing a group of motifs within the pattern of surface
- Juxtaposition of different materials within a similar content
- Using irregular scale and proportion of texture that would not be related to the scale of space
- Creating a human scale three-dimensional paintings on two-dimensional surfaces in order to give the sense of continuity to space, or blur spatial boundaries.
- Blurring boundaries by using unconventional patterns and textures in order to create optical illusion
- Using illusionary treatments in order to:
    - Breaking down the physicality of surface by means of
    - Shifting perceptually the spatial enclosure or the limitations of space
    - Blurring inside and outside relations

All findings relevant to the understanding of the perceptual qualities and the techniques for creating ambiguity, visual illusion and complexity in space, are summarized in Table 4. These will be taken as basis in the analysis of relevant cases.

Table 4: Ambiguity in design: aspects, principal approaches, elements, tools and techniques

Elements /components of interior space	**Design intentions/ aspects of ambiguity**	**Major tools of interior design**	**Techniques**
- Enclosure and openings - Furniture, furnishing - Lighting systems and fixtures - Objects - Surface treatment - Materials: color texture and pattern	- Manipulating the reading of space - Manipulating the interpretations - Creating visual complexity - Exaggerating scale, or other properties of elements - Creating unexpected correlations among elements - Generating sudden and surprising discoveries for the observer	- Composition and order - Articulation of relations - Scale / proportion - Correlations between elements - Articulation means and surface treatment - Materials: color texture and pattern	- Applying more than one principle / system of design - Mixing, juxtaposing, superimposing controversial forms, - Playing with the visual qualities and definition of space and objects - Employing means of optical illusion - Organizational systems (grid-central-radial- linear-axial - Combining two or three organization system such as central system with grid system - Unexpectedly combination of different arrangements such as diagonal and grid arrangements of furniture and textures - Overlapping or Subtracting of spatial forms - Playing with the scale of elements and objects - Exaggerating in the size and height of objects -Altering the standard distance and height such as height of columns, walls, etc. - Enhancing or reducing perceptual and perspectival deformation in form - Using irregular scale - Using unconventional proportion of texture on surface - Creating a human scale three-dimensional paintings - Using unusual patterns and materials as solution for spatial arrangements - Using contrasting elements such as irregular shapes in contrast with regular ones

Chapter 4

CASE STUDIES: AMBIGUITY AND MANIPULATION OF PERCEPTION IN INTERIOR SPACE

4.1 Spatial Ambiguity in Historical Interiors

This section seeks to offer an analysis of a range of historical interiors that carry potential to better understand how architectural design may result in manipulating perception and strong effects of ambiguity in space. As was established in the theoretical part, most techniques for ambiguity rely on sometimes extreme alteration of the design elements and their relations and proportions, as well as their articulation, while in terms of composition and order the techniques employ mix organizational systems and principles. These methods and techniques of alteration would tend to control and establish diverse and conflicting impressions from space, and thereby making it possible to stimulate the senses and alert perception. Hence spatial ambiguity would generate when employing provocative and surprising spatial data, radically changing the accustomed / expected relations among elements, blurring spatial boundaries with means that on the extreme board on visual illusion, or otherwise presenting solutions that suggest various readings in the combination of the principles used in design.

It can be said that, the general idea of design as practice of manipulating perception towards certain effects and affective ends, has been considered in architecture since ancient times, but has turned into a positive design value and explicit design intention

in contemporary interiors. As ambiguity is a special case of such manipulation it can be best illustrated and becomes, especially tangible in ‘extreme’ examples. Following a historical chronology, a range of cases will be illustrated and analyzed with respect to their ambiguous effects in keeping with the proposed tentative list of techniques. In turn these may help make these tools and techniques more legible and refined – and gain special understanding of designed effects in space and the various possibilities for their perception.

4.1.1 Antiquity

Antiquity refers to various design periods before the Middle Ages. The earliest examples are found in ancient Egypt. Aside of the awesome size of the religious structures, which remain unique in history in view of the proportional relations with the human body, these examples can be interpreted in terms of an interesting aspect of ambiguity – they frequently present a confusing mixture of space (open for circulation and use) and mass (the enormous structural columns which carry the roof). However, the effects of these buildings are not necessarily aimed to create ambiguous spaces, but certainly aimed to manipulate perception of observer. It should be mentioned that the main reason of these proportionally dominant structural columns is the aim of constructing such awesome and high spaces and the constraints of construction technology of the time.

The Temple of Seti, located in Abydos, Egypt, with L shape plan, consists of two hypostyle halls and seven chapels. The roof of the first hall is supported by twenty-four columns and the second hall is supported by thirty-six columns (Wilkinson, T. A. (2002). This temple has linear and symmetrical arrangement of the elements and components such as columns, walls, and chapels. It can be construed that these

columns and their order in the space create its specific effects: these columns are enormously high, with unique proportion and shape. Hence an extraordinary relation between architectural elements and components, and space characterizes these interiors – situating the body within an exceptionally dominant and powerful architectural space, creating feelings of awe, fear and anxiety by the sheer size of the structural elements (figure 45). Moreover, when viewed in terms of 'figure-ground' relations - with this size of elements and small spatial distance in-between, the columns turn to be the 'figure' while space is reduced to back-ground. In this temple the perception of size is still enhanced through altering the proportional shape of columns, and the building appears to be still more enormous in size and height. Also integration of the ceiling, floor and row of columns in axial composition give a strong feeling of depth to space. So that, by effects of construction limitations the special size, distance and height of columns and walls, as well as the perceptual deformation of columns, enhance the sense of awe, and anxiety (figure 46).

Figure 45: Temple of Seti, First hall- Abydos- Egypt Abtu temple- Around- 2055 BC (URL 33)

Figure 46: Temple of Seti, Second hall- Abydos, Egypt- Around 2055 BC (URL 33)

The architectural works of Antiquity contain the archaic, classical and late antiquity periods, which gradually extend from ancient Greece, to the Roman architecture.

During the old Age, buildings were constructed as rectangular volumes and contained the order of structural columns both inside and outside the building – religious or mansion. Later on, the approaches of ancient architecture which apparently had a worldly dimension, gradually transformed to the style of classical architecture with completely religious content. In this period, due to the diminishing power of royal government and the emerging ideas of democracy, the religious rituals were opened to a broader public and the temples constructed were to celebrate the city god, who was worshiped as the representative of the city. Accordingly temples surrounded with numerous high columns were to become the symbol of architecture of ancient period. However the columns were formed not only for structural, but also for visual manipulation with regular diminishing circumference, but also were bulging middle and thereby appeared both stronger and taller.

The facade of the Library of Celsus (114–117 A.D) offers another example where the illusion of changing distance relations among pairs of columns is produced by way of playing perceptually with the size and articulation of the building components.

This library belongs to the architecture of ancient Rome, and located in Ephesus, Anatolia. Also it was the one of the large libraries in ancient Rome (Robertson, D. S., 1929). The building has a single rectangular shape with a single apse in one side of the building. It has a central plan and the series of columns and rooms are arranged around this rectangular hall. This building is on top of a platform and has three entrances and eight supporting columns in each of the two floors while the actual distance / span between these remains relatively unchanged. However, in the ground floor the arrangement the supporting columns is in four pairs and each of these pairs are

connected with an ornate beam. In the second floor the columns are connected and made to work in different pairs, and the central pillars have much larger capitals and rafters. Hence while the second floor pairs of columns are directly above the first ones and create two-storey gallery, in each of the two floors in spite of their almost equal distance, the pillars are seen much more far from each other. Also, the upper floor columns are slimmer and connected encompassing the central axis. Hence, alternating the scale and pairs connecting beams respectively diminishes or enlarges the perceptual distances among them. On the other hand, the three front entrances of this building are two-storey high, hence, the building seems much larger and taller than its actual size. Despite of the simple rectangular shape of building, the unconventional treatments such as using objects with unusual scale and proportion near the usual ones and playing with the scale and height of building and columns, all generate visual manipulation and ambiguity in the space (figure 47 - 48).

Figure 47: Library of Celsus, Ephesus, Anatolia- Enlarged perceptual distances among columns - 114–117 A.D (URL 34)

Figure 48: Library of Celsus, Ephesus, Anatolia- Building seems much larger and taller than its actual size 114–117 A.D (URL 34)

Articulation of space in terms of surface treatment is another technique employed since Antiquity in altering the perception of an interior in form of mosaics, murals and frescoes as pictorial treatment of enclosing surfaces. The *'Trompe-l'œil'* presents another such special technique for misleading perception of depth and creating an illusion of the space through painting three-dimensional pictorial representations of space on surfaces. *'Trompe-l'œil'* is a French concept for "deceive the eye", is a work of art that tricks the eye by illuminating three-dimensional images of imagined spaces in human scale. The origin of this art is belong to ancient Greece and perfected in Roman architecture. Still later it becomes the principle for representing the realistic three-dimensional perspective in Renaissance period and is also used widely during the Baroque period. Furthermore, this technique is not just used in painting, but is widely used in interiors directly applied on surfaces of enclosure – on floors, walls, ceilings, doors, etc. In the House of the Vettii (79 AD), located in Roman town of Pompeii, the perceptual extension of space by way of two dimensional treatment of the enclosure (murals), makes for a disappearing boundary and extends perceptually the interior space by adding an illusionary scene (figure 49). Also scale of human bodies in painting is close to actual size, blurring image and reality accordingly, it creates a manipulation of depth and confusion of real and painted space (figure 50). Hence, it can be said that, using life-size human figures and large proportion of texture on surfaces, may change perceptually the limitations and boundaries of the space, so that the blending of image and space gives sense of continuity to the observer.

Figure 49: House of the Vettii – Pompeii- 79 CE (URL 35)

Figure 50: House of the Vettii – Pompeii- Human bpdy scale paintings- 79 CE (URL 35)

4.1.2 Renaissance

Following Antiquity and the 'Dark Ages' of economic and political instability and confusion, the Renaissance is a period of relative steadiness and prosperity producing far-reaching cultural and intellectual developments. Giordio Vasari, the Italian artist was the first artist that used the term Renaissance in his book *'The Lives of the Artists'*

and explained that the artists and architects of that era were "believing that their buildings had to belong to a higher order". Filippo Brunelleschi, was one of the forerunner architects of Italian Renaissance that established the concept of 'linear perspective' as a means of representing space during the 15th century. Later on, Battista Alberti, another Italian architect formed the rules of 'central perspective' based on Brunelleschi's theory of perspective (Spiliotis, A., 2008). During the Renaissance, the techniques of perspective became the tools that artists used in order to represent and express depth of space and produce illusion of three dimensional real situations and architectural space. One of the first paintings of Renaissance period, painted by Piero della Francesca is called '*Flagellation of Christ'* (1455–1460). The artist used linear perspective in order to show the hall in a realistic form (figure 51). Despite of the simplicity of painting, it could perfectly show the geometrical principles of composition as well as the proportion of space with human scale (Lavin, M. A., 1990). By help of this technique, pictorial representation gains power to invite and deceive the eye – visual perception – towards an almost three dimensional 'spatial' experience.

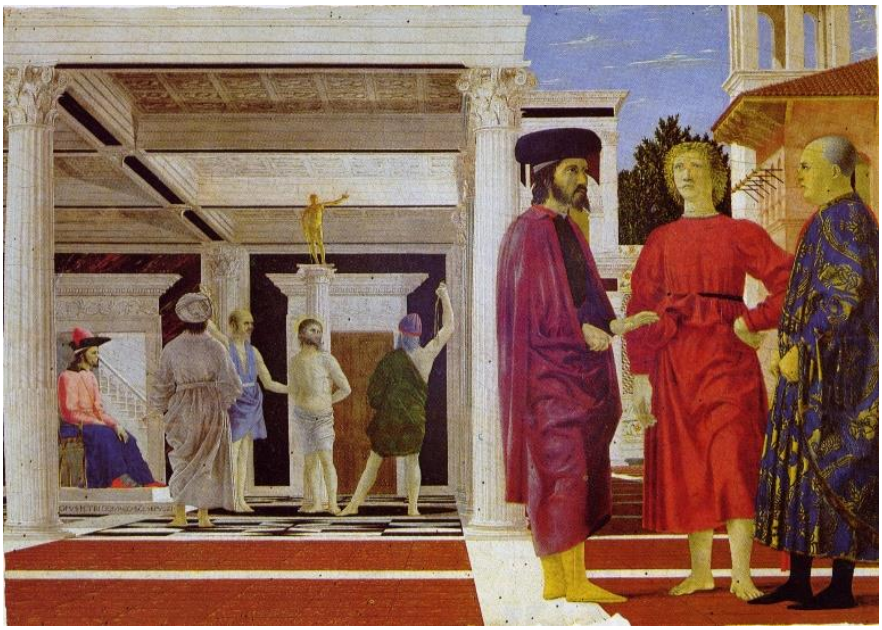

Figure 51: 'Flagellation of Christ' - Piero della Francesca, 1455–1460- (URL 36)

However, experiencing vivid three-dimensional depth of space does not only occur through observing of three-dimensional picture from the center of perspectival projection. In other words, the quality of perception of depth could be changed if the picture is represented to the eye of observer from any point of projection other than the center. Hence, in order to create a vivid three-dimensional depth, it is necessary to project the picture in a large size and from long distance. The most frequent cases of implementation of these principles are the paintings on walls or ceilings. One of the best examples of this technique is the art work of Andrea Mantegna, in the Camera Degli Sposi located in Palazzo Ducale, Mantua (figure 52-53). In this painting, he tried to break up the perception of the ceiling by drawing a parapet and showing the sky above it. Around this parapet there are several figures that are sited on the edge of parapet (Kubovy, M., 1988). Such examples would mark the beginnings of the art of creating illusionistic paintings in and of architectural space.

These illusionary treatments such as creating three-dimensional sky above the ceiling, and the use of these human figures, all are blurring spatial boundaries and giving false sense of continuity to space.

Figure 52: Camera Degli Sposi - Andrea Mantegna - break up the perception of the ceiling by drawing a parapet and showing the sky- 1474 (URL 37)

Figure 53: Camera Degli Sposi - Andrea Mantegna - 1474 (URL 37)

Later on, Baldassare Peruzzi took a step toward the creation of even more ambiguous spaces by painting three-dimensional images on the wall of the second floor of the Villa Farnesina and perceptually deforming the enclosure of the interior (figure 54). In this, Peruzzi painted a balcony supported by architectural elements such as columns and create the illusion of extensions in walls. Perception of observers is manipulated by offering an artificial 'view' of the city of Rome from a balcony. So that, also in this building, the artist used the surface treatment for illusionary techniques to extend the limitations of building and blurring the inside and outside boundaries, manipulating perception and confusing the observer.

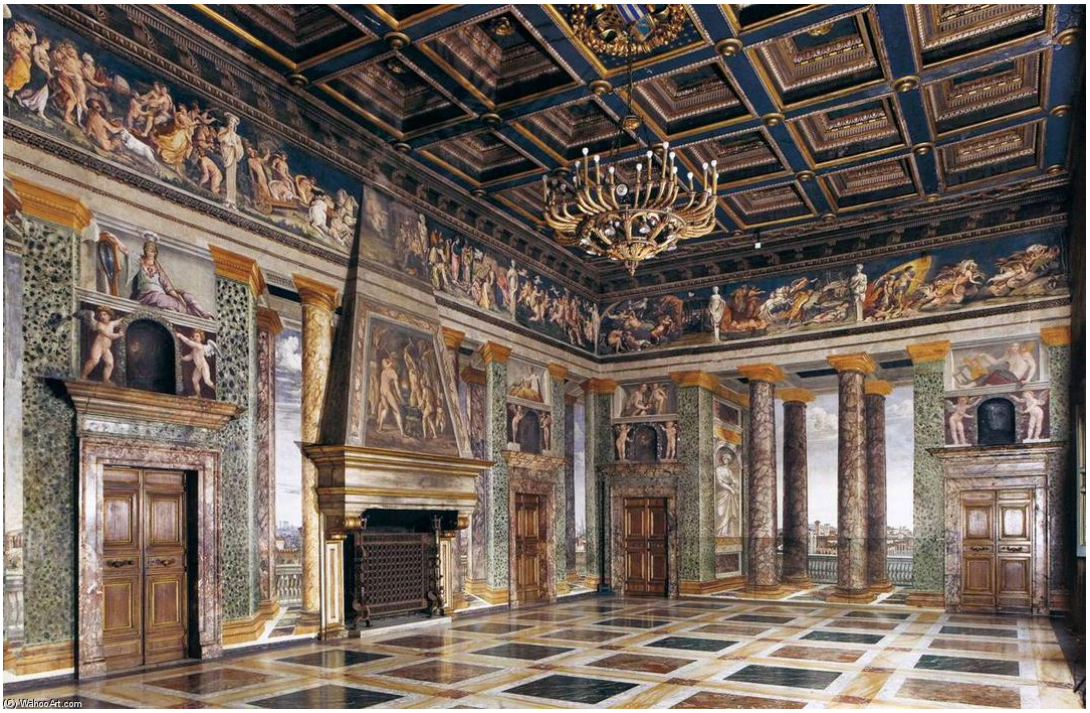

Figure 54: Salla delle Prospettive- Baldassare Peruzzi- Rome1515 (URL 38)

Another example of employing murals to manipulate visual perception of interior space is the church of San Satiro in Milan (figure 55-56). The church's paintings are the art works of Donato Bramante, who is one of the great artists and architects of the Renaissance. Viewed from the entrance, the church appears to contain a long nave and

a long apse in the end point of the church. However, when gradually getting closer to the altar, the long apse is seen in its real length – not more than a meter in depth. The optical illusion of the mural seems real with the help of painted architectural components in perspective such as the columns and vaulted ceiling that all go to a central vanishing point at eye level of viewer. Hence, through deformation of common architectural components and elements the impression of vivid depth is created within the space (Emmer, M. (Ed.). 2005).

Figure 55: Church of San Satiro - Donato Bramante- Nave seems longer from front view1482- Milan (URL 39)

Figure 56: Church of San Satiro - Donato Bramante- From 1482- Nave's actual depth- Milan (URL 39)

4.1.3 Mannerism and Baroque

Mannerism is the style following the Renaissance in European art and literature since the seventeenth century. Gradually it became to be known as an artificial, radical, and spectacular form of approaching art and architecture. Different from the Renaissance artists who emphasized the clarity of balance, symmetry and linear extension of space with the viewer in central position, Mannerist artists tried to use dramatic 'nature' as a base for intellectuality and represented high emotions. They employed exaggerated figures and scenes, contrasting textures, colors, focusing on light and shadow, producing mysterious unexpected and ambiguous spaces. Mannerism movement finds strongest expression in Italy, in painting, sculpture architecture at a time between the Renaissance and Baroque period (Bosquet, J., & Taylor, S. W., 1965).

Palazzo Te in Italy, is one of the best examples of the Mannerism style, constructed by Giulio Romano, in 1534. The palace built around a central courtyard and includes several chapels and rooms. The Mannerist style frescos are painted on the wall and ceilings of these rooms as continuous image. The technique is employed in terms of rich ornamentation on walls and ceilings and juxtaposition of various textures, as well as the use of sharp contrasting colors, exaggerated figures in real human size, creating a very complex and ambiguous space (figure 57-58). This way the perception of the actual form of the enclosing walls and ceiling is effectively blurred and spatial experience is misled.

Figure 57: Palazzo Te - Giulio Romano- Blurred boundary between walls and ceilings-1534- Italy (URL 40)

Figure 58: Palazzo Te - Giulio Romano- Blurred boundary between walls and ceilings- 1534- Italy (URL 40)

The Laurentian Library, in Italy is another example of Mannerism. The construction of this library was started by Michelangelo, and continued by Tribolo and Vasari and Ammannati, and opened to public in 1571. The building has a long rectangular shape that divided into two rooms, one long library reading room that proceeds from much taller square entrance hall that is filled by a huge staircase. The reading room has linear organization of interior space and all the elements and components such as windows, columns, tables and chairs are arranged symmetrically alongside this rectangular space architecture (Figure 59, 60). The special kind of ambiguity of this interior is that the building seems to be inside out. The design method is to employ to the interior some

enormous treatments that conventionally belong to the exterior facade. The enclosing walls are ornamented with fake blind windows, articulated in the way they would appear on the outside façade. The central staircase occupying the space is another architectural component manipulated for special spatial effects. The unusual shape and materials used for the staircase make the interior of this building very ambiguous and very complex. The central part with convex steps appears as liquid that flowing down onto the floor. The absence of handrail on the side flights demonstrate that it is intentionally built as a sculptural rather than functional element. Furthermore, the reading room has a strict and symmetrical interior design. The articulation of the ceiling in cassettes and their coordination with the wall pilasters and windows enhance the perspectival effects – i.e. the depth of space. The intermittently and continuous repetition of the interior elements such as windows and ceiling, their absolute alignment with the tables has created a u-shaped enclosure in contrast with the central floor pattern. The floor patterns and materials, as well as the rigid articulation of walls and ceiling, result in an unconventional and odd environment (Nicholson, B., Kappraff, J., & Hisano, S. (2015).

Figure 59: The Laurentian Library- The entrance and– Michelangelo 1571- Italy (URL 41)

Figure 60: The Laurentian Library- The study room and library– Michelangelo 1571- Italy (URL 41)

Different from Mannerism's exaggerated techniques in artistic creation, the Baroque architects once again employed the realistic forms and shapes, and principles of Pre-Mannerism and especially Antiquity. The movement began in Italy from the early 17h century and was prevalent in Europe until the early 18th century and became widely influential for architecture, but also the arts of painting, music, and sculpture. In Baroque architecture, two ideas have been most considered: one was creating spaces that are suitable for everyday life of people in the growing cities, the other was creating small spaces for praying. Thus, in the seventeenth century cities were enriched by the rise of many magnificent and great churches. During the Baroque period, the painting progressed more than other works of art. Again it was produced not only on canvas, but also placed and covering the walls, ceilings and domes of the palaces and churches. The main aim of baroque architects were to create space that is in a perfect integration with itself and with the people inside the space (Lyttelton, M., 1974).

During the Baroque period, a kind of art is came to the forefront, which later became known as Anamorphosis. This art was rooted in the technique of 'Trompe-*l'œil'* and refers to the process of deforming an image/ representation in keeping with perception. However, in order to perceive it properly, it is necessary to observe the image from a specific vantage point – i.e. the whole space perception is manipulated with respect to the crucial point in the interior. The golden age of this art is between 16th till 18th century and one of the famous examples of this art is the Church of Sant'Ignazio in Rome, Italy. Almost two centuries later, after Renaissance, Fra Andrea Pozzo, the Baroque architect, started to establish an imaginary architecture in the ceiling fresco of the Church of Sant'Ignazio (figure 61). In this painting situated on the ceiling, he is tried to blur the boundary between ceiling and the walls. He created an optical

illusion by perceptually extending the walls into the ceiling by painting scenes as if vertical and putting several figures that coming down to the walls. Furthermore, the two arches and their vertical columns at two sides of the ceiling cause sense of illusion so that it is not possible to understand the exact location, and the form of the real ceiling (Pirenne, M. H., 1970).

Figure 61: Saint Ignatius Being Received into Heaven - Church of Sant'Ignazio- Fra Andrea Pozzo- 1691–4 – Rome (URL 42)

Another great example of Baroque style is the Palazzo Spada, by Francesco Borromini. In this building, Borromini manipulated the actual size of architectural elements in order to create a spatial illusion enhancing the perspectival shrinking and thereby the depth of space. Accordingly, in the entrance part of the colonnaded corridor the height of the columns and ceiling are 3.5 m and the width is 3.12 m, however, in the other part of the corridor that is connected to the courtyard, the height and width start to reduce to 2.45m high and 1 m wide (figure 62). Hence, the illusive treatment of corridor create a strong sense of depth that the corridor seems to be much longer than its real dimension (Leeman, F., & Schuyt, M., 1976), (figure 63). Hence by playing

with the scale and proportion of the objects and components, changing the standard distance and height of columns and unusual surface treatments he tried to create perspectival deformation manipulating the perception of spatial form.

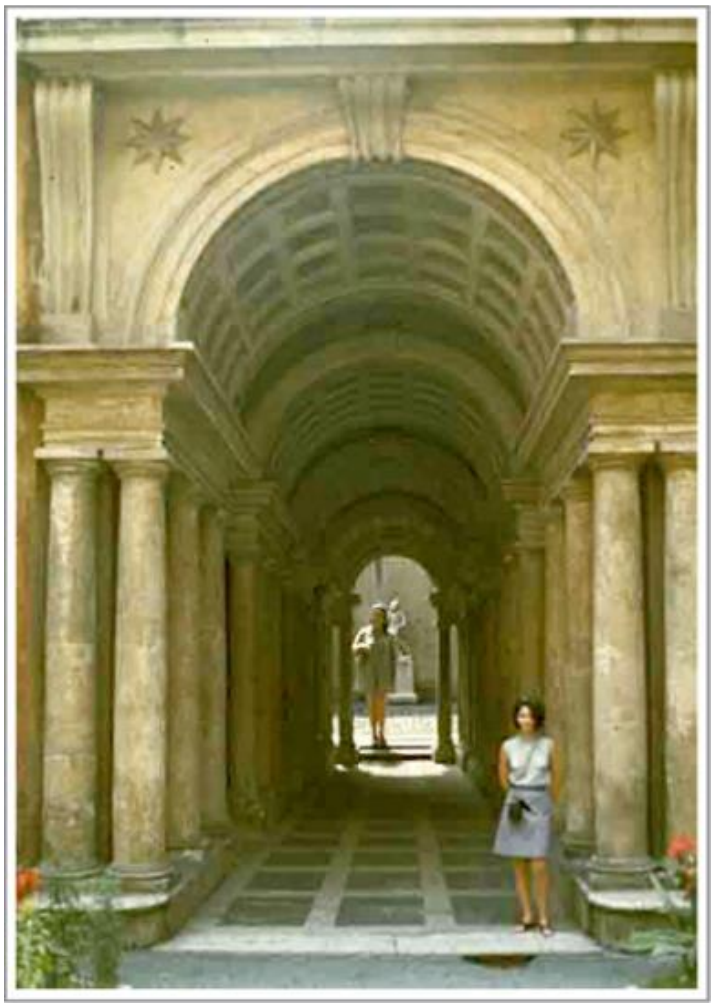

Figure 62: Palazzo Spada- Francesco Borromini- Columns with different height- 1540- Italy (URL 43)

Figure 63: Palazzo Spada- Francesco Borromini- corridor seems to be much longer than its real dimension- 1540- Italy (URL 43)

4.2 Spatial ambiguity in Contemporary Cases

As evident from these several different cases from history, even during these early periods architects and artists have discovered that they can use various methods to create interesting spaces, which in some cases can be perceived as ambiguous. With respect to the concept of manipulation of perception two types of approaches can be identified as implemented in different artworks and architectural buildings. One employs misperception and illusion to manipulate perception of space by artworks visually transforming the enclosure of a space – such as murals on ceilings and walls. The other is more about generating interest by way of 'spatial' techniques that challenge perception – such as controversies in the overall composition and order and correlations of elements of space, that open up to diverse interpretations of observer and provide extreme experiences of space. It can be said that, while all designed spaces may have some degree of complexity and ambiguity, the creation of ambiguity in an

intentional design approach is based on posing challenges to perception. In this, the issue is to provoke various senses such as through circumstances that confuse and/or surprise, of transparency and layering of spaces, visually blurred spaces – such as dark spaces, or spaces that mislead the eyes of observer. These circumstances could constitute specific kind of immediate special experiences that lead to provocation of some extreme feelings and emotions. Hence, in the following some examples of contemporary architectural works – designed interiors, environments, and spatial situations - are analyzed in order to clarify and concretize the ambiguous nature of these designs, and their techniques and effects on the perception of space.

4.2.1 Misperception and Ambiguity in Visual Manipulation of the Spatial Enclosure

Throughout ~~the~~ history, artists have discovered and employed the art of Anamorphosis only in repercussion to linear perspective. However, during 20th century, this art was widely studied and combined with the latest technologies and new forms of this art is came to forefront.

One of the early examples of the art of Anamorphosis that lead to a kind of misperception of space is the 'Ames room', invented by Adelbert Ames, Jr in 19th century. The room presents an experimental environment which is designed to demonstrate the operations of geometrical and volumetric manipulation of the usual references according to which a space is understood. Hence in the perspectival perception of the interior scale and proportion come fore as surprising effects. The space has to be viewed with one eye through a central pinhole. From this point of view, this rooms looks like a rectangular enclosure with equal walls in size and height. In this sense, there is no ambiguity and dilemma, however the actual shape of the room

is trapezoidal, the walls are tilted and the floor and ceiling are inclined (figure 64). In this situation, when two persons enter the room and stand in two corners of the back wall, despite to their equal height, it seems that there is a major difference between their sizes. Now there is an ambiguity and dilemma: while their backs are laid on the rear wall and the wall seems perpendicular to the side walls, then it is hard for the observer to understand how it is possible to see two individuals with a great difference in size and height (Behrens, R. R., 1993), (figure 65). Therefore, it can be construed that, by suddenly deforming ~~the~~ one element in the set of usual elements, such as in this case deforming one wall of the square room, can suddenly manipulate perception and interpretation of observer.

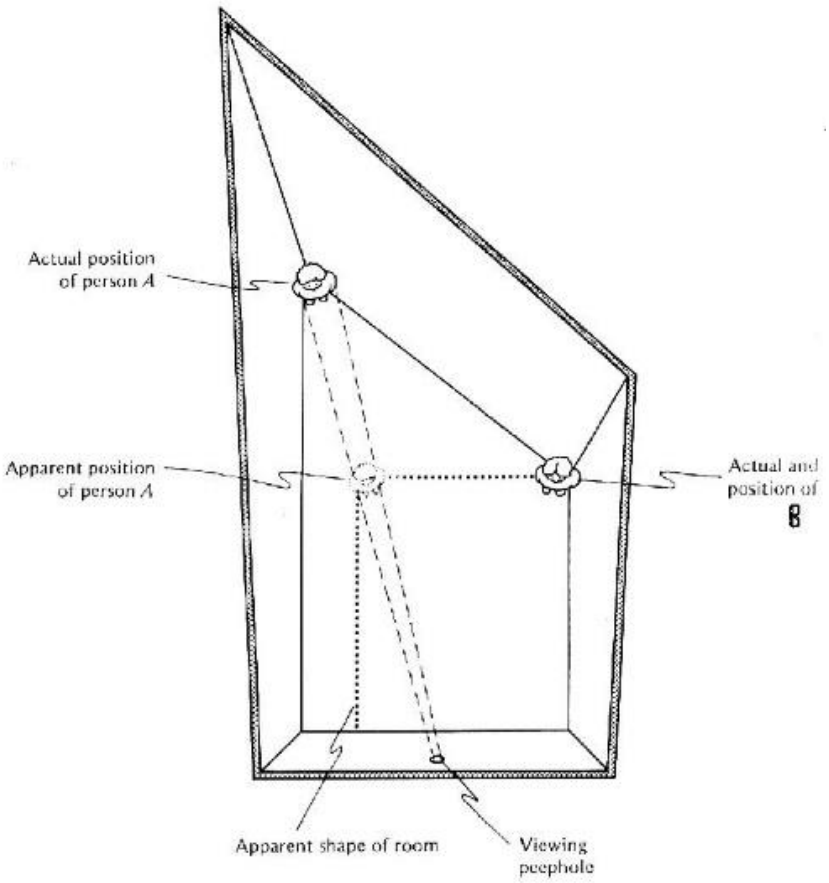

Figure 64: Plan of Ames room- 1946 (URL 44)

Figure 65: View of observer from pinhole (URL 45)

A more recent contemporary example of this art in an artistic installation refers to the geometric paintings of the Swiss artist Felice Varini, projected onto real environments. His artworks are applied either on larger scale of exterior walls and even urban structures (figure 66-67), or in small scale of interior spaces (figure 68), creating spatial / perceptual ambiguity, while raising attention to both the optical art, and the environmental features. The effects in space of his exhibitions are ambiguous and the observer may immediately be confused, due to the monotonous colors and stretched shapes on the wall that have no meaning from different points. However, the effects of these installations start to come together when the observer stand in a specific vantage point and views the whole composition.

Figure 66: Project “of concentric yellow circles, at Carcassonne for the 7th "IN SITU, Heritage and contemporary art"- Felice Varini- 2018- France (URL 46)

Figure 67: Project “of concentric yellow circles, at Carcassonne for the 7th "IN SITU, Heritage and contemporary art"- Felice Varini- 2018- France (URL 46)

Figure 68: Tra il Pieno e il Vuoto (In the Fullness and Emptiness)" - Felice Varini - 2003 (URL 47)

In general, the techniques of optical illusion seem to draw the attention of many architects throughout the history, due to their potential to modify and thus question the perception of real world. As Matthew Luckiesh stresses: ‘the mental being is impressed with things as perceived, not with things as they are’ (Luckiesh, M., 1922). Hence, one technique that contemporary architectural uses widely in order to constitute misperception, is applying unconventional patterns and textures on exterior or interior surfaces in order to generate interest, diversity and complexity in the experience of ordinary spaces. Visual perception is manipulated by creating optical illusion. One of these examples is the tile company Casa Ceramica in Britain. The floor of entrance corridor is made of black and white ceramics, the arrangement of these ceramics on one side of the corridor is such that it induces to the observer that there is a large dent on the ground. This optical illusion can be perceived only from one perspective, and it

is created to stop people from running within the corridor. In can be understood, that the use of techniques of optical illusion can convert a traditional and usual corridor into a space that could catch the attention of visitors and create various immediate feelings such as duality and even insecurity (figure 69).

Figure 69: The tile company Casa Ceramica- Britain (URL 48)

In Casa Cor Todeschini Pavilion designed by Studio Guilherme Toress, the architect has used various techniques to create an unusual interior place. In this interior the juxtaposition of different materials and exaggeration in use of lines in different directions constitutes intense visual complexity in space. Furthermore, the dominant organizational lines suddenly change direction and connect, in effect creating a boundary between the two clashing patterns – which induces a hypothetical corner on the floor (figure 70). Exaggerating the number of vertical elements in space, such as columns, high narrow windows, the vertical lines of curtains, together with the long

pendant light and the other vertical objects, all stimulate the perception of height making the space appear more voluminous (figure 71).

However, the un-proportioned elements introduced into space, the exaggerated and clashing of linear textures on floor and walls, as well as contrast of black and white, turns the pavilion to a dramatic and ambiguous interior space, where real and geometrically generated imaginary volumes mix. Furthermore, it can be perceived that certain aspects and principles from Gestalt theory guide the grouping system and similarity principle have been effectively used. In other words, there are various different groups of objects and patterns in juxtaposition with each other that carry similar characteristics within themselves.

Eventually, it can be said that combination of different orders and systems of grouping, the visual power of diverging patterns, as well as the use of unusual proportion and size of elements, and the exaggerated number of elements and components, all contribute to the visual illusion, ambiguity and manipulating perception.

Figure 70: Casa Cor Todeschini Pavilion- hypothetical corner on the floor Studio Guilherme Toress- 2015- Brazil- (URL 49)

Figure 71: Casa Cor Todeschini Pavilion- Interior vertical elements are exaggerated the height of building (URL 49)

Anoter intersting example of employing optical illusion as manipulative technique is an apartment decorated for *Suite Elle Decoración,* by Jean-Paul Gaultier. This building creates optical illusion by using unconventional patterns and textures (Boixeda, M., 2017). It presents an unexpected interior where using strong geometrical patterns as if projected and deformed on differnt surfaces has the effects of bluring boundaries between space, elements and objects and achieving a highly ambiguous design. In this apartment all of objects such as walls, floors, chairs, wardrobes, are covered by a homogeneous soft material and gray color that transformed the functional objects to

an endless and continuous set of sculptures, due to this technique the boundary of the objects has disappeared and the observer experiences a sense continuity, confusion and disorientation, and is perceptually lost in space (figure 72-73).

Figure 72: Instalation for Suite Elle Decoración, by Jean-Paul Gaultier- 2010- Paris (URL 50)

Figure 73: Instalation for Suite Elle Decoración, by Jean-Paul Gaultier- 2010- Paris (URL 50)

Granada Business Confederation located in Spain, designed by Alejandro Muñoz Miranda, presents another instance of ambiguous space (figure 74). In this interior shows the effects of introducing more than one organizational system to the composition of elements and components. Superimposing the central organization around a central hall, the gridded system of subspaces, and the diagonal organization of the double height square shape corners, all of which overlap the central square creates ambiguity in such a way that the main dominant system is not differentiable (figure 75). The main hall acts as a mediator and connects different spaces, to each other, while the perception and interpretation shifts among each of these. Furthermore, the subtraction of the double height cubes from one corner forms various skylights that are covered by glass from the second floor. The homogeneous materials of walls, floors and ceilings, blurs the boundaries of spaces. Hence, the reflection of the cubical shape skylight inside the building, and the blurred boundaries, as well as superimposed spatial organizations, all result in a mysterious and flux atmosphere (figure 76 -77).

Figure 74: Granada Business Confederation- Alejandro Muñoz Miranda- 2007- Spain (URL 51)

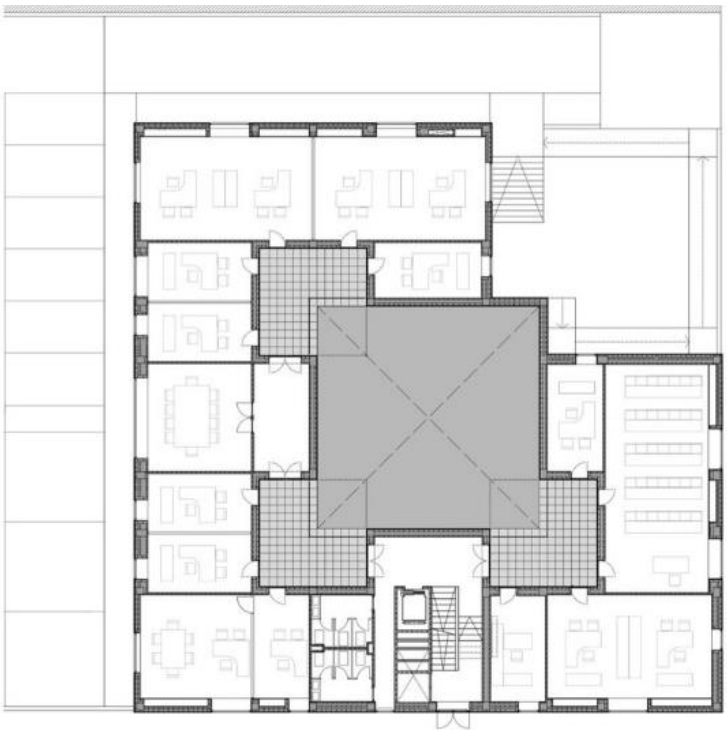

Figure 75: Granada Business Confederation- floor plan (URL 51)

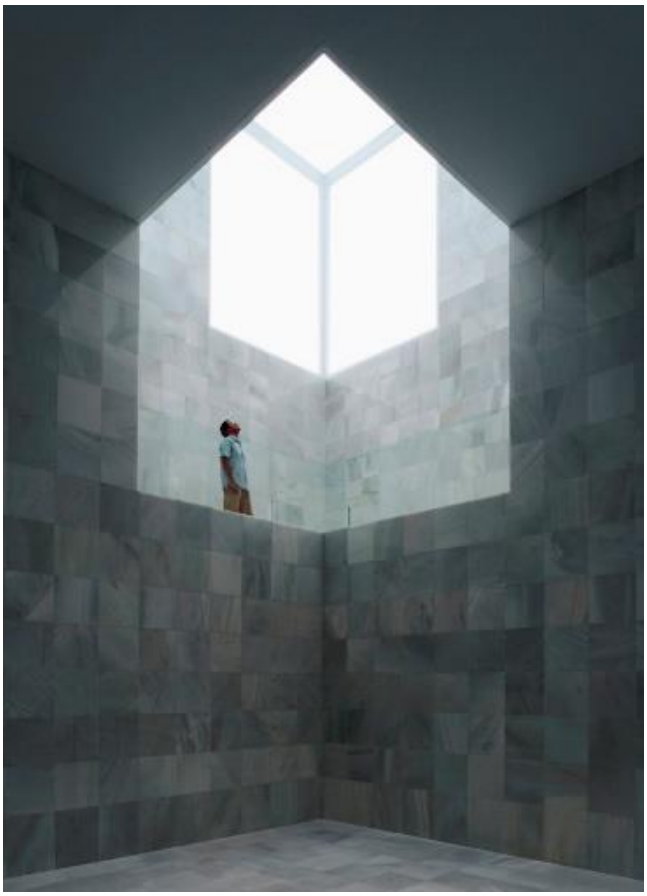

Figure 76: Lighting and material of interior spaces (URL 51)

Figure 77: Lighting and material of interior spaces (URL 51)

With the advent of Modernism in architecture, numerous concepts have entered into architectural design literature. One of these concepts is the principle of ‘transparency’ in architecture. The concept of transparency in understood in terms of visual continuity and is defined as the opposite of the concept of the ‘closed’ space. By increasing transparency in design, the different interior spaces are in close interaction among themselves and with the exterior surrounding, which may or not involve and refer to human movement. In addition to visual transparency, there are two other types of transparency, that introduced by Colin Rowe and Robert Slutzky. ‘Perceptual transparency’ refers to the materiality of boundary, such as glass or translucent surfaces. ‘Phenomenal transparency’ is beyond the visual perception and refers to the spatial interconnectedness and perceptual continuity. In this way, transparency is concurrent to perception of various spatial positions, so that “The position of the transparent figures has equivocal meaning as one sees each figure now as the closer, now as the further one” so it can be interpreted that, there is an ambiguous situation in the space (Rowe, C., & Slutzky, R., 1963). Since space is of three-dimensional nature, it is possible to create clear and precise transparency by using open surfaces or glass materials in various directions. However, creating phenomenal transparency in architectural spaces is more difficult and there are less debates and criticisms in this regard. According to Colin Rowe and Robert Slutzky, phenomenal transparency is expressed in terms of awareness of the existence of a layered spatial structure. In this approach, a transparent architectural work could inform the viewer about its elements and principles, in relation to the layered structure and nesting of different spaces. These elements and principles could be the main root of phenomenal transparency and they could be corners, angles, plates or their images. With this in mind, it can be said that,

transparency in architecture can be the origin of various spatial interpretations, ambiguous circumstances and extreme experiences (Rowe, C., & Slutzky, R., 1963).

As an example of layering, Le Corbusier in the project of Villa Stein at Garches, brought the new concepts of transparency to work in horizontal and vertical sections. Hence he tried to separate the structure and walls of the building from the spatial organization of space (figure 78). In this project, Le Corbusier applied various layers into the interior space, and put the system based on the stratification of front layers that caused spatial complexity. Accordingly, increasing of the complexity of space organization and the relationship of elements may result in spatial ambiguity and illusion, and the architect tried to compensate for this by applying the principle of hierarchy and spatial continuity (Von Meiss, P., 2013).

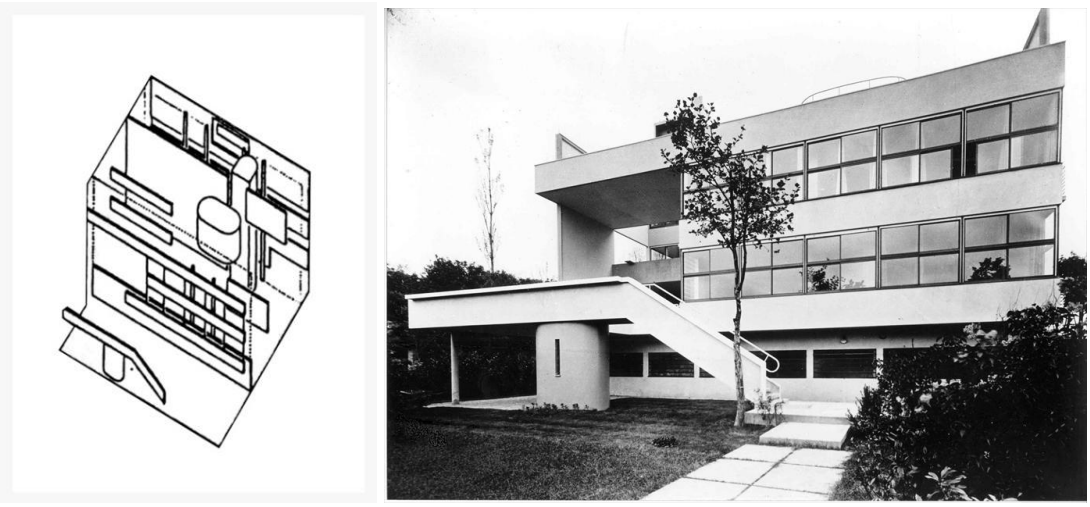

Figure 78: Villa Stein - Le Corbusier- 1927- Garches (URL 52)

4.2.2 Design Approaches for Extreme Experiences

In general overview of the field of architecture with respect to ambiguity, it can be said that ambiguity can produce extreme experiences of various feelings such as fear, anxiety, interest and joy. Furthermore, various extreme experiential circumstances can

be provided by design, such as for example creating illusion of infinity and boundlessness by radically extending the height of elements, or providing exotic situations by using of glass elements in critical – i.e. unexpected positions. Nevertheless, transparency such as glass employed as the 'walking' surface on which the user is situated offers a very special technique to render experience extraordinary. In this there are various elements such as glass materials, or techniques such as alteration of height, that could stimulate perception and create extreme spatial experiences.

In this regard, the Double triangular pavilion, by Dan Graham, is a striking example that could manipulate perception through changing of light. This pavilion contains three vertical reflective surfaces that create a rectangular enclosure. Due to the steady change in the position of the sun light, these three walls are constantly changing in effect from mirror to glass. Hence, the pavilion can be perceived either a solid shape, or as a thin and weightless form that tend to disappear from view (figure 79-80). Also in the interior the surfaces of this pavilion act exactly the same: one side of the 'walls' suddenly reflect the outside green area which is far from pavilion and combine this picture with the near view of the other wall and create ambiguity through superimposing of distance and near view within the single space (Graham, D., & Hatton, B., 1977). In this building, by using unconventional surface treatments and materials, the architect tried to blur the inside and outside relations and give the sense of continuity as well as break down boundaries and create optical manipulation and deception.

Figure 79: Double triangular pavilion- Solid form - Dan Graham- 1989- Germany (URL 53)

Figure 80: Double triangular pavilion- Light transparent form- Dan Graham- 1989- Germany (URL 53)

Reflective surfaces such as mirrors are important means of articulating surfaces, and elements in interior space that could establish illusion of duplication, reflection, deformation, and extension in the perception of space. The combination of mirror with glass material can create an extraordinary space that immediately stimulate the perception of observer. Luce Piere's installation called, Environment III in New Zealand, is a stunning combination of mirror and glass material (figure 81-82). Simultaneously, the mirror floor and ceiling and corrugated walls create a sense of vertical infinity and continuity in space. It is a magical space where the bodies are within a spatial extension that induce the illusion of depth and shallowness at the same time (Pringle, T., 2002).

Figure 81: Auckland Art Gallery, Environment III- Luc Piere - New Zealand- 2011 (URL 54)

Figure 82: Auckland Art Gallery, Environment III- Luc Piere - New Zealand- 2011 (URL 54)

Glass material is one of the building elements that in combination with height, can provide deception of perception and create sense of floating in space. It can be said that, while a glass floor indicates that despite its invisibility it can carry the weight, it also tricks perception into anxiety because it is hard for man's mind to accept that transparent material could carry the weight without creating any danger (Nijsse, R., 2003). Skydeck of Willis tower in Chicago, is an example that displays the transparency as a magical tool that makes spectator to forget the gravity and enchants the panoramic landscape of the city (figure 83-84).

The structural components of Skydeck are at their minimum. There is no hand rail and the glass joints are in a very small size. It is a suspended structure that gives the

immediate experience of floating in the air without falling. The situation is thrilling because it works through the contradiction between the sense of being safe and not being supported. The placement of sky-deck in a very high altitude and its full transparency is shocking in that beside the view of city as an urban model in perspective, it creates feelings of fear, anxiety, joy and pleasure at the same time.

Figure 83: Skydeck of willis tower- Chicago- 2009 (URL 55)

Figure 84: Skydeck of willis tower- Chicago- 2009 (URL 55)

Eventually, it can be said that, glass materials, used either as wall, floor, or ceiling, can manipulate perception or give the sense of floating, falling and extending. By ‘felt’ to be there but not ‘seen’ they can also create an immediate experience of some contradictory feelings such as fear, danger, and duality besides the feeling of pleasure, joy and happiness. They raise the awareness of body within space and provide immediate engagement with space.

4.2.3 Ambiguity and Drama in the Design Works of Philippe Starck

Contemporary architecture shows manifold successful examples where ambiguity emerges as a quality of space and as positive value in design. The prominent French architect and designer Philippe Starck is one of these professionals who consistently develops an approach to design towards creating ambitious spaces where perception is intentionally manipulated by using of various design tools and techniques. He has

started his design career with various industrial products and furniture since 1980, involving also interior design. Philippe Starck is famous also for his hotel and restaurant design works all over the world. His philosophy of design is based on “democratic design" that the products are not only for elites but they are for all people. For Phillippe Starck people are not only users of spaces, but they are actors that have interaction within the spaces. His designs are full of surprise, imagination and creativity, where the unconventional artworks and spaces combine with daily life of people. One of Phillippe Starck’s main considerations and conceptions for design is to create surprising, dramatic and even theatrical spaces that stimulate emotions and generate immediate engagement of people with that space. As he mentioned in one of his interviews, “I tell stories and offer the public the most complete spiritual notion possible of the spaces they visit. Public spaces are above all about emotions and experiences” (Wingfield, J., 2018).

It can be said that, manipulating perception is Philipp Starck’s driving interest. Conceptually he deals with unfamiliar design approaches that create interesting and engaging spaces. He is known for his unusual design interpretation of usual objects. In a place where people expect to see only an aggregation of ordinary objects, his designs are different, unusual and fun. In his designs Starck tries to create interesting, uncommon and playful atmospheres. In this he uses techniques of transforming simple objects into extraordinary design elements, placing these in unconventional relationships, playing with proportion, scale, order, light and all other basic design elements.

Since 1980, Philipp Starck has also started his hotel design career. His hotels and restaurants are not only places for staying or dining, but they are living spaces that are full of fun and surprise. Mama Shelter, in Paris, France, is one the hotels designed by Phillipe Starck. According to Starck, the concept of this hotel is based on humanity, togetherness, honesty and youth. As he mentioned, "We wanted to bring a democratic dream to fruition... give the best to the most people possible while drawing from the newest ideas and the energy of the young" (Wingfield, J., 2018). There are various design techniques that are used in this hotel to make it an odd place for fun, joy and discovery – a composition with controversial systems of order and spatial clues opening to different possible readings. The interior elements of the space have a gridded arrangement. This arrangement is articulated with some sections in black and white grid floor finishing. However, the perception of the space in this order is put into question by a powerful diagonal arrangement of furniture objects. This diagonal arrangement clashes with the order of the surface patterns and asserts a competing one, suddenly affecting the perception of space (figure 85-86). Several arrangements can be seen in the interior of this building. For instance, instead of homogeneous pattern on the ceilings, he tried to use various patterns and textures that in combination with objects, furniture, lighting fixtures and texture of floor, create a busy and controversial, but at the same time coordinated and harmonic atmosphere. On the other hand, the lighting systems in the interior space of this hotel rely on the use of various spot lights in order to create a dramatic atmosphere, instead of using homogenous, ambient lighting. Furthermore, the orthogonal arrangement of interior walls is in contrast with the diagonal arrangement of floor texture and the positioning of the furniture. As it is seen in figure 87, all interior elements such as furniture, lighting fixtures, floor materials, wall textures and other means of articulation, are positioned and applied

according to these different clashing directions and superimposed orders. Also blending different elements such as objects, enclosure and surfaces and unexpectedly combining of different systems of organization such as diagonal and grid arrangements of furniture and textures with perpendicular walls and ceilings, all create a composition with high visual complexity and manipulation of perception – open to diverse interpretative possibilities. While this creates dynamism and movement in the space, it also invites different and conflicting readings of the interior. Various directions of grouping and orienting elements, and exaggerated proportion of some objects as well as juxtaposition of different materials and textures in surfaces and furniture, all create a mysterious and ambiguous space that could deceive the perception and provoke sense of curiosity in observer.

Figure 85: Mama Shelter, sudden changing in direction of objects- Phillipe Starck - 2008 – France (URL 56)

Figure 86: Mama Shelter, sudden changing in direction of objects- Phillipe Starck - 2008 – France (URL 56)

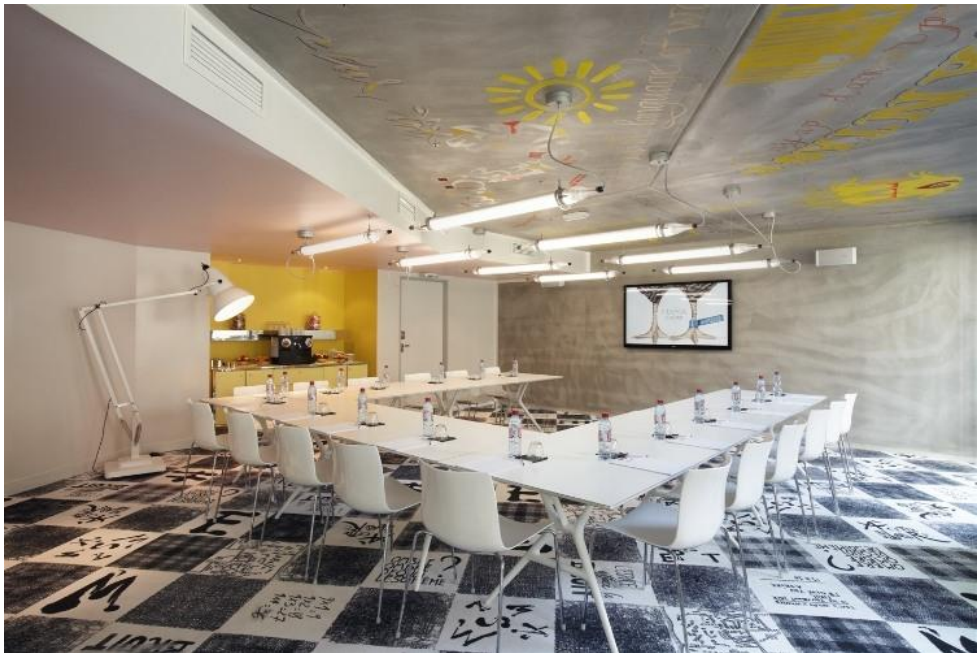

Figure 87: Mama Shelter, Superimposition and clash of different systems of order- Phillipe Starck – 2008 – France (URL 57)

In one of the residential design project series for YOO hotel, located in Panama, the same techniques are applied, the grid texture of floor finishing and its relation with

diagonal arranged furniture forming a visually unresolved interior that create optical illusion. The rectangular shape of space and orthogonal arrangement of walls are in contrast with the diagonal arrangement of floor material and furniture. The observer feels a sense of disorientation as two strong and diverging directions of order are overlapped (figure 88-89).

In Philipp Starck's designs, familiar things can suddenly become unfamiliar by suddenly changing their size and proportion to other objects in the space. In the Gramercy YOO, the oversized pendant light in the room (figure 90), and the massive flower pot and chess pieces in the lobby of St Martin Lane Hotel (figure 91) are but some examples of this technique. As the human brain has predefined principles for perception of correlations based on previous experience, the objects and man's relationship with the objects. Such unexpected size relationships, introduce an unresolved effect and create immediate feelings of duality, ambiguity and even insecurity. However, unknown, radical and new correlations also can lead man to discover and interpret the environment actively. Thus unconventional design approaches that bring together fresh outlook on order, objects and relations, also bring high potential to attract the attention of people.

Figure 88: Residential design project series for YOO hotel – diagonal arrangement of objects- Philippe Starck- Panama (URL 58)

Figure 89: Residential design project series for YOO hotel – diagonal arrangement of objects- Philippe Starck- Panama (URL 58)

Figure 90: St Martin Lane Hotel- Philippe Starck -London (URL 59)

Figure 91: Gramercy YOO - Philippe Starck- New York (URL 60)

One of the main interests of Starck is to create visual illusions, and generate the sense of being observed - by way of large-scale paintings of figures on different surfaces. Some of these paintings represent three-dimensional space in ceiling frescos that are the reflection of baroque period, these paintings aim to create an illusionary extension of space (figure 92, 93). Using unconventional proportion of texture on surface and creating a human scale three-dimensional paintings in this example and again using of spot lights, all are created a theatrical and dramatic atmosphere that gives the extension to the actual height of ceiling and manipulate the perception of observer. This concrete example also suggests conflicting directions and defying the logic of composition, making reference to surrealist traditions of deformation and confusion of reading reality.

Figure 92: Restaurant Le Dali- Ceiling painting- Phillipe Starck- Paris (URL 61)

Figure 93: Ramses restaurant- Ceiling paintings - Phillipe Starck (URL 62)

Lan restaurant in Beijing, is another example where over scaled paintings are widely used in walls and ceilings. The ceiling paintings are two-dimensional painting of figures that remind of the Antiquity period (figure 94). The position of these painting are constantly changing from walls to ceilings, in other words, in some sections the paintings are located on the ceiling and in another part of space the paintings are located in the interior walls of space. However, these figures are directly looking down, and they transmit the feeling that someone huge is constantly watching the users. Dim lighting, the use of surreal exaggerated paintings, warm colors, the use of unusual patterns and materials such as heavy curtains instead of walls as partitions, all are concrete design elements that help create a theatrical, even surreal atmosphere in the interior, where the imagination of the people within them is stimulated and flourish (figure 95).

Figure 94: Lan restaurant – Phillipe Starck- two-dimensional painting of figures in ceiling-Beijing (URL 63)

Figure 95: Lan restaurant – Phillipe Starck- Various exaggerated paintings, warm colors and heavy curtains as partitions -Beijing (URL 63)

Paramount hotel in New York is another example that reflects the Phillipe Stark's intention in creating ambiguity in space and human situations, of dramatic and theatrical spaces. Placed in an articulate center of space, on over-scale chessboard pattern flooring, rotated in relation to the volume, the viewer is mesmerized by the atmosphere and finds himself as part of this theatrical show (figure 96). Instead of overall and floating lighting, Stark again used various spot lights to emphasize the textures and furniture and create dramatic atmosphere. The windows on the walls that illustrate the sitting areas behind these windows, create continuity in the space, yet also frame and expose. Furthermore, these sitting areas are like a series of showcases that display the users of those spaces as models or actors of a theatrical show. It can be said that, unexpected combination of materials, the unfamiliar arrangement of furniture, as well as the strange counter-perspectival shape of the stair, all of which manipulate perception and create an ambiguous and mysterious space (figure 97).

Figure 96: Paramount hotel – Dramatic and theatrical space - Phillipe Starck- New York (URL 64)

Figure 97: Paramount hotel – the unfamiliar arrangement of furniture and the strange counter-perspectival shape the stair- Phillipe Starck- New York (URL 64)

It can be conceived that Philippe Starck creates interesting unconventional, theatrical places that make any visitor-actor-audience ~~to~~ discover the meaning behind his every design work. This involves also the discovery of one's own immediate situation and role in the interior. Starck has a complete understanding of the human senses, so that he can touch the deepest human emotions and transfer a set of different feelings and experiences in a moment of time. Poetry is a verbal expression of emotions and affections, just like Starck's works that are emotional expressions formed in spaces.

4.3 Summary

Ultimately, from the study of both historical and contemporary cases, it can be derived/concluded that along with the similarities there are also differences in the approaches in these two periods. Throughout, ambiguity in its various aspects and techniques is applied in predominantly public spaces. The historical cases hence

include public spaces with religious functions such as temples, churches as well as palaces as the places where these techniques of manipulation are used. However, unlike to the historical ones, in contemporary examples there is a larger variety of public spaces where such techniques and qualities are being applied – the spaces providing leisure and entertainment, such as restaurants, hotels, exhibitions and other artistic environments.

Another difference between the two cases refers to the type of techniques that are used. Hence for instance in historical cases there are predominantly techniques of surface treatments such as three-dimensional paintings that are employed. However in contemporary examples ambiguity is generated by employing various techniques such spatial arrangements, playing with forms, size, scale, and proportion, surface treatment and various other techniques of articulating relations in unconventional and surprising ways.

Chapter 5

CONCLUSION

This study intended to explore and offer a better understanding of effects of ambiguity in interior space in correlation with human perception of space.

During the recent decades, there is a new interpretation of beauty which is derived from very complex systems of nature, which becomes more influential in the field of architecture. In this regard, the conventional and usual forms of architecture are progressively more frequently being replaced with unconventional, complex design solutions. Hence, in order to create an interesting, complex, joyful space, that could manipulate visual perception and enable curiosity, ambiguity can be seen as a positive value that could be applied in every architectural design solution. The study of ambiguity and also of the approaches that lead towards spatial ambiguity, is an interesting subject that helps investigate and understand the extreme cases of manipulation of perception. This subject is studied in the field of architecture. However, it was observed that, this topic has been less explored and discussed in the field of interior architecture. Accordingly, this current research was developed in order to have a more in-depth study on the issue of ambiguity in interior architecture.

In this regard, the current research began with a study of theoretical sources both in philosophy and in architecture, in order to understand the mechanisms of perception in correlation with space. The study of theoretical part was completed with a table that

charting the diverse ideas and approaches to space and perception. In the following chapter, this study attempted to investigate the effects of ambiguity on perception as well as its effects on the interpretations of space through the study of extraordinary cases. The result of this part of the study was to compile a concise list of design tools and techniques that bear potential to manipulate perception and create ambiguity in space.

Space perception is human being's very first process in identification and understanding of surrounding environment. This process occurs through integration and analysis of the information, received by sensory receptors of sight, touch and smell. In the next step the outcome of this analysis is being incorporated with the imagery memories and past experiences and gives a relatively clear image of the space. During many decades, several theories are being established to indicate how the human perception operates toward the physical world and what kind of factors may affect the process of perception. Furthermore, many philosophers, scientists and architects have put forward some opposing theories and ideas in regard to this issue.

As a result of the theoretical studies of the current research, it can be said that, perception is fundamental for human experiences within the space. In other words, without perceiving the space it is not possible to establish memories and experiences related to that space, and experience in general. These experiences could be either immediate, based on unconscious perception of objects and spaces, or it can be related to a very conscious action of mind and the process of gathering and analyzing of stimulus. In both cases the result is procreation of several emotional responses that

come from perception of some general features of space such as its elements, objects, colors, textures, components, etc.

Experience of architectural space, is one of the main subjects in the field of architecture that is studied by various architects and theorists. According to the studies, the architectural space has an important role in supporting and forming man's mental issues. Furthermore, it is a very powerful mediator that could connect man with the outside world. From this perspective, the main purpose of architecture, in addition to its duty to providing the basic human needs for security, is to prepare an environment that take the man from everyday life into the place that gives the possibility of flourishing the imagination, and experiencing intense feelings of happiness, joy, fear and curiosity. From this point of view, the techniques of manipulation of perception in architectural space started from ancient period with perspectival deformations and paintings of human scale figures. It continued with the Renaissance and Baroque periods and the invention of linear perspective and three-dimensional pictures and paintings in the spaces. Later on, during the 19^{th} century the Optical illusion techniques combined with the neuroscience and various studies on the effect of stimulation of retina on visual perception, and the outcome was creation of significant Optical artworks that are generated extreme visual illusions.

It can be said that, 'design for ambiguity' or perception of ambiguity as an affirmative experiential and design quality, can provoke the imaginations and emotions through specific design of architectural space, and create a visual illusion and manipulate perception of spectators. In this regard, the understanding of mechanism of perception and finding the techniques that help to achieve to this issue is one the major concern

of this research. In this regard, in the case studies, various different aspects of ambiguity were explored in terms of diverse effects of interior spaces.

It can be now concluded that ambiguity becomes increasingly a positive spatial value and a conscious intention in design, as well as a desired quality in perception. This is especially valid for leisure and entertainment spaces, where engagement with space and stimulating experiences become integral expectation. Also ambiguity becomes a quality for designers and architects, who seek to experiment and develop various techniques and tools that are fundamental for creating ambiguity in space.

According to the study of the theoretical sources, it can be construed that, the main principal design intentions of ambiguity can be defined through six aspects: manipulating the reading of space, manipulating the interpretations, creating visual complexity, exaggerating scale, or other properties of elements, creating unexpected correlations among elements and generating sudden and surprising discoveries for the observer. Also, there are various tools and techniques that could be employed and involved in the design of spaces. For instance, some of these techniques and tools entail: mixing, juxtaposing, superimposing controversial forms, playing with the visual qualities and definition of space and objects, employing means of optical illusion, extremely altering the scale and proportion of objects in order to create an odd image of space, using different materials such as glazed materials in order to provoke intense senses, altering and superimposing different space organization systems with the aim of creating misperception and complexity in space, using Op art techniques for manipulating the senses and creating misperception of space. All of these techniques are discussed in detail and analyzed in the chapter two and three of this

thesis. The purpose of such ambiguous architectural spaces is to extremely stimulate immediate perception in order to provoke various immediate feelings and emotions that raise spatial awareness and provide intense engagement with space.

Ambiguity and complexity play a special role in spatial experience. In contrast to simple, straightforward, clearly ordered spaces, such as needed in hospitals, schools, or work environments, it is the leisure spaces that provide entertainment, such as hotels, exhibitions, restaurants, etc. where ambiguity is desired and useful – it would stimulate perception, take attention towards the space, and offering a rich and intricate experience.

Ambiguity is also a different issue from confusion in space, which is due to the absence of legible order within the space. It is also distinct from simple, straightforward, clearly ordered, well defined spatial arrangements that would not stumulate senses and create immediate engamgement with space. However, in an ambiguous space, there are various elements and components that are superimposed within a specific orders and systems, and most importantly – diverse possibilities of reading and interpreting interior space. These design factors and their various relations and interactions, could create a complex visual picture which, in order to be understood as overall image, requires the observer's active involvement to group these elements and components and find out their relationships, and generate meanings. Hence, what makes an ambiguous space meaningful is the logic underlying the overall composition – the set of spatial organizations and articulations of elements and objects that, despite to their visual complexity, are coordinated in certain ordering systems and obey particular disciplines.

Hence, it can be said that, ambiguity as a positive value, elevates the quality of the space by its explicit, legible contribution and turn the ordinary space into interesting place that provoke human senses, emotions and feelings by surprising, shocking and unexpected experiential situations. Ambiguity also stimulates people's imaginations and forces them to engage with the space in order to explore the uncanny, marvelous condition and through this discovery, it provides unconventional spatial experiences and spatial awareness as well as intense experience of space.

This current thesis can be considered as a pilot study on effects of interior space in terms of ambiguity as positive spatial quality – entailing extraordinary compositions, visually interesting, perceptually rich and memorable atmospheres. The research on theoretical sources and relevant case studies literature has focused on ambiguity as an interesting subject – valuable in understanding both design and perception of interior space. It has derived and illuminated various aspects of ambiguity, as well as a range tools and techniques employed in its construction.

Recommendations for Further Studies

This research might be considered as the ground for extensive and thorough exploration of ambiguity. Ambiguity is an interesting architectural concept, concerning the understanding of space in profound ways. Hence further theoretical investigation will enrich such understanding in three major directions:

- The constitution of architectural space and its effects,
- The contribution, role and mechanisms of space in human existence, experience and perception, and
- The possibilities and potential contribution of the practice of design in this regard.

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APPENDICES

Appendix A: Table 1: Theoretical Perspectives On Space and Perception

Name / Approaches	Concepts / relations	Key words	Elements / mechanisms of perception
Plato	- Space as constant, indestructible universe - Indirect experience - Perception as an instant phenomenon	- Difference of knowledge from perception - Sensory awareness of external stimuli - Being, becoming, emphasis as three level of reality	- Five senses - Memory and imagination
Aristotle	- Space as place	- Space as vacant lot - Necessity of considering boundary for space - There is an end for space	- Enclosure - Geometrical content with geometric shapes
Giordano Bruno	- Space	- Space in relation with objects and bodies - Infinite space	- Objects that form space
Descartes	- Dualism - Cogito	- Existence of ego - Contradiction between mind and body - Unification between Mind and thought	- Mind and body as two essences of perception
Immanuel Kant	- Direct / indirect realism - Immediate perception	- "nouminal" world or physical world outside the body - "phenomenal" world or replica of the real world	- Pure source of light - Sense organs - Internal consciousness

Name / Approaches	Concepts / relations	Key words	Elements / mechanisms of perception
Hume	- Sensory experience - Impression & Ideas	- Sensation, emotion - Impressions of sensation - Impressions of reflection	- Human senses
Henri Bergson	- Immediate – mediated experience	- Direct perception - Subjective and Objective process of perception - continuity of immediate experience	- Immediate sensory system
Henri Lefebvre	- Space / architecture - lived space/ substance / materiality	- Physical, mental, and social levels - Function and structure as main features of space	- Homogeneous & fragmented - Geometrical - Visual
Martin Heidegger	- Intentional perception - Direct realism - Nonrepresent-ational perception	- Spatial existence - Interpretation of physical world - Distinction between Being and entities - Poetic existence - Close relation between space and human existence	- perception is possible through ambient light - Self-consciousness - Essence of time
Gaston Bachelard	- Poetics of space - Space and action - Inner space	- Memory and imagination - Unification of senses - Essence of complexity - Co-operation between real and unreal - Formal imagination - Material imagination	- Human mind as the essence of imagination
Pollio Vitruvius	- Bodily experience of Space	- Sensory experiences - Human senses - Emotional responses - Delight and pleasure	- Color, texture, light, material and sounds

Name / Approaches	Concepts / relations	Key words	Elements / mechanisms of perception
Norberg-Schulz	- Existential space - Architectural space	- Object-character - Permanent objects - Immediate perception	- Center - Place - Direction - Area
Juhani Pallasmaa	- Multi-sensory experience of space - space as medium	- Non-visual senses - Sensory perception - Mental images of space - Emotive import - Collaboration of the senses	- Materials, objects, scale, light, color - Meaning - Atmosphere
Perez-Gomez	- Thought - Immediate/ mediated perception	- Existential meaning - Pure existence without any mediator	- Importance of light in perception
Phenomenology	- Perception as "intentional" phenomena - Perceptual experience	- Three dimensional mental images - Interaction of internal existence and external object	- Objects as three dimensional volumes
Gestalt theory	- Visual perception	- Relations -Principles: Similarity, Common Fate, Proximity, Continuity, Good configuration, Past experience	- Order - Figure ground

Appendix B: Table 2: 'Interior Space as Design Issue: Elements, Principles, Order, and Composition'

Name / Approaches	Concepts / Relations	Key–words	Design elements and principles
Norberg-Schulz	- Space-oriented experiences - Existential space - Mass and space	- Three dimensional context - Immediate human perception	- Visual form, dimensions and quality of light - Scale - Composition - Centre - Path - Grid
Francis Ching	- Form and space - Enclosure - Bodily experience of Space - Order & Legibility - Composition and Order	- Volume - Line - Plane - Light - Surfaces - Vertical elements - Solid and void - Circulation - Leaner, superficial and volumetric elements - Functional, formal and symbolic roles of space	- Shape - Surfaces - Texture - Furniture -Fixtures - Color - Organizations Central, Radial, Linear, Grid organizations - Proportion and scale - Mechanical and Visual scale - Order - Hierarchy - Rhythm
Pierre Von Meiss	- Perception - Multi-sensory experience of space - Multi-sensory experience of space	- Enclosure - Objects - Openings - Light and Shadow - Materials - Perceptual possibilities - Harmony and equilibrium - Movement of body within space - Spatiality of objects	- Volume - Enclosure / openings /surface - Proportion - Order - Symmetrical / Asymmetrical Balance - Contrast - Complexity - Coherence - Symmetry - Figure- Ground

Name / Approaches	Concepts / Relations	Key–words	Design elements and principles
Rudolf Arnheim	- Immediate perception of space - Orientation - Position	- Visual perception - Light - Transparency - Movement - Spatial form - Depth - Expression - Surfaces	- Volume - Mass - Grouping - Furniture and fixtures - Color and texture

Appendix C: Table 3: The Concept of Ambiguity as Positive Design Value

Name / Approaches	Concept / Relations	Key words	Elements / tools/ principles
Jean Baudrillard	- Duality between real and virtual world	- Generate seduction, contradiction, duality	- Contradictory relations - Dual and Polar relations
Robert Venturi	- Complexity in physical shape and content - Contradictory elements	- Complexity - Contradiction - Richness of meaning - Paradox in perception - Optical illusion	- Composition - Diverse elements - Shapes - Structure - Texture - Material
Antony Vidler	- Sense of estrangement - Anxiety - Producing an antithetic condition that provokes confusion and deception	- Contradiction between homely and unhomely - Contrast between familiar and unfamiliar things - Dark and abandoned spaces	- Volumes - Masses - Materials - Textures
Pop art	- Mass media - Popular culture - Manipulating attention and perception - Blurring boundaries between ordinary objects and art	- Ordinary objects - Unconventional mix of elements - Unexpected and surprising juxtapositions of objects and relations - Creating a dynamic perspective	- Playing with scale - Reversing customary qualities and materials - Unusual Proportions - Bright colors - Combination of collage pieces with the painting - Playing with the common material of objects - Creating objects in the scale of monuments

Name / Approaches	Concept / Relations	Key words	Elements / tools/ principles
Op art	- Manipulation of visual perception - Producing visual error - Visual illusion - 2D-3D illusion, - Illusion of movement	- Sense of movement, flashing and vibrating - Juxtaposition of paradoxical elements - Geometric abstraction - Visually confusing and playing with the perception of the eye	- Geometrical shapes - Foreground & background - Repetition of similar elements - Unusual Size - Intervals - Bright colors - Light and shadows - Symmetrical lines - Shapes/ deformation - Black and white colors - Abstracted patterns - Using techniques of trompe l'oeil and Anamorphosis - Weightlessness - Light or electromagnets - Movement of light and propensity of eye
Surrealism	- Human unconscious - Emphasis on imagination - Unconventional perception - Hyper-reality - Demonstrate the everyday life in its most dreamy way	- Mysterious and odd visual impressions - Sense of confusion of real and imaginary, reality and dream - Unusual behavior of the common objects	- Playing with Scale - Deformation /transformation of familiar things - Unusual proportion

Appendix D: Table 4: Ambiguity in Design: Aspects, Principal Approaches, Elements, Tools and Techniques

Elements /components of interior space	Design intentions/ aspects of ambiguity	Major tools of interior design	Techniques
- Enclosure and openings - Furniture, furnishing - Lighting systems and fixtures - Objects - Surface treatment - Materials: color texture and pattern	- Manipulating the reading of space - Manipulating the interpretations - Creating visual complexity - Exaggerating scale, or other properties of elements - Creating unexpected correlations among elements - Generating sudden and surprising discoveries for the observer	- Composition and order - Articulation of relations - Scale / proportion - Correlations between elements - Articulation means and surface treatment - Materials: color texture and pattern	- Applying more than one principle / system of design - Mixing, juxtaposing, superimposing controversial forms, - Playing with the visual qualities and definition of space and objects - Employing means of optical illusion - Organizational systems (grid-central-radial- linear-axial - Combining two or three organization system such as central system with grid system - Unexpectedly combination of different arrangements such as diagonal and grid arrangements of furniture and textures - Overlapping or Subtracting of spatial forms - Playing with the scale of elements and objects - Exaggerating in the size and height of objects -Altering the standard distance and height such as height of columns, walls, etc. - Enhancing or reducing perceptual and perspectival deformation in form - Using irregular scale - Using unconventional proportion of texture on surface - Creating a human scale three-dimensional paintings - Using unusual patterns and materials as solution for spatial arrangements - Using contrasting elements such as irregular shapes in contrast with regular ones