

COMPLEXITY AS A FEATURE OF INTERIOR DESIGN AND  
PLACE ATTACHMENT

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## **ABSTRACT**

### **COMPLEXITY AS A FEATURE OF INTERIOR DESIGN AND PLACE ATTACHMENT**

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This study was done to investigate the effect of ornament or interior design features on place attachment.

The ornament or design feature differed among conditions of having an interior design (or containing complex design) and not having any design (being plain and without ornamentation). And place attachment was defined as the extent to

which one chooses a place to stay in when the place serves no practical function. The medium of experiment was the website “thesis-experiment.com” that showed participants 48 pictures (24 pairs) each pair showed the same place with and without design elements and asked participants to rate their preference to spend their “leisure time” in the place that was shown in the pictures and their reaction times were measured. Participants also filled big five inventory (in English or Turkish) and selected their level of inclusion to nature among seven interconnected circles. The results show that people spend more time looking at complex pictures (with design condition) and rated those picture more in terms of preference to stay there. Moreover, ratings of complex pictures were significantly and positively correlated with openness to experience but only those items that were not reverse coded and were in Turkish. The findings of these findings are discussed from a stimulation perspective.

**Keywords:** Place Attachment, Design, Interior Design, Visual Complexity

## ÖZ

### İÇ TASARIMIN BİR ÖZELLİĞİ OLARAK KARMAŞIKLIK VE MEKAN İLE DUYGUSAL BAĞ

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Yüksek Lisans, psikoloji

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Bu çalışma, süs veya iç tasarım özelliklerinin mekan ile duygusal bağ üzerindeki etkisini araştırmak amacıyla yapılmıştır.

Süsleme veya tasarım özelliği, bir iç tasarıma sahip (veya karmaşık tasarım içeren) ve herhangi bir tasarıma sahip olmayan (düz ve süslemesiz) koşullar arasında farklılık gösterir. Ve mekan ile duygusal bağ , bir kişinin pratik bir işleve hizmet etmediği zaman içinde bir yeri seçtiği ölçüde tanımlanmıştır. Deneme ortamı, katılımcılara her bir çiftin tasarım öğeleriyle ve tasarımsız olarak aynı yeri gösterdiği ve katılımcılardan “boş zamanlarını” geçirme tercihlerini derecelendirmelerini isteyen “thesis-experiment.com” web



sitesi idi. Resimlerde gösterilen yer ve reaksiyon süreleri ölçüldü. Katılımcılar ayrıca BIG FIVE envanter doldurdu (İngilizce veya Türkçe) ve birbirine bağlı yedi daire arasından doğaya iç içe olma seviyelerini seçtiler. Sonuçlar, insanların karmaşık resimlere bakmak için (tasarım koşulu olarak) daha fazla zaman harcadıklarını ve bu resimlerde gösterilen yerlerde kalma tercihleri bakımından daha fazla derecelendirdiklerini göstermektedir. Üstelik, karmaşık resimlerin puanları, deneyimleme açıklığı ile anlamlı ve pozitif olarak ilişkiliydi, ancak yalnızca ters kodlu ve Türkçe olan öğelerdi. Bu bulguların bulguları stimülasyon perspektifinden tartışılmaktadır.

**Anahtar Kelimeler:** mekan ile duygusal bağ, tasarım özellikleri

This is dedicated to my mother

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## TABLE OF CONTENTS

PLAGIARISM.....	iii
ABSTRACT .....	iv
ÖZ.....	vi
ACKNOWLEDGEMENTS.....	ix
TABLE OF CONTENTS .....	x
LIST OF TABLES.....	xiii
LIST OF FIGURES .....	xiv
CHAPTER 1	
1. VISUAL PERCEPTION	
1.1. Visual Perception Of Environment.....	1
1.2. Definition Of Aesthetic Response .....	7
1.3. Visual Properties Of The Environment That Influences Preference.....	11
1.3.1 Objective Perspective On Visual Aesthetics .....	11
1.3.2 Subjective Perspective On Visual Aesthetics.....	11
1.3.3. Holistic View On Visual Aesthetics .....	12
1.4. Complexity And Aesthetic Preference.....	13
1.5 Structure Of A Scene And Aesthetic Preference .....	28
1.6. Existence Of Threat Or Tension And Aesthetic Preference .....	38

1.7. Anticipation, Curiosity And Mystery And Aesthetic Preference .....	39
1.8. Consequences Of Encounter With Natural Versus Man-Made Environments.....	42
CHAPTER 2	
2. PLACE ATTACHMENT	
2.1. Human-Place Bond.....	52
CHAPTER 3	
3. METHOD	
3.1. Participants .....	65
3.2. Materials .....	65
3.2.1. Photographs .....	65
3.2.2. Inclusion Of Nature To Self Scale (2002) .....	68
3.2.3. Big Five Factor Questionnaire Of Goldberg(1992) .....	68
3.2.4. Big Five Inventory (2017) .....	68
3.3. Procedure .....	69
CHAPTER 4	
4. RESULTS	
4.1. Analysis .....	72
4.1.1. Preference Ratings And Inclusion Of Nature To Self.....	72
4.1.2. Preference To Spend Time Infront Of Design Elements .....	72
4.1.3. Reaction time .....	73
4.1.4. Preference Ratings And Openness To Experience .....	73
4.1.5. Inclusion Of Nature To Self And Openness To Experience.....	75

## CHAPTER 5

### 5. DISCUSSION

#### 5.1. Reaction Times And Preference Ratings And

Openness To Experience..... 79

5.2 Effect Of Visual Complexity On Well-Being ..... 80

REFERENCES ..... 83

### APPENDICES

A.HUMAN SUBJECTS ETHICS COMMITTEE ..... 98

B.TURKISH SUMMARY/ TÜRKÇE ÖZET ..... 99

C. TEZ IZIN FORMU/THESIS PERMISSION FORM ..... 115

## LIST OF TABLES

Table 1.1. Demographics Of Participants .....	71
Table 4.1. Paired Samples Statistics For Preference Rating .....	74
Table 4.2. Paired Samples T-Test Statistics For Preference Rating.....	74
Table 4.3. Statistics For Reaction Time .....	75
Table 4.4. Paired Samples T-Test Statistics For Reaction Time.....	75
Table 4.5. ANOVA Statistics For Complex Pictures Ratings In Terms Of Includedness To Nature .....	76
Table 4.6. ANOVA Statistics For Plain Pictures Ratings In Terms Of Includedness To Nature .....	76
Table 4.7. Pearson R Correlation Statistics For Complex Pictures Ratings And Openness To Experience.....	77
Table 4.8. Pearson R Correlation Statistics For Inclusion Of Nature To Self Ratings And Openness To Experience.....	78

## **LIST OF FIGURES**

Figure 1.1 Five of eight stimuli in Vitz(1966).....	16
Figure 2. Square stimuli used in Vitz(1966).....	17



## **CHAPTER 1**

### **VISUAL PERCEPTION**

#### **1.1 Visual Perception Of Environment**

One of the prominent researchers in the field of visual perception and environment was James Gibson. In his studies he tried to analyze the information that lies behind every visual information obtained from a specific scene (Gibson, 1950; 1966; 1979). For instance, his idea of ecological optics (Gibson, 1950) paved the way for his ideas toward ecological visual perception. He believed that natural environments contain vast amount of information that influence us through stimulation of our senses. He argued for a learning procedure in which one learns to differentiate among rich arrays of information that our perception is involved in when we have contact with nature in any way (Gibson & Gibson, 1955). In short, it is viewed that it is the property of nature to stimulate our senses with every contact; and this stimulation is of utmost importance for Homo sapiens because they were species that relied on travel and ever changing natural resources. Therefore, sensitivity toward natural environment would have played a significant role in survival of our species (Harari, 2015).

When one looks at any natural phenomenon through the lens of evolution, functionality of features must be taken into consideration. In other words, how this stimulation translates into functionality is the essential issue. In accordance with this perspective, another important dimension in this regard is the concept of “affordance”. Affordance refers to the array of information that is associated with an object. It could be said that affordance is the characteristics of any element or object. This information will determine the interaction with the object or the environment. For example, a broken bridge affords falling down and death and an empty table in a café affords gathering and socialization (Gibson,1950). Therefore, there has always been a pattern of perceiving what an environment affords based on merely observing it. And this can be said to be the importance of our sense of sight in evolutionary terms.

This concept of the natural world being information loaded guides us to obviously extrapolate that we are highly sensitive of the information in the natural environment. Thus, as Wohlwill (1983) also mentions, it can be a good criterion to distinguish natural environments versus man-made environments based on the sheer amount of information that can be received from the environment. In other words, the sheer amount of stimulation that one receives from natural environments is different than the amount stimulation one receives from man-made environments. Because as species we have been equipped to deal with the natural environment and what it affords.

In a very preliminary and naïve exploration of visual properties of man-made versus natural environments it can be stated that in natural environments there are more curvilinear and irregular lines than man-made environments. In man-made settings we see more rectilinear patterns and regular lines. Also, another dimension can be that in nature there are more gradual transitions and man-made environments can be said to include more abrupt transitions. At the same time, in natural environments there are more rough and disorganized textures than man-made environments which contain more smooth and more regular patterns.

The irregularities in the natural environments are abundant. To be more specific, line-irregularities and texture-irregularities are ubiquitous in natural setting. Therefore, nature can be interpreted as possessing higher complexity and diversity in a visual sense when compared with man-made environments. Furthermore, higher complexity and diversity is linked to higher levels of arousal and pleasure (Wohlwill, 1983).

The other dimension that can be used to differentiate man-made versus natural environments is the dynamicity or the pattern or the speed by which the general motions in an environment take place. In natural environments we see less gross movement and less movements of kinetic-type. In the man-made environments there are more kinetic-type movement and more gross movements (cars, trains, buses etc.). The research suggests that complexity (not only diversity) is

desirable based on an inverted U-shape in which the intensity of the stimulation beyond a certain point becomes undesirable (Wohlwill, 1983, Berlyne, 1974).

There are other alternatives to the effect of nature on human psyche that causes humans to prefer nature to man-made world. Wohlwill states three other alternative explanations (beside visual stimulation) regarding the properties of natural environment that makes it more preferable and desirable for humans. The three alternatives are: 1) nature as embodiment of change and growth, 2) nature as refuge 3) nature as a symbol.

If effects of nature in terms of richness of stimuli is the reason behind our preference for nature then viewing nature as the embodiment of change and growth is in-line with richness of stimuli view of nature. In these terms, one can view nature as ever changing and, stopping habituation in visual sense as well as providing our visual system with different shapes every day, every season and every year. On the other hand, man-made structures and environments are not changing the way the nature changes. The changes in natural environments are substantially slower and most important of all, the changes in man-made structures, not a part of natural ecosystem, heralds erosion as well as destruction and going back to the “natural state”. Therefore, the first alternative can be interpreted to be a part of conceptualization of nature that sees nature as source of ever vibrant stimulations. But also it brings to mind the qualitative differences

between different kinds of stimulations in our natural and man-made environments.

The other alternative regarding the reason behind the preference of nature over man-made environment is the fact that people try to seek refuge in the nature. Even in some early studies about the motivation behind visiting natural areas it is evident that seeking refuge is one of the top reasons that people visit natural environments. (Rossman & Ulehla, 1977, Hendee, 1969).

This view on natural environments can be related to stimulative aspects of nature in some ways.

First of all, the term refuge is used because of the inverted U-shape pattern of stimulation desirability. Nature may be providing humans with just the right amount of stimulation and may not overload humans with too much stimulation. And because of comparison with the man-made environment the nature is named as refuge. Therefore, it may not be the lack of stimulation but the right amount of stimulation that makes people to prefer nature over city. Hence, the second alternative can also be interpreted in the light of stimulativeness of nature.

Secondly, as Wholwill (1983) suggests it may be the unresponsivity of nature toward us that makes it a refuge for humans. The nature is not changed or modified significantly at all by actions of one human or even a group of them this may be the basis for feeling of “unity” or “oneness” with nature. To put it

all together, in a human society, individuals are bombarded with information on how to react to people, to what extent should this reaction be and with how much intensity should this reaction be. These unconscious analysis is the basis of social interaction for humans and a source of stimulation for sure. But in modern times these stimulations can go beyond our limits to bear and this can be another reason that people to seek refuge in natural environments.

Another alternative is seeing nature as a symbol. This view can be complementary with explanation of preference toward nature as a source of stimulation. In the way that repeated experience with the same stimulation as well as the exact time in which it happened can have lasting effect on how the experiencer will symbolize this experience. On the other hand, in order to be a symbol in lives of human beings one natural feature must have enough stimulation to change the life of the people around it. This stimulation being interpreted as pleasant or unpleasant can be related to so many factors that changes throughout the history. For instance, Wohlwill (1983) gives the example of mountain in human history. Nowadays mountains are basically one of the most frequented places on our planet. Mount Alps were most probably interpreted negatively 10 centuries prior to this day. Because what it used to “afford” was not pleasant at all but death in one of the most horrible ways. But in today’s world it is one of the most desired places to visit. Because the man have made the stimulation of Alps to be in a suitable range for us. The

probability of dying from hypothermia is not as high in today's world as it was before. Hence, symbols are the result of stimulation "over time" and one place can be symbol for different concepts and those concepts can be drastically different from one another. Moreover one cannot interpret it as to be refuting the original stimulative aspects of nature. In contrast, the phenomenon that may become a symbol must at the first place be stimulative to humans and then certain meanings can be attributed to it but the meaning of a place can be perceived differently in different contexts. For instance if one is not properly equipped for hiking in the mountain the experience of mountain climbing can be full of dangers and unpleasant or stressful and it can make the natural elements and landscape of the mountain to be perceived as unpleasant in comparison with hiking fully-equipped. But if hiking wants to be a symbol of anything it needs to have stimulative power to some extent. Therefore, If any object or phenomenon wants to provoke any kind of ascribed meaning or even preference it needs to contain stimulation for senses.

## **1.2. Definition Of Aesthetic Response**

The affective system in humans is involved in virtually all activities that are considered to be significant or meaningful. (Ittelson, 1973, p. 16; Izard, 1977; Zajonc, 1980; Lazarus, Kanner, & Folkman, 1980). From this perspective, humans' response to features of any environment (whether natural or man-made), that can be categorized as an experience with aesthetics, can be said to

involve emotional and affective experience. In fact, early studies confirm that people actually reported being emotionally aroused as one of the benefits of natural recreational areas (Rossman & Ulehla, 1977; Shafer & Mietz, 1969).

Aesthetic response in a natural environment can be put out as the preference or like-dislike emotions as well as neurological response connected with pleasure (Zajonc, 1980; Berlyne, 1971). This preference or pleasantness is of affective nature (Osgood, 1962). Affect can be said to be inherent in human species because they are hardcoded into our existence. The evidence for this is that five emotions are present at birth and other emotions manifest themselves when one reaches certain levels of maturity. (Izard, 1971; Izard & Buechler, 1980, 1973). At the same time, children who were born blind show their emotions through facial expression in the same way as children born with sight (Eibl-Eibesfeldt, 1972). Also, the expression of emotions are the same across different cultures on earth (Ekman, Friesen, & Ellsworth, 1972; Izard, 1971). Furthermore, the preference on the continuum of like-dislike is possible to be completely separate from recognition (Moreland & Zajonc, 1977; Wilson, 1979). Suggesting the affective process to be an independent and hardcoded system on humans. Also, it is one of the functions of this affective system to give structure and importance to subsequent cognitive reactions to stimuli. This can be very valuable in an adaptive/evolutionary sense because it can speed up the reaction to environment significantly (Zajonc, 1980; Izard, 1977). This innateness can be used with



confidence to state that the affective system is an evolutionary necessary tool that is hardcoded on us because of its necessity for adaptation to environment. One of the features of this adaptation can be said to be choosing an environment that is stimulating and engaging enough for our senses to grow and develop its full potential. It is from this perspective that pleasantness of a natural scene can be postulated to be a reaction to meaningful elements of environment in terms of survival (Appleton, 1975). According to Izard (1977) and Zajonc (1980) there is a framework by which we can summarize the relationship between natural setting and subsequent affect and cognition. In short it postulates that it is the first general affective response that motivates an adaptive behavior which can be avoidance from or approach towards certain natural stimuli. To go one step further it is found that even a memory of natural environment or imagination of it can also elicit an affective response (Singer, 1966). In this framework, there are elements in natural environment that elicits initial affect. They are firstly, structural properties of a setting. Secondly, depth properties of the setting that can be inferred quickly and thirdly, general environmental content. For humans the general structure of the setting like patterns, transitions and focal spaces can be inferred very quickly without significant processing and therefore cause affective response in return. At the same time, the content of setting (what can be found in the setting like presence of greenness, water etc.) also can elicit affective response toward a natural scene. Findings of Izard (1977) and Zajonc (1980) suggest that after the initial arousal in autonomic system there is a follow

up cognitive appraisal of the scene. In the case that the emotion associated with the scene is strong it can either dominate the subsequent cognitive response or make the cognitive response be more efficient. This efficiency refers to the speed of identification and recognition of elements present in the scene. The role of cognition here is to identify and judge the elements of the environment and their influences on well-being. (Arnold, 1960; Lazarus *et al.*, 1980). In this stage the evaluation of cognitive system can also result in developing different emotions related to the environment based on past memories and associations related to the observed scene. In short, the affective system that recognizes the environmental patterns is responsible for finding some patterns pleasant. Moreover, based on the evolutionary function of affective system, preferred scenes or what humans find aesthetic beauty in environments is preferred because of its survival value.

In this sense feelings and emotions are closely connected to actions and behaviors. In this perspective the adaptive nature of actions all start with the affect that is stimulated/ elicited by nature (Ittelson, Franck, & O'Hanlon, 1976, p. 192; Mehrabian and Russell, 1974; Izard, 1977; Tomkins, 1962). This fact does not mean that nature determines the behaviors of individuals; the term action impulse means that the actions that are elicited by nature or stimulated by nature (in the sense of creating arousal in individuals) does not necessarily need to be acted out but it can be stopped or suppressed by the individual

(Lazarus *et al.*, 1980, p. 198). In this perspective the concept of geographical determinism loses its meaning.

### **1.3. Visual Properties Of Environments That Influences Preference**

The visual properties of objects can be divided into three categories. The first is an objective perspective on visual aesthetics. The other category is subjective perspective and the third category is the holistic view toward aesthetic experience.

#### **1.3.1. Objective Perspective On Visual Aesthetics**

The first objectivist in visual aesthetics can be traced back to be Aristotle. He proposed that the characteristics that are interpreted to be aesthetic or beautiful is inherent in the object itself. These characteristics are order, symmetry and definiteness. In the book *Analysis of Beauty* Hogarth (1753) contends that linear lines are the least preferred form and he obtained this opinion by manipulating straight lines and curved lines which are considered to be objective properties. Therefore, he proposes that regularity is not preferred and it should be replaced by variety (Hanfling, 1992).

#### **1.3.2. Subjective Perspective On Visual Aesthetics**

Another visual aesthetic property can be placed into the subjective category. The idea behind this category is that the aesthetic properties of an object comes from what it arouses or produces (in affective terms) inside the observer. If it

produces pleasantness or pleasure then it has a degree of aesthetic properties and if it produces opposite affects then the object does not have aesthetic properties (Ward, 1992). As Ward (1992) explains in his book, Hume (1997) posits that although aesthetics should be considered as subjective, it is a generalizable subjective experience. There are some people who possess high ability to discern and discriminate between works of art and a degree of agreement exists among them suggesting that there is commonality among viewers of art and based on this one can extrapolate that there is a shared sense of subjective aesthetic. Then Hume (1997) states that the subjective experience of aesthetics can be generalized because human beings share their emotions and affect and this experience is not exclusive. Furthermore, some researchers stipulated that there is the factor of meaningfulness in contrast with collative variables (objective variables) that influences the aesthetic preference or aesthetic experience. To be clearer, the tendency to make meanings of visual settings is the important factor in aesthetic experience according to those who have a subjective perspective on aesthetics (Munsinger & Kessen, 1964; Martindale et al, 1990).

### **1.3.3. Holistic View On Visual Aesthetics**

According to this view on aesthetics the aesthetic experience is elicited by both the physical properties of an object as well as personal characteristics of people who are having aesthetic experience.

Dewey (1958) describes aesthetics as “experience”. In this perspective one can conclude that aesthetic experience both relies on psychological aspect of an experience as well as physiological properties of the experience. Bell (1997) in general describes aesthetics in human beings as an “emotion”. In his book he talks about basic qualities of objects that can produce aesthetic emotions and calls those qualities “significant forms” which can evoke aesthetic response or emotions. Moreover, in aesthetic experience both significant forms and aesthetic emotions should be present but significant forms precede aesthetic emotions and play a causal role in this relationship. There are some properties of forms and objects that results in emotions of preference and liking in certain contexts.

#### **1.4 Complexity And Aesthetic Preference**

Complexity has been defined in different terms and based on different patterns of shapes as well as different patterns in visuals. According to Attneave (1957) more complex shapes are harder to be constructed from memory and they are more difficult to be remembered by name. Therefore, one can say that more complex shapes stimulate the cognitive system more than non-complex forms or objects. The concept of complexity is referred to the quantity of independently perceived units or elements in one single scene. When a scene is referred to as being highly complex it means there are large number of elements that are perceived as not being similar to each other (Berlyne, 1971). There are

early accounts of the importance of complexity. In early studies it was shown that complexity in visual terms has an effect on preference. For instance, adults preferred more complex visuals to attend to in comparison with visuals containing less visual complexity (Berlyne, 1958). Similar findings were reported by Fantz (1961) in which the infants' span of attention was longer for more complex visuals. Stimulus complexity was posited to influence attention. In another study done by Spitz and Hoats (1963) the duration of exposure was taken into account as well. In this study different age groups attended only for 3 seconds to either a complex or a less complex visual. The participants were asked which one of the visuals they would prefer to see again. In this study participants chose less complex visuals more frequently but the highest age group in their study (16 years olds) looked at the more complex visual when it was chosen. Berlyne (1963) conducted another study which incorporated exposure duration into the study of complexity and aesthetic preference. In this study there were four different durations of exposure for both complex and less complex visuals. The result showed that the longer participants looked at the stimuli, the likelihood of choosing the complex visual decreases. In other words, there is a negative association between exposure time and preference for the more complex visual. The conclusion came in another study done by Berlyne (1966) in which the results demonstrate that if the visual is exposed to participants for less than one second, the more complex visual is more likely to be chosen. And if the stimuli is exposed to participants for more than three

seconds the less complex stimuli is likely to be preferred by participants. The explanation behind the findings are said to be related to participants' "curiosity". If participants are not given enough time that is needed to look into and explore the visual they are more likely to prefer the more complex visual just to satisfy curiosity. And if participants are let to be exposed for a long period they are more likely to satisfy their curiosity by sufficiently exploring the stimuli and therefore be less curious about it and prefer it to a lesser extent. Moreover, this preference can be viewed in terms of stimulative properties. When there is not enough time to have a good look at some visually complex form, it has more stimulative power because in addition to being visually complex, there is less habituation produced by lengthy viewing time. Therefore, the complexity of the object loses its function because simply our senses get used to it. Moreover, after being used to the complex object another less complex object would be viewed as more information-loaded because of a contrast effect between two shapes. In a study done by Willis and Dornbush (1967) the authors investigated the relationship between age, degree of complexity and exposure time and its influence on preference for each visual. The method used in this study was taken from Attneave (1957) in which random shapes were constructed using a  $k \times k$  matrix and from this matrix  $n$  points were plotted (number  $n$  refers to any number between 1 and  $k$ ) then these chosen points were randomly connected to each other that produced a polygon with  $n$  sides. After that, the peripheral points were connected to make a convex

polygon. Next the points inside the polygon were ordered randomly and one by one they were taken into a part of the surrounding polygon randomly. There were 20 pairs of figures which were presented in four different exposure times for three different age groups. Each pair consisted of either an eight or seven or six or five or three sided figure paired with a four sided figure. The exposure times varied between 0.5 seconds, one second, three seconds and ten seconds. The results show that preference for complexity in visuals starts as early as 5 years old and this preference increases with age and exposure time did not result in a significant effect. Also, it is postulated that there is a “pacer” stimulus which is the preferred level of stimulation (Dember and Earl, 1957). With relation to a complex stimulus, there is another concept called “unexpectedness of stimulus” which refers to the extent to which a stimulus is unexpected by the perceiver and this unexpectedness can change individuals’ affective reactions (Maddi, 1961).

Another early studies on visual complexity and preference was done by Vitz (1966) contained two studies of effect of visual complexity based on progressively increasing visual complexity. In one of his studies he created 8 visually complex pictures which contained line drawings. the different degrees of complexity was done by first drawing a one inch straight line in a blank piece of paper and then extend it with sixteen randomly selected angles. The angles were all 22.5 degrees that is the result of 360 degrees being divided into 16 equal



degrees. At the first level of complexity the visual contains eight steps of connecting one inch lines in different angles. The second level of complexity visuals contain eight more additional steps to the first visual. Every higher complexity visual was made via adding 8 additional steps to the previous level of complexity. Participants first ranked the pictures based on preference and then stated their preference based on 28 different combination of pairs. The result showed that the preference increased as a function of complexity up to the 5<sup>th</sup> level of complexity and then decreased. In his other study Vitz (1966) used another definition for complexity. In this second study he used a square which a line was drawn from each side until it intercepts any other side. Each square had sides of 8 inches and each side was equally divided by 20<sup>th</sup> of an inch. The starting point of each line was determined randomly from these divided points with a random angle ranging from 1 to 179 degrees. The simplest consisted of 4 lines in a square and each progression in complexity was made by adding four additional lines by the same fashion. In total 6 different squares were made. The same procedure of the same study was followed with the minor differences of stimuli being only six in quantity. The result showed that the preference increased as a function of complexity up until the fourth level of complexity and in the last two complex pictures it reduced preference. In figure 1.1 and figure 1.2 the sample of these images are shown.

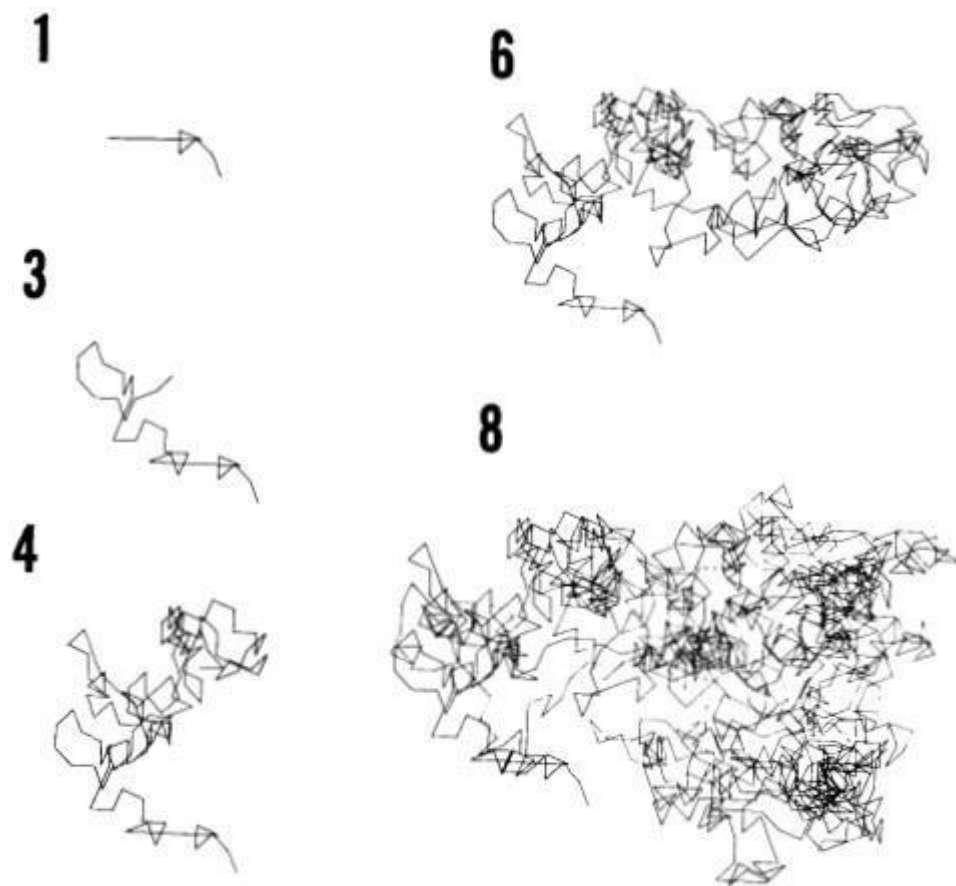


Figure 1.1. *Five of eight stimuli in Vitz(1966)*

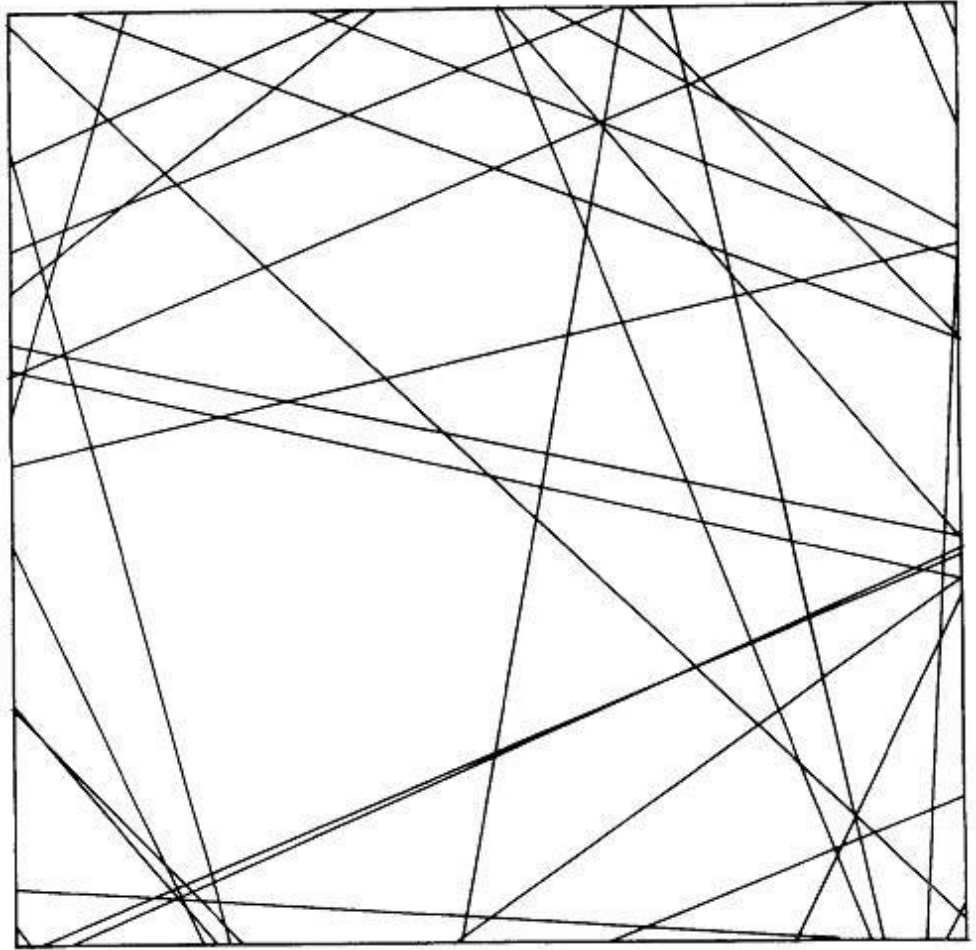


Figure 1.2. *Square stimuli used in Vitz(1966)*

In a number of laboratory studies mentioned by Berlyne (1971), number of unstructured and randomly created arrays showed that participants preferred the arrays based on an inverted U-shape style. This means that moderate levels of complexity is related to higher preference and both low and high complexity were associated with lower levels of preference and pleasantness. Moreover Berlyne (1974) also makes the statement that it is not only one characteristic or visual property of objects that determines preference, but it is related to collative

properties of an object. These collative characteristics are responsible for making a difference in arousal levels of humans; whether increase the arousal when one is having too little of arousal or decrease the arousal levels when one is experiencing excessive arousal.

In other studies, the relationship between complexity, reported interestingness, viewing time and exploratory activity was found to be generally linear and positive (e.g., Berlyne, 1963). Furthermore it was also found that the voluntary exposure of landscape slides was highly correlated with reported complexity (Wohlwill, 1968).

The relationship between complexity and preference for natural and urban environments have found mixed results in the sense that almost all studies have found significant relationships between complexity and preference for a place but in some studies the relationship is an inverted U-shape and in some studies the relationship is found to be linear positive (e.g., Kaplan, Kaplan, & Wendt, 1972; Ulrich, 1977; Wohlwill, 1968, 1976). According to Wohlwill (1976) the reason behind these non-conforming results is the difficulty inherent in sampling scenes of natural environments with different levels of complexity. Some studies that their samples only included low to moderate-complexity scenes of nature. In these studies, the relationship between preference and complexity is found to be linear. In other studies that included high level of

complexity in natural scenes found inverted U-shape relationship between preference and complexity.

In recent studies, researchers investigate the functionality of visual characteristics on interaction with and preference for websites. These type of studies may give us insight about what visual properties may mean in a very recent made up world which we call the cyber world as well as offering us more functional insights regarding the role of complexity and aesthetic preference. In so many studies of this sort a set of pictures called International Affective Picture System (Lang et al. 2005) was used. In one study a negative relationship between visual complexity and affective valence was found. Affective valence refers to pleasantness or unpleasantness of stimuli. Moreover, a positive association was found to characterize the relationship between visual complexity and arousal levels by using International Affective Picture System (Ochsner, 2000). In another study, Bradley (2000) found that arousal levels increase as a function of increment in both pleasantness and unpleasantness of stimuli. In the study done by Pandir and Knight (2006), they investigated the relationship between complexity, pleasantness and interestingness. They showed the participants printed A4-sized picture of twelve homepages of different website and they presented it to them at the same time. Then they asked their participants to rank them based on complexity, pleasantness and interestingness. Investigators instructed the participants to write down their

reasons for each choice after ranking. There was an unexpected result which does not conform to the history of research in this topic. The results demonstrated a significant high degree of agreement among participants in their ranking of complex homepages of websites. This finding means that people knew which picture is complex and they agreed on the degree of complexity of each stimuli. With regard to pleasantness there was a significant and low agreement among participants which means that participants did not agree of level of pleasantness of stimuli. Also there was no agreement on interestingness and each stimulus was ranked differently by participants based on interestingness. Surprisingly, there was a significant and negative association between pleasure and complexity. In other words, participants rated what was perceived less complex to be more pleasant. In short, the relationship between complexity and interestingness was highly significant and these two factors were negatively associated (Pandir & Knight, 2006). In another study done by Tuch, Bargas-Avilaa, Opwisa and Wilhelm (2009) more or less the same method was used. Homepages of 36 websites were used as stimuli in this study. This study measured physiological responses of users with regard to their ratings of each website. The results reflected on their research paper demonstrates that visual complexity of websites were positively associated with arousal levels and was negatively related to valence appraisal (pleasantness). Visual complexity was also found to be related positively to facial muscle tension which shows unpleasantness and negatively associated with heart rate

which ambiguously is related to decreased preference. Also visual complexity was associated with higher reaction times in task which involved finding a certain symbol (an asterisks) in a webpage. One could infer from these results that the quality that we call complexity is an objective quality of objects or visual stimuli and one can hypothesize that our species may have been equipped with competency to discern complexity in the environment. Also an alternative explanation for the reason behind absence of the inverted U-shape association may be that since there is no “natural” baseline for complexity even the more simple pictures among the group of independent variables may fall just in the middle of the inverted U-shape. Meaning that those picture which were selected as being simple in relation to others (that received the most ratings of pleasantness) may actually be in the middle range of complexity that is preferred by human beings when compared with the universal stimuli that our brains are used to perceive. In accordance with this conceptualization, the definition of webpage complexity can be different in various studies. In Tuch, Bargas-Avilaa, Opwisa and Wilhelm (2009) the compressed size of each JPEG format pictures was taken as the measure of complexity. In the study of Pandir and Knight (2006) the subjective complexity ratings of individuals were taken as the measure of complexity. In a study done by Geissler, Zinkhan and Watson (2006) a more objective measure was employed which was the number of links in a website, the graphics and homepage length. And in the study of Geissler, Zinkhan and Watson (2006) they found the inverted U-shape relationship

between the complexity factors and communication effectiveness factors which were attitudes of consumer toward the webpage, attitudes toward the company, attention toward the homepage and purchase intent which can be used confidently as a measure of preference in its own context. In this study the moderate levels of complexity exerted the maximum effect on the dependent variable and positive attitudes. Therefore, it seems that the different ways of operationalization of complexity influences how we perceive the relationship between complexity and positive attitudes or preference. There seems to be other factors that influence our perception of aesthetics at least in man-made environments like websites. Context seems to play a role in aesthetic preferences of websites. In one study by Schaik and Ling (2008), the effect of context was investigated. In this study the stimuli were different webpages and they were clustered based on their context and there were different conditions in viewing the stimuli (homepages of different websites). Participants filled a scale to express their aesthetic preferences. There were three conditions under which they expressed their preferences, those were brief exposure (for the duration of 500 ms), self-paced exposure (take your time as much as you like) and in the other condition they filled the scale after using the site. The results demonstrates that the stability of judgments were increased from brief exposure to self-paced exposure and from self-paced exposure to site use in the condition that provided context. These findings mean that the context in which the aesthetic choice is made plays a great role by making the amount of time



dedicated to analyze the stimuli quite irrelevant. In other words, context of the stimuli gave enough information for participants to make their choice therefore, the amount of time spend on analyzing the stimuli had no influence on judgments. Moreover, participants were able to distinguish between relatively attractive and relatively unattractive webpages only when there was no context. Here one may be able to make the statement in which the context (which is about what function the site serves) makes the participants to ignore aesthetic characteristics in a visual sense. It can be stated that aesthetic judgment is dependent upon information regarding the usability of the object for us and this is the reason that aesthetic judgment occurs only in the no-context condition. In accordance with findings of this study Tractinsky et al. (2000) makes the statement that what is beautiful is “usable”. The reason behind the effect of context in this study may be presenting to the user a list of priorities or a hierarchy of information about usability which in turn it orients our aesthetic judgment. Therefore we do not resort to our innate and natural environment-oriented way of aesthetic response which depends on our visual judgment. In this study in the self-paced exposure condition those webpages whose context were information-based (were designed to be a medium to dissipate information about a subject matter) were distinguished based on their attractiveness. The results showed that websites that possessed classical aesthetics (emphasis on order and reflection of information in an efficient manner) were preferred over those that possessed expressive attractiveness (having high visual complexity).

The result at hand may be an evidence to give insight about the process behind context of stimuli and how it influences aesthetic judgments.

As well as the role of context the role of gender and age can be an influencing factor for preference toward complexity. There are studies that investigate the association between gender and visual complexity. Hsiu-Feng and Bowerman (2012) found the expected inverted U-shape model of preference among Taiwanese children.

Another study which implemented magnetoencephalography to map regions that are active during aesthetic judgments. There was a gender difference in region of the brain that was active during the aesthetic judgment. In detail, for women the parietal region activity was bilateral and for men it was lateralized in their right hemisphere (Cela-Conde et al., 2009).

If we follow the same logic or theoretical framework based on the inverted U-shape (Berlyne, 1974) it can be inferred that highly random and unstructured complexity will result in lower preference in aesthetic terms. The highly complex natural scenes elicits low levels of preference and this can be said to be highly adaptive in the sense that when one approaches a highly complex scene in nature it signals the lack of information or lack of cognitive appraisals. And approaching a place without any appraisal beforehand is a recipe for disaster in wild.

Furthermore, initial low preference can have adaptive functions and can be the prerequisite for more motivation to cognitively engage in the environment. This can be the first step to structure the visual environment and make sense of it. In a highly complex environments the initial liking can be disastrous because if humans engage with the highly complex environment they would be engaging with something that they have little information about.

The realm of cyber world may seem totally incompatible and unlike the real world in which we live and have evolved. But since it is a man-made design and works on our basic senses namely our vision preferences in the cyber domain can give us great deal of information about visual preferences and bring to light human beings' innate tendencies. At the same time, we need to be careful about the generalization of these information to our daily world. Findings of cyber domain can be good in the sense that it can be representative of our visual preferences and processing in isolation from other senses. This approach can be said to lack ecological validity because isolating the sense of vision (or basing cognition solely on vision) can be quite impossible if we try to implement in a naturalistic setting. This can be an advantage as well as a shortcoming because then we may get diverted from how a holistic (data extracted from all of our senses) affect liking and preference.

### **1.5. Structure Of A Scene And Aesthetic Preference**

Based on preferences for moderately complex visual arrays it can be extrapolated that in visual sense humans have a tendency toward some kind of structure in the environment.

Some empirical evidence comply with this preposition. It is shown that the basis for affective engagement with a visual array is more dependent upon the configuration of the array not the individual components of it. For instance, in facial recognition configuration of physical features is more the center of attention rather than individual features (Patterson & Baddeley, 1977). Tuch, Bargas-Avila and Opwis (2010) also examined the factor of symmetry in perceived beauty of websites. Participants in this study rated every website based on its symmetry, classical and expressive aesthetics and intuitive beauty. The results demonstrated that symmetry exerted an effect on expressive and classical aesthetic as well as perceived intuitive beauty. On the other hand, there was a gender effect on non-preference toward asymmetrical websites. The results showed that asymmetry in websites influence aesthetic preference only for male participants.

There seems to be 3 structural characteristics that influences human judgment of aesthetics (Wilson & Chatterjee, 2005). The first factor is that among images, in what one can call western culture, people prefer images that the movement demonstrated in the image starts from left and proceeds to the right side rather

than a movement from right side to the left side of the image. (McLaughlin & Cramer, 1998; Mead & McLaughlin, 1992). Also there is some inclination toward the direction of faces in images and paintings. The pictures that showed profiles of people sitting and oriented toward the right side were preferred more by people. Moreover, even the sequence of elements were more preferred when they had a left to right orientation (McLaughlin & Murphy, 1994; Benjafield & Segalowitz, 1993; Humphrey & McManus, 1973; Freimuth & Wapner, 1979).

The second factor seems to be the place of the elements that are made to attract attention. When they are in the right side of the image they increase preference. In other words, if the object that is supposed to attract attention is on the right side of an image or picture the preference for that image increases (Mead & McLaughlin, 1992, Christman & Pinger, 1997, Beaumont, 1985). Furthermore, the existence of one salient point is important in aesthetic preference. This characteristic is called Focality. This property of scenes is more related to structural properties of visual arrays (Ulrich, 1977). To define focality one could say that it is the extent to which a point in a scene attracts viewers' attention. It becomes possible for a focal point to exist when different elements of a scene direct the observers' attention to a particular point in the scene. The focal point does not need to be only one element but it can be a group of features that are grouped together. In a study done by Ulrich (1977) different scenes of rural road sides was rated by trained judges to contain different levels of focality. The

scenes were shown to two different groups (American university students and Swedish university students). There was a positive moderate association between focality and preference ratings. The relationship between focality and liking was further investigated by Janssen (1976). In his investigation he tracked eye movement of participants in reaction to outdoor scenes. He recorded eye-fixations and realized that participant looked for a salient feature in the scene which in average was found around 1.25 seconds. This research's findings can explain visual processing in the sense that people sought a reference point for their perception of a visual setting. This may show a bias in human visual perception in which people look for structure and configuration in a scene rather than systematic analysis of elements (Wohwill, 1983) .

The next factor that seems to be of importance is called the balance of elements in a picture or image. To be clear, balance refers to how elements of a picture are located in relation to each other. The most convenient and simplest form of balance is symmetry (Wilson & Chatterjee, 2005). The preference for symmetry is recognized to be profoundly based on evolutionary development of recognition system in animals and human beings. The predominant view used to be that symmetry signals the quality of the signal dispatcher. But this view is challenged as Enquist and Arak (1994) propose that the underlying reason for the preference of symmetry in objects is the fact that symmetrical objects can

be recognized easier independent of their location and orientation in one's visual field.

There is also another form of giving organization or structure to a set of elements and it is called "Dynamic balance". In Dynamic balance, the symmetry does not exist in its traditional sense but different members of a visual object is organized in such a way that different elements compensate or even each other up (Wilson & Chatterjee, 2005). The dynamics and the balance properties of an image can be said to be independent of cultural forces and the what is called "zeitgeist" of a society and other human factors because it seems that those properties that are related to balance of elements is related to unconscious processing and does not fall completely to the realm of attentive processing. Evidence for the unconscious nature of processing of this sort comes from studies that demonstrates that people are sensitive toward balance properties even at a very short exposure time (100 ms) (Locher & Nagy, 1996; Ognjenovic, 1991).

Balance of elements can be also viewed as a developmental stage in human growth as a result of developed sensitivity toward structure of visual stimuli. It is demonstrated that children before reaching 9 years of age place elements on the paper based on a made-up structure but after the age of 9 children make structure in their painting by lining up the elements on either a horizontal or a vertical grid and they produce a center that attracts attention (Golomb, 1987). A

similar pattern can also be seen in adults. The designs produced by adults are seen to contain the geometric center and center of balance lined up significantly close to each other (Locher, Stappers, & Overbeeke, 1998). There are also psychometric tests produced to test sensitivity towards balance. One of these test is called VAST (Goetz, Borisy, Lynn, & Eysenck, 1979). This test is designed to assess sensitivity toward balance as a personality construct and it was shown that samples from different backgrounds responded similarly to items of this test (Iwawaki, Eysenck,& Gotz, 1979). Galitz (2002) proposes several other elements of aesthetic preference for not only aesthetic elements of images but displays in general (which can go in the realm of user interface). Other elements beside symmetry and balance are predictability, economy, unity, regularity, sequentially, simplicity, proportion and grouping.

Regularity refers to a consistent and a standard pattern existing in a display design. One can achieve regularity in a picture by making equally distant (following a standard in spacing) vertical and horizontal reference points for aligning the visual elements. Regularity can be achieved by any constant standard and it can be achieved by using elements with similar shapes, size, color etc.

Predictability is the type of arrangement that follows conventional “order” in which design of elements are repeated in an order that produces certain expectancy of the place of the other elements in the display. Predictability is



closely related to the function of displays. Predictability suggests a plan behind the design. Sequentiality is a design pattern that guides the eye movement through the display. To produce sequentiality one needs to provide attraction for the eyes. Eyes are attracted to unusual, bigger, brighter, isolated elements as well as colorful elements in comparison with a black and white pattern. Moreover, eyes are attracted to dark areas more than white areas. Economy is reflecting the purpose of the display as easily and minimally as possible. Economy of the design of the displays is the opposite of ornamentation which means adding extra elements to make something more intricate and “beautiful”. It seems that intricacy decreases clarity and therefore is not desirable. In cyber space complexity in the visual array is not desirable which is obviously in sharp contrast with natural visual stimuli.

Unity is another essentiality for aesthetic preference. Unity can be defined as coherence or a pattern which reflects the elements as being a total, one piece. Unity can be achieved by using identical or similar shapes, colors and size. Also unity can be produced by spacing related elements in a lesser extent than the space between other unrelated elements (Galitz, 2002).

In fact the concept of “unity” which is investigated by Küller and represented as a semantic factor, is found in different series of studies (Küller, 1972; Kwok, 1979). For Küller unity is very much related to enclosedness which can be interpreted as being closer to each other in comparison with other elements.

Proportion is another feature that is considered while evaluating aesthetics of an image or a display. According to Marcus (1992) there are shapes with certain proportions that are preferred more than other shapes possessing different proportions. This preference toward certain shapes also is in accordance with the assumption that visual preference is inherent and an evolutionary asset in human beings.

Square has a proportion of one to one (1:1) and it expresses stability. It could also take the shape of a diamond by rotating it. Diamond reflects dynamicity and tension.

Square root of two (1:1.414) is another proportion that is preferred. If one divides this shape in two along its length the resulting two shapes are square roots of two rectangles.

Another preferred shape is Golden Rectangle (1:1.618). This shape is based on the famous Golden Ratio which is the pattern by which organic life grows and inorganic life takes shape. The golden ratio happens when a line is divided into two such that the proportion of the small line produced by the division to the big part produced by the division is the same as the proportion of the big part produced by division to the whole undivided line. This preferred proportion can be based on our predilection toward natural phenomenon.

Other preferred shapes are rectangle with its sides being on proportion of one to square-root of three (1:1.732) and double square which is a rectangle that two of its sides is double in length in comparison to the other two (1:2).

Simplicity is another factor that shapes our preference toward displays' configuration. Simplicity obviously refers to how direct and to-the-point a design is and how straightforward the meaning of a pattern is reflected (Galitz, 2002).

Simplicity may not be interpreted as the number of elements but it can best be described as how easily one can perceive or predict the method of use of certain features. One may takes the simplicity as the number of elements because Bauerly and Liu (2008) showed that the medium number of elements is actually most preferred by participants in a webpage display which is in accordance with Berlyne (1974) that postulates that medium level of complexity is preferred by viewers.

Grouping is another factor. Grouping elements together shapes the appraisal or meaning of different patterns in a display. Grouping in a visual sense happens via four principles: proximity, closure, matching patterns and similarity. Gathering elements based on grouping is more pleasant to individuals that perceiving a shape without grouping. (Galitz, 2002).

From an evolutionary perspective, the attention or preference toward the configuration or structure is in line with evolutionary economics that renders

the decisions made in an environment to be based on patterns rather than individual component; because it is highly time-consuming and energy-consuming to be recognizing all the individual components one by one and make cognizant decisions based on it. The same point is made by Ulrich (1977) who states that in an environment with large quantity of elements one can reduce the elements to a lesser quantity by grouping elements together. This would make a significant increment in the speed of visual information processing. There are different patterns by which the grouping of visual elements can be achieved. Grouping of elements can be done via homologous textures, repeating elements in an array, visible grouping of individual components or any other property that can make different, varying component to seem continuous and producing a focal point in a scene (Wohlwill, 1983).

Depth and preference in aesthetic preference is found to be related to each other (Craik, 1970; Ulrich, 1973, 1977; Wohlwill, 1973). Other examples among these studies found that trees that have some kind of depth are preferred more than those without any depth (Brush, 1978; Daniel & Boster, 1976). In evolutionary term and from an adaptive perspective restricted depth is an element that produces initial dislike and uncertainty. The example can be a thick forest in front of an explorer. The lack of depth signals uncertainty and produces affects that are adaptive to fight or flight (in contrast with exploration or approach behaviors). Also the avoidance of an uncertain setting needs the initial

dislike and can be life saving for species that are travelling almost all the time (Harari, 2015). In this accord, some studies have found a negative association between restricted depth in a visual setting and preference (Brush, 1978; Craik, 1970; Ulrich, 1973, 1977). Depth is also very much needed for any action based on cognitive and conscious response. And survival is very much dependent upon estimating the correct distance among different elements and have a notion of general relationship between different elements of a scene. (Ulrich, 1977). Without depth humans could not have the concept of a three dimensional world. Therefore, depth equips human beings with spatial information and therefore, it should elicit liking.

Texture, especially texture of the ground surface is of great importance in defining depth. Texture influences the cognitive appraisals of the environment also the ground surface texture eases the recognition of elements' relationships in three dimensions. Furthermore, the ground surface texture needs to be homogenous and even in length to facilitate the correct estimation of distance. (Gibson, 1958, Ulrich, 1977). From this perspective, if even and uniform textures are facilitators of the correct distance estimation, this pattern of ground surface texture should be preferred in contrast with uneven and rough textures. Another significant point in ground textures may be the fact that uneven and rough ground surfaces signal difficulty in mobilization and movement in that area which in adaptive terms it should elicit low preference. Moreover, there is

a link between ground surface texture and complexity in a visual array. It is logical to assume that the uneven and rough surfaces could produce more visual complexity (in a two-dimensional surface). It is true to assume that rough surfaces increase complexity but at the same time it decreases the order and structural properties. And complex visual arrays which are homogenous and continuous are preferred over un-structured complexity. In some studies the pattern of low preference for rough and scruffy surfaces was found (Rabinowitz and Coughlin, 1970 & Ulrich, 1973). In other studies, a positive relationship was found between preference and even-length grass surface on the ground (Daniel & Boster, 1976; Arthur, 1977).

#### **1.6. Existence Of Threat Or Tension And Aesthetic Preference**

The comprehension regarding existence of a threat or any kind of tension must result in activation of dislike affect in us and therefore, visual settings that produce tension and/or threat must be preferred less than visual settings that does not include threat/ tension in terms of survival. The empirical support for this assumption is evident. For instance, Ulrich and Zuckerman (1981) presented the participants with different depiction of natural environments and landscapes. The varying element in these pictures were markers of calm or tension. The coding of these slides were based on dangerous situations in real life that people would avoid. The examples include stormy sea, an avalanche,

thunderstorm, flood etc. Among 200 participants' rating of these pictures a negative relationship between tensions and liking preference was found.

### **1.7. Anticipation, Curiosity And Mystery And Aesthetic Preference**

If the straight line of vision is curved, it has been found that it creates special curiosity among people. Cullen (1961) calls this property of some visual settings "anticipation". According to Cullen a curved vista stimulates ones curiosity by making the person to be in a state of anticipation regarding what lies after the curve or what is at the end of the curved landscape.

The term "deflected vista" is coined by Appleton (1975). And also it is called "mystery" factor that promises information as well. (R.Kaplan, 1973; S. Kaplan, 1975). From an evolutionary perspective it is highly adaptive that evolution has produced a predisposition toward exploration and obtaining information about our surroundings and landscapes. It would be more stimulating to look at a vista that promises more information than a vista that does not because our brain does not believe in "half-stories" and it needs a complete scene(one that has a beginning and an end) to ascribe meaning to it. There are evidence that demonstrate that views with mystery factor are consistently rated more preferable than the ones which do not encompass the mystery factor (R. Kaplan, 1973; Ulrich, 1977). Furthermore, Gimblett (1990) tested Kaplan and Kaplan (1982) hypothesis regarding factors influencing preference toward a scene. There were four factors in Kaplan and Kaplan (1982) theory: Mystery,

Coherence, Legibility and Complexity. Mystery was defined to be the extent to which one can gain more information by venturing further into the place or the scene. And complexity is defined as the amount of variable elements that increase diversity. The result indicated that the mystery and complexity were well related to preference of scenes but legibility and coherence were not correlated as much. The same pattern for mystery and preference was found by Herzog (1984) in which mystery factor was predictive of preference in natural environment. Moreover, in the realm of interior design the importance of mystery and complexity has been shown. Scott (1993) demonstrated that both mystery and complexity are positively associated with preference and also positively correlated with each other. In this study mystery is defined to be indicated by scene accessibility, how far is an element from the closest point of interest, screening of view, how enclosed a space is and whether there are significant brightness contrast. In Urban settings mystery plays a role in preference and liking of the environment as well (Herzog, 1989).

Mystery has even a role in purchase motivation in which when moderate amount of information is presented to the customer the curiosity toward an object increases (Hill, Fombelle & Sirianni, 2016). This can be another general finding that partially validates the theory of Berlyne (1974) in which it states that moderate complexity results in optimal preference. The mediating factor between preference and complexity can be curiosity or mystery. Also it was



shown that emotional differentiation which refers to being able to distinguish between different emotions experience is related to curiosity which in turn is related to how one reacts to novelty and complexity (Fayn, Silvia, Erbas, Tiliopoulos & Kuppens 2017). There may be more to mystery and its relationship with aesthetic preference that meets the eye. Mystery is a predictor of both preference and danger appraisal even though danger appraisal and preference are negatively associated. The setting in which mystery resides can influence both preference or threat appraisal. Mystery and an open field is negatively associated whereas it is positively correlated with curved alley ways (open natural setting versus urban setting). The alleyways was shown to be more correlated with danger and preference was more correlated with open natural settings (Herzog & Miller, 1998). This result is in accordance with previous work of Herzog and Smith (1998) that stated a negative association between perceived danger and preference and a positive association between mystery and preference. On the other hand, in the setting of a forest with no pathways, mystery was negatively correlated with preference for the setting (Herzog & Kropscott, 2004). The findings of this study is “unusual” according to the authors but one may be able to explain the findings in the light that mystery in a forest with no visible pathways can be signals of threat the same way that curved alleyways are in the study of Herzog and Miller (1998). In their study the natural setting was characterized as “open fields” in contrast with closed spaces. Threat appraisal in an open field can be lower since there are always

ways of deterring or running away from dangers in every direction with no need to identifying exit routes beforehand. As a matter of fact Herzog and Bryce (2007) quite agree with this interpretation. In their study they added visual access to their model. Mystery was defined as prospect of further information being visible from one's current standing. Hence, they conducted the experiment in 1) high visual access and 2) low visual access condition. They found out that in high visual access condition the preference was correlated with mystery and unassociated with visual access but in low visual access condition the preference was unrelated to mystery and positively associated with visual access.

### **1.8. Consequences Of Encounter With Natural Versus Man-Made Environments**

There are a body of research that states the psychological benefits of contact with nature. Those people who viewed natural settings had an increase in positive mood and those who views urban settings had a decrease in positive mood (Driver & Greene, 1977; Ulrich, 1979). People who reside close to natural setting live a more satisfied life in general. Also people who worked in settings that provided views of natural plant life were more satisfied with their jobs and experienced less stress, less headache and fewer illnesses (Kaplan and Kaplan, 1989).

For instance it has been found in a study of 6 low-rise building that the view of nature and natural elements has significant effect on affective functioning, being at peace, being distracted, satisfaction with nature as well as satisfaction with neighborhood but the same effect was not replicated for the view of built environment or the view of the sky and weather did not replicate the same result (R. Kaplan, 2001).

Also, especially in stressful environment the view to natural settings are of importance in terms of relieving stress in settings like hospitals, military bases or nursing homes (Lewis, 1996). Moreover, it was shown that among people who had gall bladder operation those who were exposed to natural views (in comparison with urban views) recovered faster, had fewer post-operation problems and stayed for less in the hospital (Ulrich, 1984).

Even after watching a horror movie the physiological state of participants came back to normal faster for those who were exposed to natural scenes rather than urban scenes (Ulrich et al. 1991). Commuting is considered a stressful activity but those people who experience driving in a natural settings with plant life surrounding the driving path recover more quickly and have a higher levels of immunization in comparison with those who drive in roads which does not include natural elements (Parsons et al., 1998).

The same pattern of healthy regulation of physiological response as a result of contact with nature can be seen among prison inmates that had a view of nature;

those inmates had fewer stress symptoms and fewer sick calls (Moore, 1981). Human beings are evolved to spend time in nature but, in comparison with previous ages in history, in the modern life style we have spent the least amount of time within the natural environment among the plant and animal species. The overwhelming nature of stimulation related to natural environments results in reduced vitality and ill-health and this type of consequence on health can be traced to separation from natural stimuli (Katcher and Beck, 1987; Stilgoe, 2001). In the review of Rohde and Kendle (1994) they reviewed positive psychological responses to viewing natural settings. They found evidence for feeling of pleasure, relaxed wakefulness, sustained attention as well as decrease in negative emotions.

There are different explanations to what causes nature to be therapeutic or psychologically helpful. One explanation is called attention restoration hypothesis which states that nature restores the attention of the individuals and by doing so it exerts its psychological benefits (Kaplan and Kaplan, 1981). There are four requirements on restorative settings. Fascination, sense of being away, extent or scope, compatibility with individuals' purposes. In this regard fascination refers to the extent to which one directs involuntary attention or interest toward an object. Sense of being away translates into escaping from one's immediate environment. Extent or scope refers to how much one feels he or she is a part of a bigger setting. And compatibility means the extent to which

the environments will let the individual pursue his or her own personal goals (Maller, Townsend, Pryor, Brown & Leger, 2005, Hartig et al., 1991).

There are evidence to support restorative hypothesis as Hartig et al. (1991) reports, a walk in park completely relieves mental fatigue. In a study among immigrants having a contact with nature resulted in ownership feeling of the country they reside in, better integration and less isolation, relief from everyday stressors, more empowerment and having an attitude that believes in existence of opportunity and possibilities (Wong, 1997).

In one of the early studies of this theory, students who were under pressure for an examination were exposed to two sets of colorful slides. One set of pictures were colorful pictures of everyday natural scenes which was dominated by greenness and water. The second set of pictures contained clean and new urban scenes that lacked vegetation and water. The level of complexity in each picture was kept equal in order not to influence the results. Before and after viewing each set of pictures their feelings were measured and there was a definite finding regarding restorative powers of natural scenes but the same pattern was not found for the pictures containing urban views and in some cases it had negative effects on participants' feelings. The reactions to the pictures were mostly loaded on "sadness" and "positive affect" factors of Zuckerman Inventory of Personal Reactions. (Wohlwill,1983).

There was a second explanation that was based on another study by Ulrich (1981). In this study some physiological as well as emotional responses to natural versus urban environments was measured. The alpha wave altitude was measured as the physiological basis of cortical arousal in participants. The participants were relaxed and were shown colorful pictures. The pictures were in 3 categories one group of pictures contained nature with vegetation and greenness, second group of pictures was pictures of nature that contained water and the third group of pictures were Scandinavian landscape without vegetation and water. These three different group were equal in complexity and the amount of information they contained. The result showed a hierarchy of positive outcome on affective states of individuals. The best positive effect was for nature scenes that contained water. The next positive effect, although lower in degree in comparison with nature scenes containing water, was for nature scenes with vegetation pictures. Scenes with water and vegetation effectively kept the attention and interest of individuals. Also, the result of this study suggests that participants experience wakeful relaxation while viewing natural scenes.

This study also suggests that being exposed to nature does not have a global effect in comparison with urban scenes (Ulrich, 1981). There are lots of early researchers that hold the evolutionary perspective with regard to humans' emotional response to natural settings. (e.g., Driver & Greene, 1977; Iltis, Loucks, & Andrews, 1970; Stainbrook, 1968).

In his early attempts Wohlwill (1983) suggests that the attention restoration properties of the natural environment may be best pronounced for individuals who experienced stress and anxiety at the time of viewing. He suggests that the arousal levels among stressful individuals is reduced when they view natural scenes. However, for individuals who are in a relaxed state when viewing natural settings their level of arousal is kept in the optimal levels.

Even it has been documented that the cognitive function of children who moved from a less green place to a greener neighborhood. As a result the cognitive functioning of children increased as a function of the relocation to a place with higher amounts of vegetation (Wells, 2000). Furthermore, it was discovered that the extent of vegetation nearby the residential area moderates the effect of life stressors on children's wellbeing. To be more specific, children who lived near higher level of greenness and vegetation were less influenced by life stressors in comparison with children with lower levels of vegetation in their neighborhood. In accordance with healing characteristics of nature Hartig, Evans, Jamner, Davis and Garling (2003) tested the effect of nature after tasks that demand attention and driving (by the justification that commuting is unpleasant). The results indicated that mere act of sitting in a room that contained tree views reduced diastolic blood pressure faster than sitting in a room with no view. Moreover, walking in nature resulted in reducing stress to a higher extent in comparison with walking in an urban setting. With regard to

attention, walking in nature increased the performance on attentional tasks whereas the performance declined while walking in urban setting. While positive affect of participants increased and anger decreased in walking in natural setting condition, the opposite of this pattern was observed for participants who walked in urban setting. Furthermore, even the fake views of nature (shown through television) also influenced stress reduction in a clinical setting. To test the effect of nature researchers mounted televisions in a clinic. In the conditions of no television and natural environment shown in the TV participants experienced lower stress levels than the condition of day-time television and urban setting videos played from the television. Also stress was reduced more during no television condition in comparison with television condition. And pulse rates of participants were significantly lower in nature video condition in comparison with urban video condition (Ulrich, Simons & Miles, 2003). In another study which investigated the different effect of roadside environments on human stress response it was discovered that those who were exposed to urban environment were more responsive autonomically in comparison with those who were exposed to natural environment. To put it more clearly, the skin conductance of those who were exposed to natural environment was lower than those who were exposed to urban environments. this finding shows stress response to a lesser degree for those who were exposed to natural environment. Moreover, the blood pressure of exposés to nature changed in a less abrupt way in comparison with those who were exposed to urban



environment. Furthermore, recovery from stress was slower and sometimes stopped by exposure to urban settings (Parsons, Tassinary, Ulrich, Hebl & Grossman-Alexander, 1998).

Moreover, the positive effects of exposure to nature was also demonstrated for pregnant women. In her study, Stark (2003) put pregnant women on their third trimester of their pregnancy through an intervention program which involved 120 minutes of activities that are considered restorative during a week. The results indicated that these women (who were put into the intervention program) had superior performance in directed attention task which involved performing one task while inhibiting distracting stimuli.

Also people tend to choose places with natural elements as their favorite places. Korpela, Hartig, Kaiser and Fuhrer (2001) investigated the accounts of people about their favorite place in general and unpleasant places in general. Natural settings was shown to be over-represented in accounts of favorite places and under-represented in accounts of unpleasant places. The subjective description of favorite places included most of the elements of restorative experience. The places were described as being relaxed, being away from stressors and worries as well as the chance to reflect on one's self.

The restorative power of a place is significantly associated with subjective aesthetic preference. When participants were exposed to videos of natural in contrast with urban settings following viewing of a scary video; they rated the

extent to which they find the beauty of the environment they were shown and performed a task which required concentration. Participants preferred natural over built environment and experience more positive mood and concentration following the viewing of natural settings video. Moreover, in mediation analysis it was revealed that a great portion of aesthetic rating of natural environment was accounted by its perceived restorative potential. (Van den Berg, Koole, van den Wulp, 2000). Also when people perceive they are in need of mental restoration their aesthetic ratings of natural settings increases (Staats, Kieviet & Hartig, 2003). Moreover, perceived bird biodiversity and perceived naturalness of a place influences happiness and positive affect positively and significantly. The perceived restorative potential of a place mediates this relationship (Marselle, Irvine, Lorenzo-Arribas & Warber, 2016). These studies clearly demonstrates the innate ability of human beings to discern and recognize restorative settings and its representation in nature.

In an intervention program that aims to investigate the relationship between engagement with natural beauty and various different health outcomes, it was demonstrated that people who got involved in this program had a stable increase in terms of health, happiness, connectedness with nature and conserving nature. Moreover, the increase in engagement with natural beauty mediated the association between nature connectedness and health outcomes. Although unrelated to engagement with natural beauty, emotional regulation also

mediates the association between nature connectedness and health outcomes (Richardson & McEwan, 2018)

## **CHAPTER 2**

### **PLACE ATTACHMENT**

#### **2.1. Human-Place Bond**

Place attachment refers to the affective bond by which one relates to the environment. This phenomenon is central to human life and the reflection one makes over the place facilitates identity, creates meaning and the sense of community in people (Manzo & Devine-Wright, 2014). The attachment theory can be interpreted to encompass a general relationship with the environment; Bowlby also considered the attachment with a caregiver to be a part of adaptation to the environment in general (1973, Chapter 9).

The obvious tenets of place attachment are the concepts of place and attachment and how they relate to human experience. The notion of attachment is very much based on the affect associated with it. Place can be explained as a space that is ascribed meaning by means of group, individual or cultural forces. Moreover these places can be of different sizes like earth or universe, city or community, home or rooms and even objects. (Low & Altman, 1992). The preference for certain landscapes as well as certain places comes from the struggle that humans faced in critical stages of their evolution. For instance,

seeing the surrounding without being seen was an absolute advantage for humans and the proclivity for these places are evident; like towers, caves, vistas and other places in which we see evidence of human activity (Appleton, 1975).

Very similar to attachment theory in interpersonal relationships (the bond between caregiver and the child which bases itself on instinctive behavior that leads to survival of human child) the attachment to place can have the same characteristics. The concept of secure base in human attachment to the caregiver or parental figure can be a facet that is shared in attachment to a place theorization (Guiliani, 2003). Attachment can be also defined in behavioral terms in which it is defined as any set of behaviors that is directed toward getting closer or stay close to an individual who is perceived to be better able to survive (Bowlby, 1988).

It needs to be clear that the behavior of attachment is highly different than the affect that underlies attachment because behavior may take different forms and change from time to time while the affective bond is enduring and it long-lasting. Attachment is not equal to infatuation or affection toward someone but it refers to the feeling of general well-being that is associated with a person and seeking proximity with that person results in increased sense of well-being. Therefore, this feeling of attachment can be present in other emotional bonds one has with elements of environment (Guiliani, 2003). The same pattern that is observed in attachment which is “separation from attachment figure results in

anxiety”, can be viewed among those who are displaced from their residency as a result of urban development or disasters. One of the first studies of this matter belongs to Fried (1963) which investigated the effects of forced dislocation of people of West End which is a suburb in Boston. The results demonstrated high similarity between the experience of losing a loved one and being displaced forcibly. The underlying factor which produces the observed similarity between being displaced and losing a loved one is postulated to be disruption of sense of continuity by disrupting identity of resident as a result of depriving them from spatial and social identity. Furthermore, Gerson, Stueve and Fischer (1977) defined attachment to place as “individuals’ commitment to their neighborhood and neighbors”. Moreover, the conceptualization of place attachment is postulated to have four dimensions; three of which is of social attachment nature and the other is of affective attachment nature. The social attachment dimension is made up of institutional ties (attachment to local institutions), social activity (the extent to which one engages in events and activities of the neighborhood) and local intimates (having friends and people one is close to in the neighborhood).

Affective attachment is defined as the level of satisfaction with neighborhood and the extent to which one wants a stable residence in that neighborhood. According to this model, individuals choose to get attached to their neighborhood and the choice is based on needs, prospect, resources and

properties of the neighborhood or their home. According to Tuan (1974) the concept of “place” is born as a result of association of emotional experiences and a geographic area. Tuan (1980) also differentiates between “rootedness” and “sense of place”. Rootedness is the result of a long-time residence and refers to familiarity sensed within a place. Sense of place refers to the active construction or maintenance of places by words, actions or made-up objects (artefacts).

Shumaker and Taylor (1983) first associated two concepts of attachment and residential satisfaction. Attachment is defined as “a positive affective bond or association between individuals and their residential environment. From this perspective on attachment, an evolutionary explanation may emerge in which attachment to a place is defined as stability in residency in a place until the time that being in that place loses its rewarding nature and does not satisfy the needs in a general sense. Therefore, there should be a congruence between needs of the residents and social and physical resources of the place or environment.

There is evidence to support calling place attachment a multi-dimensional concept. In their study Riger and Lavrakas (1981) two dimension are mentioned that are called social bonding and behavioral rootedness.

Attachment to place as well as aesthetic preferences are considered to be affective-evaluative components of place identity (Proshansky, 1978). The feelings of attachment toward a place is fostered when one’s positive perception

of environment outweighs the negative perceptions which means one should make judgments and evaluate the environment in order to form attachment with the environment. The nature of perceived knowledge about environment depends on quality and characteristics of physical elements of the environment, quality of social components of the environment and individuals' capabilities that makes adaptation or change possible within the environment. It is also postulated that since environment changes and this is an unchanging rule there should be significant attention paid to variability of self-identity (Proshansky and Fabian, 1987; Proshansky, H. M., Fabian, A. K. and R. Kaminoff, 1983).

There are other theorists that postulate place attachment to be related to the concept of self. Specifically, Belk (1992) states that being attached to certain features means to include those surroundings into one's self-concept or to make it a part of extended-self and this act of inclusion to self cannot be based solely on functionality of an object but there should be an emotional basis for attachment. William James (1890, as mentioned in Belk, 1992) states that:

a man's Self is the sum total of all that he CAN call his, not only his body and his psychic powers, but his clothes, and his house, his wife and children, his ancestors and friends, his reputation and works, his lands, and yacht and bank-account. All these things give him the same emotions. If they wax and prosper, he feels triumphant; if they dwindle and die away, he feels cast down (p. 291)

There are several ways by which Sartre (1943) claims that possessions can be included into one's concept of self. One of these ways is by controlling them or



having a sense of mastery over them. Belk (1988) states that when one encounters the uncontrollable forces upon oneself; this inevitable encounter, facilitates the incorporation of it into the self. Like the identification with prison uniform while being imprisoned.

Another way to be included in the extended self according to Sartre (1943) is through creation. Creating can be seen in the way people treat their possessions. Examples can include, personalizing an avatar in cyber space or adding stickers to cars and other possessions like laptops. Knowing something can also be a way to be included into the self (Sartre, 1943). The fourth method by which possessions can be included into one's self concept is through habituation (Belk, 1988). Habituation can be said to be very close to knowing something because frequent encounters with something increases the knowledge one has about it. The evidence for this claim can be seen in differential reactions and evaluations among different body parts in terms of their strength of association with the self. It is found that less visible organs were rated as less central to self-concept and more visible organs are linked more with the self-concept (Belk, 1987; 1990).

Another place that is closely tied to human beings' experience of self is home. According to Saegert (1985), home cannot be defined as a housing unit but it is a part of "dwelling experience". The experience of dwelling refers to the process by which we try to tie together our personal life and geographic places and the center of our dwellings is our home. It is of importance to note that humans as

species are actually called by some dwellers of savannahs and that is what made our survival possible. The same type of conceptualization of home was shared among participants of the study by Horwitz and Tognoli (1982). The participants who left their parental home and were living alone described their feeling after leaving as longing for a place that “felt like home” and they frequently described their current residence as not home. This shows that humans have a tendency to make a place more than a physical space but to incorporate it into their sense of self and make it part of themselves. The sense of “longing” is of special resemblance to the reaction one feels after separation from their caregiver, significant other or their attachment figure. Moreover, it has been demonstrated that symbolic self-expression plays a prominent role in attachment than mere functional properties of an object. Symbolic self-expression refers to features of an object that makes the object different than other objects and “marks” the object as property of a person (Wallendorf & Arnould, 1988). In the eyes of human beings the symbol of something and the real entity that is represented by the symbol is considered to be the same in value. One can see this conceptualization in action by observing pilgrimage and hajj among religious people as well as attraction to natural parks and wonders. People visit these sites to transcend their normal self and reach deeper and discover more about themselves (Belk, 1992).

Personalization of space is a way by which one transform a space into a territory. The territory is not so much related to control over an area or being the sole resident there but it is related to the affective bond between the person and the place (Brown, 1987). Moreover, the extent of psychological investment is also a measure for attachment to a place. Psychological investment means how people try to symbolize or mark a place to be a part of themselves. In this accord one can observe that community activity and changing the neighborhood can facilitate the attachment to the neighborhood. For instance, the decoration of the streets can facilitate attachment to that neighborhood (Brown & Werner, 1985).

Another aspect of attachment that helps fostering an affective bond with the environment is regulation of privacy or a sense of control over who enters and exists one's "territory". This regulation of privacy has been shown to be able to give a sense of home in unfamiliar places. Attachment to home contains three aspects which are rootedness, home experience and identity. Certain forms of attachment that are highly associated with identity do not need extensive experience or long term residency in a place to develop (Harris, Brown & Werner, 1996). According to Stokols and Shumaker (1981) there are two levels by which one make affective bond with the environment or in other words gets attached to the environment. At the first level personal experience in place is not required but there are symbolic values in the setting that trigger emotional

bonding. It is only at the second level that attachment requires personal contact and behavioral experience.

Scannell and Gifford (2009) define place attachment to be consisting of three dimensions which they call person-process-place framework. In the person dimension of this framework two sub-dimensions exist that are called individual and collective. In personal dimension, the personal experiences gains central role in the connection that an individual feels with the environment. Instances of personal experiences that influence connection with a place can be significant memories, significant personal realizations and growth moments and “experience in place” (Twigger-Ross & Uzzell, 1996; Manzo, 2005 as mentioned in Scannell & Gifford, 2009). In the group sub-dimension, the symbolic meaning shared among the group is of utmost importance. It is the shared historical experience that shapes the nature of attachment to symbolic collective places (Virden & Walker, 1999).

The second dimension of place attachment is the psychological process by which attachment to the place forms. The psychological process of place attachment divides into cognitive, affective and behavioral sub-dimensions. There is a strong affective component in place attachment as evident in Fried (1963) research on displacement.

The cognition component of place-attachment is in fact the association that is caused by involving mental work with aspects of a place. Memories of a place

can facilitate bonding with a place and moreover, the process of meaning making can contribute to attachment to a place. Through all these mental work one's "sense of self" is involved in a place (Hay, 1998). Another cognitive feature that influences place attachment is schemas one has about places which helps the individual to organize the knowledge about places in general which in turn helps the individual to be attached to certain places (Scannel & Gifford, 2010). The place identity also falls into the cognitive category of process behind place attachment. The identity one takes from the environment can be central to one's self concept. Place related distinctiveness is a concept that explains human-beings based on their perceived similarities and perceived distinctiveness between the place they identify with and any other place. From this perspective the similarity and bond between the places of residents may come from the shared features of the place, for instance the level of similarity between one's house and other nearby houses in the area. The difference one may perceive between oneself and others also may come from physical features of their residence. These features can be landscape, climate and other distinct features (Twigger-Ross & Uzzell, 1996). Another sub-dimension of psychological aspects of place attachment is behavioral aspects. This aspects can be defined as we defined behavioral component of interpersonal attachment that is proximity seeking behaviors and returning to the "home-base" after exploration. Studies that mention homesickness and increase attachment to a place after prolonged residence can be evidence of the behavioral component of

place attachment (Hay, 1998; Riemer, 2004 as mentioned in Scannel & Gifford, 2010). The same pattern of attachment represented by behavior can be seen in reconstruction of cities after a disaster. These cities are restored and reconstructed at the end in a similar way to its past not based on objective urban planning (Francaviglia, 1978; Geipel, 1982 as mentioned in Scannel & Gifford, 2010).

Another dimension of place attachment is place itself. There are certain features of place itself that influences attachment. There are two features of the place that influence place attachment and they are social and physical aspects of a place. In the realm of physical characteristics of a place there are so many different parameters to be taken into consideration. As mentioned in Scannel and Gifford (2010), the level of analysis is important in analysis of place attachment because in the scale of home and city the attachment was stronger in comparison with the scale of neighborhood (Hidalgo & Hernandez, 2001). Moreover density, existence of amenities needed as well as proximity are influential in formation of attachment (Fried, 2000). Another dimension of place that is important in place attachment is the social dimension which can be called “community”. According to Kasarda and Janowitz (1974) community is a network of familiar people that the relationship with them is intertwined with normal family life and everyday socialization. From this point of view the length of residence is positively correlated with the intensity of attachment because the

longer one resides in one place more and deeper interpersonal networks and bonds with local people emerges. In the social dimension of place attachment, bonds with people and the opportunity for interaction with other people defines attachment (Woldoff, 2002).

All aspects of place attachment cannot be reduced to the social dimensions. The landscape experience includes symbolic interactionism, in this interaction, one grants a certain meaning to the environment and the reflections of self are ascribed to the environment. Also the environment changes into the landscape based on viewers' understanding of certain features (Greider & Garkovich, 1994). For instance, Stedman (2003) showed that that different physical features of the environment influences the meaning one ascribe to the environment. The clearer water, the more underdeveloped the shoreline, less public access and less chlorophyll signals more attributes that is said to be representative of escape. And higher levels of these elements signals a "social place" both of these concepts facilitates attachment.

In other words, the process of ascribing meaning to the environment plays a mediating role in attachment to a place. More clearly, it seems that the meanings ascribed to the environment can be made into symbols that are included into one's sense of self.

I propose that people will prefer more complex visuals of interior spaces because participants find the more complex visuals as more stimulating. And

visual complexity will result in more inclination to spend “free time” in a certain place because it mimics nature. Moreover, I propose that people with higher levels of interconnectedness with nature will rate complex pictures higher and plain pictures lower than those with lower levels of interconnectedness with nature. The same pattern is proposed to be evident in openness to experience, higher levels of openness to experience results in higher preference for complex pictures and the opposite would be true for plain visuals.



## **CHAPTER 3**

### **METHOD**

#### **3.1. Participants**

A total of 30 people completed the experiment and surveys. Among them 13 were male and 17 were female. Moreover, among the participants 14 were not a student of METU nor they were working in METU. 16 of the participants were students in METU; the list of the departments from which students have attended this experiment is shown in table 1.1.

#### **3.2. Materials**

##### **3.2.1. Photographs**

The main material for this study initially consisted of 37 photos taken from faculty of architecture in METU University. This faculty was chosen because it contained a unique set of design patterns and ornaments in its interior design and based on observation so many other students from various other departments decide to spend time in that department and have a good time with their friends. Vast majority of students also decide to take their graduation photos in that department. Therefore, one reason that department was chosen was because it was preferred by students. Another reason behind this choice was

that it was drastically different from all other departments and all the interior elements were used to make a holistic aesthetic feature that gave that department its own unique character. This department's interior design was exactly the opposite of other departments and one could observe the difference in how and where student decide to spend their time to relax or socialize. The 37 photos that were initially taken contained the interior design and ornaments of the architecture department. The designs were placed on walls of the department and were all done by using natural material like woods, stones and metal and produced a rich visual array that contained a transition between several different patterns with different colors. The aim of capturing the design features was to capture a visually rich array and then, by using Photoshop program, turn those visually rich array to a simple and basic array that contained only one type of ornament or design feature. Therefore, for every picture taken another version of the same picture was produced that did not have the same transition of different patterns and only included one type of texture. The pictures were especially taken from places that were design to host people and included enough accommodation for people to be able to sit and spend time there. And pictures were used to ask about the preference to spend time in front of such a design feature. The questions that was aimed for each picture was "imagine yourself spending your "leisure time" or "free time" in front of these pictures and then rate how much you would like to spend your free time in front of this view in real life." and participants would rate their preference on a Likert-type

scale from 1 to 7. Not all images were used. Those images that did not represent a change or transition in a design pattern were excluded (for instance those pictures that were representative of change in a texture only and were not made to be a design feature). Those pictures that were not in front of places that were used for socializing were omitted. Moreover, those pictures that included humans in the foreground were omitted too. Also those pictures that captured design elements that were outside the visual field of a normal dweller was omitted too. In other words, only those pictures were selected that was in the visual field of a non-curious dweller. The final result was having 48 pictures. The modified pictures were stripped of any design elements that was built on the basic structure and mostly were turned into cement walls or stone walls or surfaces. Moreover, in order to make them less similar to naturally occurring textures (to reduce the stimulative nature of the stimuli) the surfaces were also photoshopped to appear smoother and without any natural pattern or to contain less natural patterns. Furthermore, in order to make the photos load faster on the website the format of pictures were changed from “jpg” to “webp” because the webp format is more compressed and takes less time to load therefore the effect of extraneous variable of loading time on the reaction time of participants is meant to be minimized.

### **3.2.2. Inclusion of nature to self scale (2002)**

This scale consists of 8 circles which are progressively overlapping. This scale was developed by Shultz (2002). The purpose of this scale is to measure the extent to which one feels interconnected with nature and it does so through figures that contain different levels of overlapping circles. The purpose of this measure was to determine the subjective perspective of participants toward nature. The coding regarding inclusion to nature was done based on grouping the percentage of inclusion in diagrams. Diagrams A, B and C were coded as low inclusion, diagram D was coded as medium inclusion and diagrams E, F and G were coded as high inclusion.

### **3.2.3. Big Five Factor Questionnaire Of Goldberg (1992)**

This questionnaire seemed more reliable than its predecessor Norman (1963). Although there were other measures available this measure was used because of the type of wording through which the five facets of personality is measured. This measure has acceptable reliability and validity (Goldberg, 1992). And possesses a bipolar structure and is adjective-anchored therefore it was believed to be more suitable and easier to grasp and it was relatively short and the wording was clear.

### **3.2.4. Big-Five Inventory 2 (2017)**

The Turkish version of the big five inventory was used for participants who did not prefer to take the English version. The Turkish Big Five Inventory was

adopted by Cemalcilar, Sumer, Sumer and Baruh (2017). This inventory was chosen because it was recently adopted and it is an advantage.

### **3.3. Procedure**

The participants were invited by a link. Moreover, in convenient circumstances participants were told to enter the website put the name of the website here by the researcher.

At the first page of the website there was a consent form which informed participants of the names of the researcher and the supervisor prof. Dr. Bengi Oner-ozkan as well as and the purpose of the study. Participants were assured that their answers would be kept confidential, no private information would be collected during the study and in the case of feeling uncomfortable they would be free to leave the experiment by leaving the website. Furthermore, contact information of the researcher was given to enable participants to ask further questions. At the end, there were a two-option button provided for participants to express their consent or deny doing the experiment. In the case of pressing the “deny” button participants were informed that they cannot continue unless they choose “I accept” button and if they did not want to give consent they needed to leave the website. Participants were redirected to the next page when they press the “I accept” button and in the next page they saw the explanation of the study which restated the aim of the study. The explanation page also contained instructions for the experiment. The instruction was as follows:

In this study you need to click on a slider to open the picture and then rate the picture. In order to rate the pictures we want you to imagine yourself spending your "leisure time" or "free time" in front of these pictures. After imagining yourself in front of the picture we want you to rate how much you prefer to spend time in front of each picture. In this experiment you need to rate all pictures and one cannot move to the next picture unless the rating is finished. The experiment will take maximum 20 minutes of your time; we thank you in advance for your time and appreciate your effort.

For all 48 pictures the same instruction was shown both in Turkish and English.

The instruction was

Imagine yourself spending your "leisure time" or "free time" in front of these pictures and then rate how much you would like to spend your free time in front of this view in real life.

Then upon clicking on a slider the picture was shown and participants rated the picture. The amount of time that passed between clicking on a slider and clicking to rate the picture was measured in milliseconds and saved in a Postgres data base. Each participant is identified based on the moment (as the date he or she accepts the informed consent and presses the "I accept" button. The moment is saved as the number of millisecond passed from the first of January 1970 until the moment when "I accept" button was pressed. Therefore, it is very much unlikely that two users can have the same user ID. Since, our data was collected in a relatively small area (campus and the neighborhoods around it) it was not a feasible idea to separate users based on their IP address because those participants living in the same area were sharing the same IP address. No names

or personal identification information was recorded or collected during the experiment.

Table 1.1. *Demographics Of Participants*

department	<i>Frequency</i>	<i>gender</i>	<i>Frequency</i>
Architecture	2	male	13
Arts and science	3	female	17
Economics and administrative science	2		
Education	1		
Engineering	5		
others	3		
Not from METU	14		

## **CHAPTER 4**

### **RESULT**

#### **4.1. Analysis**

##### **4.1.1. Preference Rating And Inclusion To Nature**

A one-way ANOVA was conducted to see if there are any differences between those who are low in inclusion to nature (chose diagrams A,B and C) , medium in inclusion to nature (who chose diagram D) and those who were coded as high inclusion to nature (chose diagrams E, F and G). The results indicate that there are no significant differences among participants in terms of their preference for both plain pictures ( $F(2,27) = 1.057, p = .362$ ) and complex pictures ( $F(2,27) = 2.09, p = .143$ ) between three levels of inclusion to nature . Tables 4.5 and 4.6 summarizes the results.

##### **4.1.2. Preference To Spend Time In Front Of Design Elements**

Two paired-sample t-tests were run for this study. One of them was to compare the overall mean for preference ratings and the other was for the reaction time it took for participants to rate each picture.

Results indicate that participants rated complex pictures higher ( $M=3.66, SD=1.863$ ) compared to plain pictures ( $M=2.11, SD= 1.326$ ). when referred to the question regarding the ratings we can infer that participants preferred to stay in



places which offer more complex and more divers visual stimuli in comparison with more plain and non-natural material look. A paired-sample t-test revealed that the difference was significant ( $t(835) = 20.13, p < .001$ ). Tables 4.1 and 4.2 summarizes the findings.

#### **4.1.3. Reaction Time**

The time that took for each participant to rate each picture was significantly different based on what kind of picture one is rating. Participants took more time (in terms of milliseconds) while rating complex pictures ( $M = 7892.78, SD = 11466.435$ ) in comparison with the time it took to rate plain pictures ( $M = 5863.34, SD = 7401.660$ ). The result of paired sample t-test revealed that the difference in reaction time was significant ( $t(835) = 4.31, p < .001$ ). Tables 4.3 and 4.4 summarizes the results.

#### **4.1.4. Preference Ratings And Openness To Experience**

Pearson correlations were conducted to see if the ratings were correlated with the scores for openness to experience. The results indicated that only there was a significant and positive correlation between ratings of complex pictures ( $M = 3.66, SD = 1.86$ ) with score of those items that were non-reverse coded and were in Turkish ( $M = 3.15, SD = 1.31$ ) ( $r(215) = .205, p = .002$ ). table 4.7 summarizes the results.

#### 4.1.5. Inclusion Of Nature To Self And Openness To Experience

Pearson correlations were conducted to see the relationship between inclusion of nature to self and items of openness to experience. The result demonstrated a positive and significant correlation between inclusion to nature ( $M = 4.83$   $SD = 1.42$ ) and score of those items that were non-reverse coded and were in Turkish ( $M = 3.15$   $SD = 1.31$ ) ( $r(29) = .36$ ,  $p = .048$ ). Table 4.8 summarizes the results.

Table 4.1. *Paired Samples Statistics For Preference Rating*

Preference ratings	<i>M</i>	<i>SD</i>	<i>N</i>
Complex pictures	3.66	1.863	836
Plain pictures	2.11	1.326	836

Table 4.2. *Paired Samples T-Test Statistics For Preference Rating*

Paired Differences								
	Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference		<i>t</i>	df	Sig. (2-tailed)
				Lower	Upper			
rating-com - plain-rate	1.551	2.229	.077	1.400	1.703	20.129	835	.000

Table 4.3. *Statistics For Reaction Time*

	Mean	N	Std. Deviation	Std. Error Mean
Complex pictures	7892.78	836	11466.435	396.575
Plain pictures	5863.34	836	7401.660	255.992

Table 4.4. *Paired Samples T-Test Statistics For Reaction Time*

Paired Differences								Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	
					Lower	Upper			
Pair 1	com-RT - pl-RT	2029.443	13603.997	470.504	1105.933	2952.952	4.313	835	.000

Table 4.5. ANOVA Statistics For Complex Pictures Ratings In Terms Of Includedness To Nature

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.421	2	3.210	2.088	.143
Within Groups	41.505	27	1.537		
Total	47.926	29			

Table 4.6. ANOVA Statistics For Plain Pictures Ratings In Terms Of Includedness To Nature

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.421	2	.711	1.057	.362
Within Groups	18.161	27	.673		
Total	19.582	29			

Table 4.7. *Pearson R Correlation Statistics For Complex Pictures Ratings And Openness To Experience*

<b>Correlations</b>				
		Complex pictures ratings	Reverse items	Normal items
Complex pictures ratings	Pearson Correlation	1	.163	.205**
	Sig. (2-tailed)		.092	.002
	N	836	107	216
Reverse items	Pearson Correlation	.163	1	.062
	Sig. (2-tailed)	.092		.528
	N	107	107	107
Normal items	Pearson Correlation	.205**	.062	1
	Sig. (2-tailed)	.002	.528	
	N	216	107	216

Table 4.8. *Pearson R Correlation Statistics For Inclusion Of Nature To Self Ratings And Openness To Experience*

<b>Correlations</b>			
		Normal items	Nature inclusion
Normal items	Pearson Correlation	1	.363*
	Sig. (2-tailed)		.048
	N	216	30
Nature inclusion	Pearson Correlation	.363*	1
	Sig. (2-tailed)	.048	
	N	30	30

## **CHAPTER 5**

### **DISCUSSION**

#### **5.1. Reaction Times And Preference Ratings And Openness To Experience**

The results regarding the reaction times indicate those pictures that were not photoshopped to look plain and without any ornament were more stimulative to the participants and this replicates other studies in this area (Berlyne, 1958; Fantz, 1961). This also can be an indicator that people in closed spaces feel more inclined toward spending time around an object which is high in visual complexity and they will attend to it more. There may be an effect of attention because we tend to like objects that we spend lots of time in its proximity like familiarity effect or mere exposure effect. Visual complexity may be a factor that acts as a cue for our mind to spend time on certain objects that may result in higher preference. There was a significant correlation between Turkish and non-reversed items of big five inventory. These findings can partially confirm the original hypothesis of being more open to experience can be a correlate of preferring diverse or complex visuals because they are more stimulative and being open to stimulation can result in higher preference. The reason that preference was only correlated with non-reversed Turkish items may be due to the higher number of these items among the inventory.

## **5.2. Effect Of Visual Complexity On Well-Being**

The overall importance associated with presence of natural elements in urban environments is the result of a body of evidence that links viewing of natural scenes to well-being (Driver & Greene, 1977; Ulrich, 1979; R. Kaplan, 2001; Lewis, 1996; Ulrich, 1984; Moore, 1981). The basic argument behind the effect of viewing nature on well-being can be considered to be some visual properties of natural scenes that can be mimicked in closed spaces. The most important of these visual properties is complexity of a scene. The experiment of this thesis tried to see aesthetics of a place in terms of diversity and complexity of design elements. In other words, the complexity of a design is operationalized as the number of different and independent unit of ornament that is added to the materials underneath for either functional purposes (like panels and windows) or for the sole purpose of visual appeal.

Place attachment was defined as the emotional bond or unconscious appeal of being around a certain location or an object inside a location. Moreover, this appeal should have not been based on the functional purposes a space fulfills in a closed area. As human beings who have evolved to migrate from one place to another and to venture into wilderness to obtain necessities. As a result human beings are packed with predispositions with regard to nature that needs to be stimulated in order to have a healthy individual that can fulfill his or her potentials in accordance with self-determination theory (Ryan and Deci 2000). Therefore, the closed spaces that are designed for people would



be better environments in general if their interior design followed the aesthetic principles of nature. The presence of natural materials (wood, stone etc.), natural elements (plants, natural light, water etc.) as well as having a natural view or vista is a *need* for places that are designed to have people dwell or take residence in. Examples of these places can be university campuses and dormitories, recreational areas, office buildings, boarding schools and most importantly prisons. Viewing of nature let alone interaction with nature is restricted for some people in prisons. Moreover, viewing of nature or scenes that mimic the natural environment is necessary for emotional regulation. Prison systems should adapt design protocols in making their buildings because the physical building has profound effects on inmates which can hinder or detriment their growth and change. Moreover, because this kind of emotional regulation is something that is hard wired by evolution the best way is to satisfy it and build upon satisfaction of this basic need.

In my idea, the importance of aesthetics of our physical urban environment is so great that there should be laws to prevent changing the natural environment in certain ways. The laws and government agencies should also prevent making our urban environments to be formed in *unnatural* ways. In here unnatural means an urban design that has the capacity of satisfying basic predilections toward nature. In modern times, principles that we call basic human rights like having the access to food and water as well as education for children, not sending children to war etc. are not negotiable and up to discussion or even dependent on policies of political parties with certain

ideologies. The so called basic human rights are what is needed for human beings' optimal growth from both an individualistic as well as a collective perspective. Shaping urban environments that are void of natural element or making an environment which is void of stimulation can result in hindered growth due to disrupting person- place emotional bond. And in turn, disruption of person-place bond can lead to a society which is not so much active social and political wise. The hypothesis behind the effect of complexity on forming an affective bond with the environment can show us what is needed for a healthy relationship with our cities, neighborhoods and even countries. First of all, because of attention restorative properties of natural scenes it is absolutely *needed* in environments that requires cognitive abilities or involves stress or long working hours. Secondly, it has been shown that being actively involved in the immediate environment can result in higher attachment to the environment (Brown & Werner, 1985). These can be indicative of the overall effect of design on social participation. It seems that lower participation in the immediate environment, that is the result of systematic design protocols, can result in less positive outcomes in terms of social and even political outcomes. I believe there is great importance in investigating how the urban design and planning influences political participation as well as how the population perceives the extent of home and outside home.

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## APPENDICES

### A. HUMAN SUBJECT ETHIC COMMITTEE APPROVAL

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ  
APPLIED ETHICS RESEARCH CENTER



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Konu: Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi: İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Prof.Dr. Bengi Öner ÖZKAN

Danışmanlığını yaptığınız Amirbahador TAHERİ'nin "Visual Interior Design Effects On Place Attachment" başlıklı araştırması İnsan Araştırmaları Etik Kurulu tarafından uygun görülmüş ve 302 ODTÜ 2019 protokol numarası ile onaylanmıştır.

Saygılarımızla bilgilerinize sunarız.

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## B. TURKISH SUMMARY/ TÜRKÇE ÖZET

### KARMAŞIKLIK VE ESTETİK TERCİH

Karmaşıklık, farklı terimlerle tanımlanmıştır ve görsellerdeki farklı desenlerin yanı sıra farklı şekil kalıplarına dayanmaktadır. Attneave'e (1957) göre, bellekten daha karmaşık şekillerin oluşturulması daha zordur ve isimleriyle hatırlanması daha zordur. Bu nedenle, daha karmaşık şekillerin bilişsel sistemi karmaşık olmayan biçimlerden veya nesnelerden daha fazla uyardığı söylenebilir. Karmaşıklık kavramı, tek bir sahnede bağımsız olarak algılanan birimlerin veya öğelerin miktarına atıfta bulunur. Bir sahneye oldukça karmaşık olarak atıfta bulunulduğunda, birbirine benzemediği algılanan çok sayıda öğe olduğu anlamına gelir (Berlyne, 1971). Karmaşıklığın önemine dair erken hesaplar var. İlk çalışmalarda görsel terimlerdeki karmaşıklığın tercih üzerinde bir etkisi olduğu gösterilmiştir. Örneğin yetişkinler, daha az görsel karmaşıklık içeren görsellerle karşılaştırıldığında daha karmaşık görselleri tercih etmeyi tercih etmiştir (Berlyne, 1958). Benzer bulgular, Fantz (1961) tarafından, bebeklerin dikkat sürelerinin daha karmaşık görseller için daha uzun olduğu, bildirilmiştir. Stimulus karmaşıklığı dikkatleri etkilemek için yapıldı. Spitz ve Hoats (1963) tarafından yapılan başka bir çalışmada maruz kalma süresi de dikkate alınmıştır. Bu çalışmada, farklı yaş grupları karmaşık veya daha az karmaşık bir görsele sadece 3 saniye katılmıştır. Katılımcılara görsellerden hangisini tekrar görmek istediklerini sordu. Bu çalışmada katılımcılar daha az karmaşık görselleri daha sık seçtiler, ancak çalışmalarındaki en yüksek yaş grubu (16

yaş) seçildiğinde daha karmaşık görsellere baktılar. Berlyne (1963), maruz kalma süresini karmaşıklık ve estetik tercih çalışmasına dahil eden başka bir çalışma yürütmüştür. Bu çalışmada hem karmaşık hem de daha az karmaşık görseller için dört farklı maruz kalma süresi vardı. Sonuç, daha uzun katılımcıların uyarılara baktığını, karmaşık görselin seçilme olasılığının azaldığını gösterdi. Başka bir deyişle, maruz kalma süresi ile daha karmaşık görsellerin tercihi arasında negatif bir ilişki vardır. Sonuç, Berlyne (1966) tarafından yapılan ve sonuçların görselin bir saniyeden daha kısa bir süre katılımcılara maruz kalması durumunda daha karmaşık görüntünün seçilmesinin daha muhtemel olduğunu gösterdiği bir başka çalışmada ortaya çıkmıştır. Eğer uyarılar katılımcılara üç saniyeden uzun süre maruz kalırsa, daha az karmaşık uyarıların katılımcılar tarafından tercih edilmesi muhtemeldir. Bulguların arkasındaki açıklamanın katılımcıların “merakı” ile ilgili olduğu söyleniyor. Katılımcılara görselle ilgilenmeleri ve görselleri keşfetmeleri için yeterli zaman tanınmazlarsa merakı gidermek için daha karmaşık görselleri tercih etmeleri daha olasıdır. Ve eğer katılımcılar uzun süre maruz kalsalar, uyarıların yeterince araştırıp meraklarını tatmin etme ve bu nedenle daha az merak etme ve daha az tercih etme ihtimalleri daha yüksektir. Ayrıca, bu tercih uyarıcı özellikler açısından görülebilir. Bazı görsel olarak karmaşık formlara iyi bakabilmek için yeterli zaman olmadığında, daha fazla uyarıcı güce sahiptir, çünkü görsel olarak karmaşık olmasının yanı sıra, uzun izleme süresi tarafından üretilen daha az alışkanlık vardır. Bu nedenle, nesnenin karmaşıklığı işlevini yitirir, çünkü sadece

duyularımız buna alışır. Dahası, karmaşık nesneye kullanıldıktan sonra, daha az karmaşık olan başka bir nesne, iki şekil arasındaki kontrast etkisinden dolayı daha fazla bilgi yüklü olarak görülecektir. Willis ve Dornbush (1967) tarafından yapılan bir çalışmada yazarlar yaş, karmaşıklık derecesi ve maruz kalma süresi arasındaki ilişkiyi ve her görsel için tercih üzerindeki etkisini araştırmıştır. Bu çalışmada kullanılan yöntem akın k matrisi kullanılarak rastgele şekillerin oluşturulduğu Attneave'den (1957) alınmış ve bu matristen n noktaları çizilmiştir (n sayısı 1 ile k arasındaki herhangi bir sayıyı ifade eder), sonra bu seçilen noktalar rastgele olarak seçilmiştir. n tarafa sahip bir çokgen üreten birbirine bağlı. Bundan sonra, dış noktalar bir dışbükey çokgen yapmak için birleştirildi. Daha sonra poligon içindeki noktalar rastgele sıralandı ve birer birer rastgele çevreleyen poligonun bir kısmına alındı. Üç farklı yaş grubu için dört farklı maruz kalma süresinde sunulan 20 çift rakam vardı. Her bir çift, dört taraflı bir rakamla eşleştirilmiş beş veya üç taraflı bir şekilde sekiz veya yedi veya altı adetten oluşuyordu. Maruz kalma süreleri 0,5 saniye, bir saniye, üç saniye ve on saniye arasında değişmiştir. Sonuçlar, görsellerdeki karmaşıklık tercihinin 5 yaş kadar erken başladığını ve bu tercihin yaşla birlikte arttığını ve maruz kalma süresinin önemli bir etki yaratmadığını göstermektedir. Ayrıca, tercih edilen stimülasyon seviyesi olan “pacer” stimulus olduğu varsayılmaktadır (Dember ve Earl, 1957). Karmaşık bir uyarana ilgili olarak, bir uyarının algılayıcı tarafından beklenmeyen olduğunu belirten “uyaran beklenmedikliği” adı verilen başka

bir kavram vardır ve bu beklenmediklik bireylerin duygusal tepkilerini değiştirebilir (Maddi, 1961).

Görsel karmaşıklık ve tercih üzerine bir başka erken çalışma Vitz (1966) tarafından yapılmıştır ve giderek artan görsel karmaşıklığa dayanan görsel karmaşıklığın etkisine ilişkin iki çalışma içermektedir. Çalışmalarından birinde, çizgi çizimler içeren 8 adet görsel olarak karmaşık resim oluşturdu. farklı karmaşıklık dereceleri önce boş bir kağıt parçasına bir inç düz çizgi çizilerek ve ardından on altı rastgele seçilen açıyla genişletilerek yapıldı. Bu açılarının hepsi 22.5 derece idi, bu da 360 derecenin 16 eşit dereceye bölünmesinin bir sonucudur. İlk karmaşıklık seviyesinde görsel, bir inç çizgiyi farklı açılardan birleştirmenin sekiz aşamasını içerir. İkinci seviye karmaşıklık görselleri, ilk görselliğe ek sekiz adım daha içerir. Her yüksek karmaşıklık görselliği, önceki karmaşıklık seviyesine 8 ilave adım daha eklenerek yapıldı. Katılımcılar ilk önce resimleri tercihlerine göre sıraladılar ve ardından 28 farklı çift kombinasyonuna dayanarak tercihlerini belirttiler. Sonuç, tercihin, karmaşıklığın bir işlevi olarak 5. karmaşıklık düzeyine kadar arttığını ve ardından azaldığını göstermiştir. Diğer çalışmasında Vitz (1966) karmaşıklık için başka bir tanım kullanmıştır. Bu ikinci çalışmada, her iki taraftan başka bir kenarı yakalayana kadar her taraftan bir çizgi çizilen bir kare kullandı. Her kare 8 inçlik kenarlara sahipti ve her iki taraf bir inç'in 20'nci sayısına eşit olarak bölündü. Her çizginin başlangıç noktası, bu bölünmüş noktalardan, 1 ila 179 derece arasında değişen bir rastgele açı ile rastgele belirlendi. En basit olanı bir kare içinde 4 satırdan oluşuyordu ve

karmaşıklıkta her ilerleme aynı şekilde dört ilave satır eklenerek yapıldı. Toplam 6 farklı kare yapıldı. Aynı çalışmanın aynı prosedürü uyaranların ufak farklılıklarının sadece altı adet olmasıyla takip edildi. Sonuç, tercihin karmaşıklığın bir işlevi olarak dördüncü karmaşıklık seviyesine kadar arttığını ve son iki karmaşık resimde tercihin azaldığını göstermiştir.

Berlyne (1971) tarafından belirtilen bir dizi laboratuvar çalışmasında, yapılandırılmamış ve rastgele oluşturulmuş dizilerin sayısı, katılımcıların, ters U biçimli bir stili temel alan dizileri tercih ettiklerini göstermiştir. Bu, orta düzeyde karmaşıklık seviyelerinin daha yüksek tercihle ilişkili olduğu ve hem düşük hem de yüksek karmaşıklığın düşük tercih seviyesi ve hoşlukla ilişkili olduğu anlamına gelir. Üstelik Berlyne (1974) ayrıca, tercihi belirleyen nesnelerin sadece bir karakteristik veya görsel özelliği olmadığını, aynı zamanda bir nesnenin harmanlama özellikleriyle ilgili olduğunu da söylemektedir. Bu ortak özellikler, insanın uyarılma seviyelerinde bir fark yaratmaktan sorumludur; Çok az uyarılma olduğunda uyarılma oranının artırılması veya aşırı uyarılma yaşanması durumunda uyarılma seviyelerinin azaltılması. Diğer çalışmalarda karmaşıklık, bildirilen ilginçlik, görüntüleme süresi ve keşif etkinliği arasındaki ilişkinin genel olarak doğrusal ve pozitif olduğu bulunmuştur (örneğin, Berlyne, 1963). Ayrıca, peyzaj slaytlarının gönüllü olarak maruz kalmasının bildirilen karmaşıklıkla yüksek derecede korele olduğu bulunmuştur (Wohlwill, 1968).

Karmaşıklık ve doğal ve kentsel çevre tercihleri arasındaki ilişki, neredeyse tüm çalışmaların bir yer için karmaşıklık ve tercih arasında anlamlı ilişkiler bulduğu, ancak bazı çalışmalarda ilişkinin tersine çevrilmiş bir U şekli ve bazı çalışmalarda ilişkinin doğrusal pozitif olduğu tespit edilmiştir (örneğin, Kaplan, Kaplan, & Wendt, 1972; Ulrich, 1977; Wohlwill, 1968, 1976). Wohlwill'e (1976) göre bu uyumsuz sonuçların ardındaki sebep, farklı karmaşıklık seviyelerine sahip doğal ortamların örnekleme sahnelerinde ortaya çıkan zorluktur. Bazı örneklerin doğasında yalnızca düşük ila orta karmaşıklıkta sahneleri içerdiği çalışmalar. Bu çalışmalarda tercih ile karmaşıklık arasındaki ilişkinin doğrusal olduğu bulunmuştur. Doğal sahnelerde yüksek düzeyde karmaşıklık içeren diğer çalışmalarda, tercih ile karmaşıklık arasında ters U şeklinde bir ilişki bulunmuştur.

Deneyi ve anketleri toplam 30 kişi tamamladı. Bunlardan 13'ü erkek, 17'si kadındı. Üstelik katılımcılar arasında 14 ODTÜ öğrencisi değil, ODTÜ'de de çalışıyorlardı. Katılımcıların 16'sı ODTÜ'de.

## YÖNTEM

### Malzemeler

#### A-Fotoğraflar

Bu çalışmanın ana materyali başlangıçta ODTÜ Üniversitesi Mimarlık Fakültesi'nden çekilen 37 fotoğraftan oluşuyordu. Bu fakülte seçildi çünkü iç tasarımında benzersiz bir tasarım desenleri ve süslemeler dizisi içeriyordu ve



gözlemlere dayanarak, diğer bölümlerden birçok öğrenci o bölümde vakit geçirmeye ve arkadaşlarıyla iyi vakit geçirmeye karar verdi. Öğrencilerin büyük çoğunluğu ayrıca mezuniyet fotoğraflarını o bölümde çekmeye karar vermektedir. Bu nedenle bölüm seçilmesinin bir nedeni öğrencilerin tercih etmeleriydi. Bu seçimin arkasındaki bir diğer sebep, diğer tüm bölümlerden çok farklı olması ve tüm iç unsurların, o bölüme kendi özgün karakterini veren bütüncül bir estetik özellik sağlamak için kullanılmasıydı. Bu bölümün iç tasarımı tam olarak diğer bölümlerin tam tersiydi ve biri, öğrencilerin rahatlamak veya sosyalleşmek için zamanlarını nasıl ve nerede geçirmeye karar verdiğindeki farkı görebiliyordu. Başlangıçta çekilen 37 fotoğrafta mimarlık bölümünün iç tasarımı ve süs eşyaları yer alıyordu. Tasarımlar bölümün duvarlarına yerleştirildi ve hepsi orman, taş ve metal gibi doğal malzemeler kullanılarak yapıldı ve farklı renklerde birkaç farklı desen arasında geçiş içeren zengin bir görsel dizi üretildi. Tasarım özelliklerini yakalamanın amacı görsel olarak zengin bir dizi yakalamak ve ardından Photoshop programını kullanarak bu görsel olarak zengin diziyi yalnızca bir tür süsleme veya tasarım özelliği içeren basit ve temel bir diziye çevirmek oldu. Bu nedenle, çekilen her resim için, aynı resmin farklı desenlerinde aynı geçişe sahip olmayan ve yalnızca bir tür doku içeren başka bir versiyonu üretildi. Resimler, özellikle insanları ağırlamak için tasarlanan yerlerden alınmış ve insanların orada oturup zaman geçirebilecekleri bir konaklama barındırmıştır. Resimler, böyle bir tasarım özelliğinin önünde zaman geçirme tercihinin sormak için kullanılmıştır. Her resim için amaçlanan sorular, “boş

zamanınızı” veya “boş zamanınızı” bu resimlerin önünde geçirdiğinizi hayal edin ve sonra boş zamanınızı bu manzara karşısında gerçek hayatta ne kadar harcamak istediğinizi derecelendirin. ”Ve katılımcılar tercihlerini 1'den 7'ye kadar Likert tipi bir ölçekte değerlendireceklerdir. Tüm görüntüler kullanılmamıştır. Bir tasarım düzeninde bir değişikliği veya geçişi temsil etmeyen görüntüler hariç tutulmuştur (örneğin, yalnızca bir dokudaki değişimi temsil eden ve bir tasarım özelliği olması için yapılan resimler). Sosyalleşmek için kullanılan yerlerin önünde olmayan bu resimler göz ardı edildi. Ayrıca, insanları ön planda tutan resimler de çıkarıldı. Ayrıca, normal bir ev sahibinin görsel alanı dışında kalan tasarım öğelerini çeken resimler de göz ardı edildi. Başka bir deyişle, sadece meraklı olmayan bir ev sahibinin görsel alanındaki resimler seçildi. Sonuçta 48 fotoğraf çekildi. Değiştirilen resimler, temel yapı üzerine inşa edilmiş herhangi bir tasarım elemanının şeritliydi ve çoğunlukla çimento duvarlarına ya da taş duvarlara ya da yüzeylere dönüştürüldü. Dahası, onları doğal olarak oluşan dokulara daha az

benzer yapmak için (uyaranların uyarıcı yapısını azaltmak için) yüzeyler ayrıca daha pürüzsüz ve doğal bir desen içermeyen veya daha az doğal desenler içerecek şekilde fotograflandı. Ayrıca, fotoğrafların web sitesinde daha hızlı yüklenebilmesi için, resimlerin formatı “jpg” den “webp” e değiştirildi, çünkü webp formatı daha sıkıştırıldı ve yüklemek için daha az zaman harcadı; Katılımcıların tepki sürelerinin asgari düzeyde tutulması amaçlanmaktadır.

B-Doğanın kendi kendine ölçeklendirilmesi (2002):

Bu ölçek aşamalı olarak üst üste binen 8 daireden oluşmaktadır. Bu ölçek Shultz (2002) tarafından geliştirilmiştir. Bu ölçeğin amacı, birinin doğa ile iç içe olduğunu hissetme ölçüsünü ölçmek ve farklı örtüşen daireler içeren rakamlar aracılığıyla bunu yapmaktır. Bu önlemin amacı, katılımcıların doğaya karşı öznel bakış açısını belirlemektir. Doğaya dahil olma ile ilgili kodlama, içirme yüzdesini diyagramlar halinde gruplamaya dayanarak yapıldı. A, B ve C diyagramları düşük dahil etme, kod D ise orta dahil etme, E, F ve G diyagramları yüksek dahil etme olarak kodlanmıştır.

C-Goldberg'in Büyük beş faktörlü anketi (1992):

Bu anket önceki Norman'dan (1963) daha güvenilir görünüyordu. Kullanılabilecek başka önlemler olmasına rağmen, bu kişilik, beş kişilik yüzünün ölçüldüğü ifadelerden dolayı kullanılmıştır. Bu önlem kabul edilebilir güvenilirlik ve geçerliliğe sahiptir (Goldberg, 1992). Bipolar bir yapıya sahiptir ve sıfat bağlantılıdır, bu nedenle kavramanın daha uygun ve daha kolay olduğuna inanılırdı ve göreceli olarak kısadı ve ifadeler açıktı.

D-Büyük-Beş Envanter 2 (2017)

İngilizce versiyonu almayı tercih etmeyen katılımcılar için beş büyük envanterin Türkçe versiyonu kullanılmıştır. Türkiye Büyük Beş Envanteri, Cemalcılar, Sümer, Sümer ve Baruh (2017) tarafından kabul edilmiştir. Bu envanter seçildi çünkü yakın zamanda kabul edildi ve bu bir avantaj.

Prosedür

Katılımcılar bir link ile davet edildi. Ayrıca, uygun koşullarda katılımcıların web sitesine adını araştırmacı tarafından buraya yazdıkları söylenir.

İnternet sitesinin ilk sayfasında katılımcıları araştırmacının isimleri ve süpervizör prof. Dr. Bengi Öner-Özkan'ın yanı sıra çalışmanın amacı. Katılımcıların cevaplarının gizli tutulacağına, çalışma sırasında hiçbir özel bilgi toplanmayacağına ve rahatsızlık duymaları halinde web sitesinden ayrılarak deneyi bırakmakta özgür olacaklarına dair güvence verildi. Ayrıca, katılımcıların daha fazla soru sormalarını sağlamak için araştırmacının iletişim bilgileri verilmiştir. Sonunda, katılımcıların rızalarını ifade etmeleri veya deneyi yapmayı reddetmeleri için iki seçenekli bir düğme vardı. “Reddet” düğmesine basılması durumunda, katılımcılara “Kabul ediyorum” düğmesini seçmeden devam edemeyecekleri ve onay vermek istemedikleri takdirde web sitesinden ayrılmaları gerektiği bildirildi. Katılımcılar “Kabul ediyorum” düğmesine bastıklarında bir sonraki sayfaya yönlendirildiler ve bir sonraki sayfada çalışmanın amacını yeniden düzenleyen çalışmanın açıklamasını gördüler. Açıklama sayfası ayrıca deney için talimatlar içeriyordu. Talimat şu şekildedir: “Bu çalışmada, resmi açmak ve ardından fotoğrafı derecelendirmek için bir kaydırıcıya tıklamanız gerekir. Fotoğrafları derecelendirmek için, "boş zamanınızı" veya "boş zamanınızı" bu resimlerin önünde geçirdiğinizi hayal etmenizi istiyoruz. Resmin önünde kendinizi hayal ettikten sonra, her resmin önünde ne kadar zaman geçirmeyi tercih ettiğinizi derecelendirmenizi istiyoruz. Bu deneyde, tüm resimleri derecelendirmeniz gerekir ve derecelendirme bitmediyse bir sonraki resme

geçemezsiniz. Deneme en fazla 20 dakika sürecektir; zaman ayırdığınız için şimdiden teşekkür eder, çalışmalarınız için teşekkür ederiz. “. 48 resmin tamamı için aynı talimatlar hem Türkçe hem de İngilizce olarak gösterildi. Talimat, "boş zamanınızı" veya "boş zamanınızı" bu resimlerin önünde geçirdiğinizi hayal edin ve sonra boş zamanınızı bu manzara karşısında gerçek hayatta ne kadar harcamak istediğinizi derecelendirin. resmi kaydardı ve katılımcılar resmi oyladı. Bir sürgüye tıklamak ve resmi derecelendirmek için tıklamak arasında geçen süre milisaniye cinsinden ölçülmüş ve Postgres veri tabanına kaydedilmiştir. Her katılımcı andan yola çıkarak belirlenir (bilgilendirilmiş rızayı kabul ettiği ve “Kabul ediyorum” düğmesine bastığı tarihte gerçekleşir. An, Ocak 1970’in ilk ayından itibaren “Ben” kabul et ”düğmesine basıldı. Bu nedenle, iki kullanıcının aynı kullanıcı kimliğine sahip olması çok düşük bir ihtimaldir. Verilerimiz nispeten küçük bir alanda toplandığından (kampüs ve çevresindeki mahalleler) ayrılması uygun bir fikir değildi. IP adreslerine göre kullanıcılar, aynı bölgede yaşayanlar aynı IP adresini paylaşıyorlardı, deney sırasında isim veya kişisel kimlik bilgisi kaydedilmedi veya toplanmadı.

## SONUÇLAR

Doğaya dahil olmayanlar arasında (A, B ve C diyagramlarını seçti), doğaya dahil olanlarda ortam (D diyagramını seçti) ve olarak kodlananlar arasında bir fark olup olmadığını görmek için tek yönlü bir ANOVA yapıldı. doğaya yüksek katılım (E, F ve G diyagramlarını seçti). Sonuçlar, hem düz resimler ( $F(2,27) = 1.057$ ,  $p = .362$ ) hem de karmaşık resimler ( $F(2,27) = 2.09$ ,  $p = .143$ )

tercihleri bakımından katılımcılar arasında anlamlı bir fark olmadığını göstermektedir. doğaya üç dahil olma düzeyi arasında.

Bu çalışma için iki eşleştirilmiş örneklem t testi yapılmıştır. Bunlardan biri tercih puanları için genel ortalamayı karşılaştırmak, diğeri ise katılımcıların her bir fotoğrafı derecelendirmeleri için harcadıkları tepki süreleriydi.

Sonuçlar katılımcıların düz resimlere kıyasla ( $M = 2.11$ ,  $SD = 1.326$ ) karmaşık resimleri daha yüksek ( $M = 3.66$ ,  $SD = 1.863$ ) puanladığını gösteriyor. Derecelendirme ile ilgili soruya bakıldığında, katılımcıların daha sade ve doğal olmayan görünümle karşılaştırıldığında daha karmaşık ve daha çeşitli görsel uyarıcılar sunan yerlerde kalmayı tercih ettiklerini söyleyebiliriz. Eşleştirilmiş örneklemli bir t testi farkın anlamlı olduğunu gösterdi ( $t(835) = 20.13$ ,  $p < .001$ ).

Her bir katılımcının her fotoğrafı derecelendirmesi için geçen süre, hangi fotoğrafın derecelendirilmesine bağlı olarak önemli ölçüde farklıydı. Katılımcılar, düz resimlerin derecelendirilmesinde geçen süreye kıyasla karmaşık resimler ( $M = 7892.78$ ,  $SD = 11466.435$ ) iken (milisaniye olarak) daha fazla zaman aldı ( $M = 5863.34$ ,  $SD = 7401.660$ ). Eşleştirilmiş örneklem t-testi sonucu reaksiyon süresindeki farkın anlamlı olduğunu ortaya çıkardı ( $t(835) = 4.31$ ,  $p < .001$ ).

Derecelendirmelerin deneyime açıklık puanları ile korele olup olmadığını görmek için Pearson korelasyonları yapıldı. Sonuçlar, ters resim kodlu olan ve Türkçe olan öğelerin puanlarıyla karmaşık resimlerin puanları arasında ( $M =$

3.66 SD = 1.86) anlamlı ve pozitif bir korelasyon olduğunu göstermiştir (M = 3.15 SD = 1.31) ( $r(215) = .205, p = 0.002$ ).

Doğanın kendine dahil olması ile deneyime açıklık unsurları arasındaki ilişkiyi görmek için Pearson korelasyonları yapıldı. Sonuç, doğaya dahil olma (M = 4.83 SD = 1.42) ile ters kodlanmış ve Türkçe olan öğelerin puanları arasında pozitif ve anlamlı bir ilişki olduğunu göstermiştir ( $r(29) = .36, p = 0.048$ ))

## 5 TARTIŞMA 6

Tepki süreleri ile ilgili sonuçlar, düz görünmeksizin ve süslemesiz olarak çekilmiş resimlerin katılımcılara daha fazla uyarıcı olduğunu ve bu alandaki diğer çalışmaları çoğalttığını göstermektedir (Berlyne, 1958; Fantz, 1961). Bu aynı zamanda kapalı alanlardaki insanların görsel karmaşıklık yüksek bir cisim etrafında zaman geçirmeye karşı daha yatkın olduklarını ve daha çok ilgileneceklerinin bir göstergesi olabilir. Dikkatin bir etkisi olabilir, çünkü yakınlık etkisi ya da sadece maruz kalma etkisi gibi çok fazla zaman harcadığımız nesneleri sevmeye eğilimindeyiz. Görsel karmaşıklık, daha yüksek tercihle sonuçlanabilecek belirli nesneler üzerinde zaman harcamamızın bir ipucu olarak hareket eden bir faktör olabilir. Beş büyük envanterin Türkiye ile ters çevrilmemiş kalemleri arasında anlamlı bir ilişki vardı. Bu bulgular, deneyime daha açık olmanın özgün hipotezini kısmen doğrulayabilir, daha uyarıcı olmaları ve uyarıma açık olmaları daha fazla tercihle

sonuçlanabileceği için farklı veya karmaşık görsellerin tercih edilmesinin bir korelasyonu olabilir. Tercihin yalnızca ters çevrilmemiş Türk kalemleriyle ilişkili olmasının nedeni, bu kalemlerin envanter içindeki sayısının artmasından kaynaklanıyor olabilir.

Kentsel ortamlarda doğal unsurların varlığı ile ilişkilendirilen genel önem, doğal sahnelerin manzarasını refah ile ilişkilendiren bir kanıtlar sonucudur (Driver & Greene, 1977; Ulrich, 1979; R. Kaplan, 2001; Lewis, 1996). Ulrich, 1984; Moore, 1981). Doğayı görmenin refah üzerindeki etkisinin ardındaki temel argüman, kapalı alanlarda taklit edilebilen doğal sahnelerin bazı görsel özellikleri olarak kabul edilebilir. Bu görsel özelliklerin en önemlisi bir sahnenin karmaşıklığıdır. Bu tezin denenmesi, tasarım öğelerinin çeşitliliği ve karmaşıklığı açısından bir yerin estetiğini görmeye çalıştı. Başka bir deyişle, bir tasarımın karmaşıklığı, işlevsel amaçlara (paneller ve pencereler gibi) ya da görsel çekiciliğin amacı için altındaki malzemelere eklenen farklı ve bağımsız süsleme birimi sayısı olarak işlevselleştirilir.

Yer eklenmesi, belirli bir yerin veya bir yerin içindeki bir nesnenin etrafında olmanın duygusal bağı veya bilinçdışı çekiciliği olarak tanımlandı. Ayrıca, bu itiraz, bir alanın kapalı bir alanda yerine getirdiği işlevsel amaçlara dayandırılmamalıydı. Bir yerden başka bir yere göç etmek ve ihtiyaçlar elde etmek için vahşi doğada girişimde bulunmak üzere evrimleşmiş insanlar olarak. Sonuç olarak, insanlar kendi öz-belirleme teorisine göre potansiyellerini yerine getirebilecek sağlıklı bir bireye sahip olmak için



uyarılması gereken doğaya ilişkin eğilimlerle doludur (Ryan ve Deci 2000). Bu nedenle, insanlar için tasarlanan kapalı alanlar, eğer iç tasarımları doğanın estetik ilkelerini izlerse, genel olarak daha iyi ortamlar olacaktır. Doğal malzemelerin (ahşap, taş vb.), Doğal elementlerin (bitkiler, doğal ışık, su vb.) yanı sıra doğal bir manzaraya veya manzaraya sahip olması, insanların oturması veya ikamet etmeleri için tasarlanmış yerlere ihtiyaç duymaktadır. Bu yerlerin örnekleri üniversite kampüsleri ve yurtlar, rekreasyon alanları, ofis binaları, yatılı okullar ve en önemlisi hapishaneler olabilir. Doğayı görmek, doğa ile etkileşimin yalnız başına gerçekleşmesi, cezaevlerinde bulunan bazı insanlar için sınırlandırılmıştır. Dahası, duygusal düzenlemeler için doğaya ya da doğal çevreyi taklit eden manzaralara bakmak gerekir. Cezaevi sistemleri, bina yapımında tasarım protokollerini uyarlamalıdır çünkü fiziksel bina mahkumlar üzerinde büyümelerini ve değişimlerini engelleyebilecek veya zarar verebilecek derin etkileri vardır. Üstelik, bu tür duygusal düzenlemeler, evrimin en çok zorlanması en iyi yolunun onu tatmin etmek ve bu temel ihtiyacın tatminini sağlamak olduğudur.

Benim düşünceme göre, fiziksel kentsel çevremizin estetiğinin önemi o kadar büyük ki, doğal çevreyi belirli şekillerde değiştirmeyi engelleyen yasalar olmalı. Yasalar ve devlet kurumları ayrıca kentsel çevremizin doğal olmayan şekilde oluşturulmasını engellemelidir. Burada doğal olmayan, doğaya yönelik temel eğilimleri tatmin etme kapasitesine sahip kentsel tasarım anlamına gelir. Modern zamanlarda, yiyecek ve suya erişimin yanı sıra çocuklar için eğitim, çocukları savaşa göndermeme vb. Gibi temel insan

haklarını dediğimiz ilkeler pazarlığa tabi değildir ve tartışmaya açıktır ya da belirli siyasi partilerin politikalarına bağımlıdır. İdeolojiler. Temel insan

hakları denilen şey, hem bireysel hem de toplu bakış açısıyla insanların optimal büyümesi için ihtiyaç duyulan şeydir. Doğal unsurdan yoksun kentsel ortamların şekillendirilmesi veya stimülasyondan yoksun bir ortamın oluşturulması, insan-yerin duygusal bağının bozulmasına bağlı olarak engellenmiş bir büyümeye neden olabilir. Ve sırayla, kişi-yer bağının bozulması, çok aktif bir sosyal ve politik açıdan akıllı olmayan bir topluma yol açabilir. Karmaşıklığın çevre ile duygusal bir bağ kurma üzerindeki etkisinin ardındaki hipotez bize şehirlerimiz, mahallelerimiz ve hatta ülkelerimizle sağlıklı bir ilişki için neyin gerekli olduğunu gösterebilir. Her şeyden önce, doğal sahnelerin dikkat çekici özelliklerinden dolayı bilişsel yetenekler gerektiren veya stres veya uzun çalışma saatleri içeren ortamlarda kesinlikle gereklidir. İkincisi, yakın çevrede aktif olarak yer almanın çevreye daha yüksek bağlanmaya neden olabileceği gösterilmiştir (Brown ve Werner, 1985). Bunlar, tasarımın sosyal katılım üzerindeki genel etkisinin bir göstergesi olabilir. Sistemik tasarım protokollerinin sonucu olan yakın çevreye daha az katılımın sosyal ve hatta politik sonuçlar açısından daha az olumlu sonuçlara yol açabileceği görülmektedir. Kentsel tasarım ve planlamanın politik katılımı nasıl etkilediğinin araştırılmasının yanı sıra, nüfusun evin ve evin dışındaki alanını nasıl algıladığının araştırılmasında büyük önem olduğuna inanıyorum.

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