

**A RESEARCH FOR UNDERSTANDING THE  
HIERARCHY OF SENSES IN SPATIAL IMAGERY**

**A Thesis Submitted to  
the Graduate School of Engineering and Sciences of  
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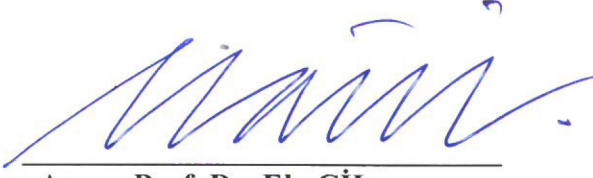
**in Architecture**

**by  
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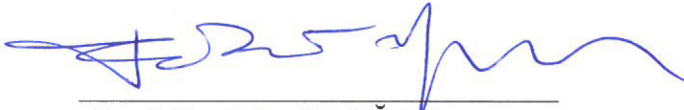
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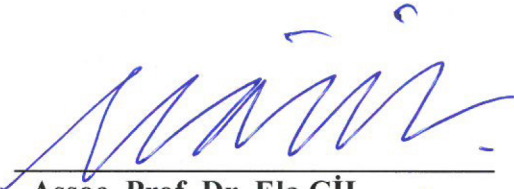


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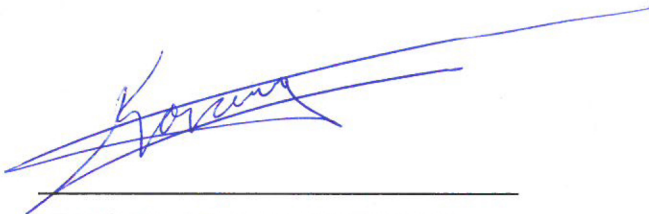


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# ABSTRACT

## A RESEARCH FOR UNDERSTANDING THE HIERARCHY OF SENSES IN SPATIAL IMAGERY

The thesis focuses on senses, perception, memory and spatial imagery for exploring the hierarchy of senses in spatial imagery.

An idea has emerged in the literature and architectural education that the sense of vision is dominant. In this study, whether this idea is correct or not is analyzed through student texts.

In this study, the texts of the second, third and fourth-grade architecture students who took “Spatial Perception and Representation” course at Izmir Institute of Technology (IYTE) examined. Within the scope of the research, written, anonymous, positive and negative memory space texts collected from the students. The sentences analyzed according to sensory coding for both positive and negative memory texts.

During this study, the senses used by the students in describing the spaces in their memories and the raids of these senses were examined and found a hierarchy or primacy of senses was tried to be made.

The collected data analyzed. These data interpreted in the light of the information obtained from the pioneers in the literature research.

*Keywords: Perception; Space; Senses; Imagery; Memory; Experience*

# ÖZET

## MEKANSAL İMGELEMDE DUYULARIN HİYERARŞİSİNİ ANLAMAK ÜZERİNE BİR ARAŞTIRMA

Bu çalışma mekânsal imgelemde duyuların hiyerarşisini araştırmaktadır. Tez kapsamında, duyular, algı, bellek ve mekânsal imgelem üzerine odaklanılmaktadır.

Literatürde ve mimarlık eğitiminde görme duyusunun baskın olduğuna dair bir ön yargı oluşmuş olup, bu çalışma kapsamında da bu ön yargının doğru olup olmadığı öğrenci metinleri üzerinden analiz edilmiştir.

Araştırmada, İzmir Yüksek Teknoloji Enstitüsü (İYTE)nde “Mekânsal Algı ve Temsil” dersini alan ikinci, üçüncü ve dördüncü sınıf mimarlık bölümü öğrencilerinin, kendilerini en mutlu ve mutsuz hissettikleri mekânları anlattıkları metinler incelenmiştir. Araştırma kapsamında, öğrencilerden yazılı, isimsiz, olumlu ve olumsuz olacak şekilde metinler toplanmıştır. Metinler olumlu ve olumsuz metinler olmak üzere, cümle cümle analiz edilmiştir.

Bu incelenme sırasında, öğrencilerin anılarındaki mekânları betimlemelerken kullandıkları duyular ve bu duyuların baskınlarına bakılmış ve duyuların bir sıralaması yapılmaya çalışılmıştır.

Toplanan veriler, literatür araştırmasında öncülerden elde edinilen bilgiler ışığında analiz edilmiş ve yorumlanmıştır.

*Anahtar Kelimeler: Algı; Mekan; Duyular; Temsil; İmgelem;*

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# CHAPTER 1

## INTRODUCTION

### 1.1. Problem Definition

Researchers studied different space aspects to understand a human's process of perception in memory space. In the conclusion of their researches, they figure out that memory spaces are directly affected by perception processes through sensory organs (Goldstein, 2007; Howes, 2005; Millar; 2008).

There are a few studies which contain all sensory organs together as vision, hearing, smelling, touching, tasting. These studies investigated how in various combinations and hierarchies the senses communicate and interact with each other while a human perceives and experience the environment (Ackerman, 1990; Goldstein, 2007; Pallasma, 2005; Rasmussen, 1959; Zumthor; 2006; Zumthor, 2010).

It is a truism to state that humans perceive their environment by processing stimuli from the environment. Through the sensory organs of individuals, these stimuli are perceived. All sensory organs work together in interaction with each other for making meaningful perception of spaces (Goldstein, 2007; Howes, 2005). However, in architectural education and especially in media, there is an understanding that visual sense has dominancy over other senses. Using only visual perception or a single sensory organ alone is not sufficient for the human to make sense of the space accurately. Therefore, the individual needs other sensory organs when perceiving the space and environment. Without smelling a space, without hearing the sounds reflected from materials that are used in the space, it is not possible to fully perceive and experience the space by merely seeing or hearing it

Sensory experience is a physical sensation, which can shape by personal history. Favorite smells of childhood or first experiences in childhood can affect new experiences and perceptions. Little notions from past experiences or perceptual

reminders can influence the new ones because they are the fundamental domains for an individual. That's why these sensations are not just a personal experience or physiological responses to the environment; they are the first and primary medium of thoughts and body. They are an outcome of the interaction of all senses and their collaborations (Ackerman, 1990; Goldstein, 2007; Howes, 2005). Together with these, the perception of the space becomes integrated and has a complete meaning. These elements that affect perception highlight the characteristics of the spaces in which we spend much of our time. Also, it affects individuals' comfort and frames their total experience or how an individual evaluate that space, and sometimes their productivity (Millar 2008; Zumthor, 2006).

To understand the nature of the relationship between the perception and space, it is necessary to examine the factors influencing perception and experience of that space which are shaped by sensory organs. Perception process and the interactions of sensory organs need to be understood and examined in detail because even after these procedures, we can discuss the memory spaces and how individuals' experiences these memory spaces; because perceptions play a role on them.

## **1.2. Research Objectives and Hypothesis**

The information we receive through our senses shape our spatial perception and construct a significant part of our experience (Howes, 2005; Millar, 2008). However, much of the studies have focused on the sense of sight and visual perception. For example; Arnheim (1954) was one of the pioneers that focused on the sense of sight and visual perception, especially in design education. Additionally, according to Howes and Pallasma; publicity of architecture inevitably has been employing images while conveying spaces, which in the modern world has been promoting vision (Howes, 2005; Pallasma, 2005).

Howes mentioned modern world's promotion of vision with saying:

Since sight and hearing were traditionally linked with intellectual activity and civilized behavior in European culture, while taste, touch, and smell were associated with animality, it was imagined that "primitive" peoples would show a predilection for the "lower" or "animal"—in short, "primitive"—senses. In the eighteenth century, one already finds treatises describing the tactile aesthetics or exceptional olfactory abilities of "savages." These become commonplace in the nineteenth century, supported by anecdotal descriptions from explorers and travellers. The natural historian Lorenz Oken went so far as to invent a racial hierarchy of the senses. In his scheme the European "eye-man" was at the top of the scale, followed by the Asian "ear-man,"

the Native American “nose-man,” the Australian “tongue-man,” and, at the bottom, the African “skin-man (Howes, 2005).

These have brought forth visual perception while suppressing the role and importance of the other senses concerning cultural differences. Even such cultural changes keep an eye on the fore while accusing other senses of being primitive.

On the other hand, there have been discussions from the field of architecture which have been led by G. Bachelard, S. Millar, J. Pallasma, S.E. Rasmussen, and P. Zumthor, who have argued for the unity of the senses and importance of the other senses than vision in experiencing the atmosphere of architectural space (Bachelard, 1969; Millar, 2008; Pallasma, 2005; Rasmussen, 1959; Zumthor, 2006; Zumthor, 2010). Those arguments influence this thesis, which has taken their discourse as a hypothesis. In this context, the purpose of this study is to examine the hierarchy of the senses in spatial perception and question the supremacy of vision. While doing that, the thesis also assesses the importance of non-visual senses in constructing a sense of space.

For this purpose, in the following chapter, the relationship between perception and space was firstly investigated. Then, studies on the factors which affect the perception of individuals were examined, and their results were discussed. Lastly, reviews on the perception of space, memory, and imagination were considered and discussed.

The third chapter presents the case study, which is an analysis of the answers in essay format to two questions (essay tasks) presented to a group of architecture students. In the essay tasks, individuals were asked to describe the places in which they remembered being most happy (pleasant) and unhappy (unpleasant) in their memories. That chapter concludes with the discussion of the results of these descriptions.

### **1.2.1. Hypothesis**

The real potential of spaces is eventually determined by the spatial experience of individuals in space. Therefore, the chain of events starting from sensing our environment to perception and then to experience is the most fundamental process which constructs spatial perception (Goldstein, 2007; Howes, 2005). The eye and visual perception were frequently studied in the literature, and according to Arnheim, Howes, Millar and Pallasma’s writings; both of them were generally accepted as the most

dominant method of recognition and sensory organ (Arnheim, 1954, Howes, 2005; Millar, 2008; Pallasma, 2005).

Also, for Arnheim and Pallasma; it is accepted that visual perception and eye have dominancy in architectural design and architectural education (Arnheim, 1954; Pallasma, 2005). However, Pallasma suggested that visual perception and sight do not have the same effect on the experience of space and spaces which in human's memory with emphasizing the importance of non-visual senses in different cultures and centuries.

Man has not always been dominated by vision. In fact, a primordial dominance of hearing has only gradually been replaced by that of vision. Anthropological literature describes numerous cultures in which our own senses of smell, taste, and touch continue to have collective importance in behavior and communication (Pallasma, 2005).

Therefore; in this thesis, I try to investigate the primacy of senses, their interactions with each other's and their role in memory and spatial perception from a two questioned task. These questions and the methodology of this study are mentioned below.

### **1.3. Methodological Framework**

The research problem that appears in the emergence of this thesis is related to how individuals evaluate spaces in a perceptual point of view, the reflections of perceived spaces in the minds of individuals, the meanings that individuals attach to them, and the images in the minds of individuals. The second and the most crucial problem for this study are the hierarchy of the senses used by individuals and the order of these senses in terms of importance in the process of expressing them while recalling their memories.

To find answers to these research questions, I concentrated on the memories of specific individuals because memory and spatial perception support each other. Much of the information on spaces is stored in human memories. These memories play an important role in upcoming experiences and memories in terms of their effects of spatial perception. In other words, memory is a crucial component. It has importance in recalling and remembering a space with the help of little notions from sensory organs. With the help of memory and past experiences, individuals can find the way home from work or recognize his/ her home with the help of sensory stimuli.

On the other hand, there is a mysterious part of memory. The individual does not always know what he/she stores in his/her memory because memories are formed after an individual's past experiences and perceptions (Groh, 2014). The mysterious part of memory and the fact that it affects perception played a role in determining the method of this study.

Therefore, the methodology of this study was established following the steps below. The goal is to find a hierarchy and primacy of senses in spatial imagery. First, the concepts of perception of space, senses, memory, and experience were examined. Previous studies in the literature have been reviewed to determine which sense and perception were found dominant in these studies.

The thesis study consists of two main analysis methods:

1. The first stage contains the examination of previous studies in the literature and the evaluation of the texts of the pioneers within the context of the subject, In the first phase of the study, fundamental concepts related to the subject were discussed. These concepts were; space, memory, experience, imagery, perception, and senses. Explaining the hypotheses or to comment on the fundamental concepts of the thesis would not be beneficial without knowing these concepts. These learned concepts will guide the case study.
2. The second stage is to analyze the results of the case study. The case study is a two questioned task with the identified respondents. In the second phase of the study, written texts were examined according to the coding method. These written texts emerged as a result of a study consisting of two questions. The questions are those that affect them most and least pleasantly in their memories. The students involved in the study were asked about places were in their memory, which affected them positively (pleasant) and negatively (unpleasant).

The reason students are asked about the places in their memory is that perception is influenced by past experiences. In addition, the memory spaces of individuals will figure out the most involved senses in their memories because memory is complex and it is difficult to generalize about memory.

86 written memory texts were obtained from more than fifty students who participated in this case study. Students who participated in the case study were incorporated anonymously into the study. So neither the names nor genders of the participants are known. The only known information about the students is their age ranges and the department they studied. These respondents are students in the architectural department of the Izmir Institute of Technology. The participants are second, third or fourth-grade architecture students, and their age range is between 20 to 23.

Of the 86 written texts, 60 are positive, and 26 are negative memory space texts. Since the numbers of positive and negative texts were not equal, 26 of the positive texts were randomly selected from 60 positive memory texts. Working with the same amount of texts will produce more accurate and consistent results when comparing positive and negative texts.

After the selection of 26 positive and 26 negative memory space texts, the texts started to be examined individually. While the texts were studied, each sentence was categorized by a method of coding dependent on the senses.

The texts were first categorized into positive (pleasant) and negative (unpleasant) texts in themselves. Later, both positive and negative texts are divided into three groups according to sentence structures. These three groups are definition/description, interpretation through senses and definition interpretation. In this way, I tried to understand what the sentences wanted to tell about the place by dividing them into three. Firstly, I attempted to determine whether the individual identified the space directly or explained it through his/her senses, or used elements that describe both his/her senses and space. With these three groups, it has been explored how space is located in memory. Whether space is stored in memory through senses or identifying elements has emerged.

Then, a second group called space and parts of space were formed to examine the stored spaces in memory in more detail. With this group, it was investigated whether the spaces held in memory were stored with senses, with the elements of the space, or as the whole of the space. Also, since memory has a mysterious side, each group allowed us to obtain more data on memory and past experiences because these memories and experiences affect and shape new memories and experiences.

The third group appeared while examining how spaces in memories are handled through spaces in texts. With the resulting group, space is divided into three as the exterior, interior, and transitional space. With these three groups (as the exterior, interior, and transitional space), which places have importance in memory texts were determined.

Finally, texts are grouped through the senses. This is the most comprehensive categorization of all categories conducted because; even the sensory organs are divided into subgroups within themselves. The main reason for this is to determine whether there is a dominant or prior sensory organ in the perception of space. These groups were; touching, vision, hearing, smell/taste, movement, and body. For vision, there were subgroups such as light, texture, color.

When examining the text, each sentence was individually coded in all these groups. When reviewing the texts; first, whether the sentence contains the definition of the space, whether the space or part of the space is mention, then the type of place where the memory passes, finally, the senses in the memories and their elements are analyzed.

The elements that we can perceive only through our eyes when the senses are examined are called visual, the aspects that we can perceive only through physical contact are tactile, the elements that we can perceive only through our ears are auditory, and the features that we can perceive only by tasting or smell are called gustatory/olfactory. The movement group is more complicated as these five are very obvious because the group we separate as movement is actually body movement, it can be included in the body, on the other hand, since there is always contact with the environment in the movement group, it can also be involved in the sense of touch. Among all these groups, the body is the one with the most essential and most mixed parameters. It is not possible to separate any sensory organs from the body. How all senses have different relations with each other; all senses have connections with the body. The body is all-embracing. The body is the center of memory and experience. The body cannot be separated from the body's environment, the individual, senses or memories. This has also made categorization difficult.

Therefore, its categorization must be detailed to reach concrete conclusions for this research. Similar field studies, literature studies, and the analytical process, which



were previously applied for the field study analyzed within the scope of the thesis study and these research was attempted to reconcile with the field study results. Therefore, these two stages have great importance in the study. Also, this study is separating itself from other studies by analyzing all senses equally, because other studies have been conducted on a single sense or sensory organ, and all senses or all sensory organs have not been examined. But in this study, it is aimed to determine the importance and the order of the senses in spatial perception in both methods.

#### **1.4. Literature Review**

The relationship between the environment and the individual begins with the perception of the environment. In order to understand how these spaces affect the individual, the individual's perception system and his/ her memory, the factors that affect perception needs to be examined (Ackerman, 1990; Goldstein, 2007; Howes, 2005; Millar; 2008).

The main idea of this research was to find the hierarchy of senses in memory spaces and their effects on the perception system of an individual because stimuli from sensory organs directly affect the perception of space and memory spaces. However; in architectural education and media, there is a notion that the eye and visual perception are more prevalent. That's why; visual perception was studied in the previous literature studies (Ahunzade, 2014; Ayber, 2009; Ayyıldız, 200; Dede, 1997; Demirtaş, 1994; Dinçer, 2011; Farrel, 1977; Farzin, 2010; Hochberg, 1983; Massaro, 1984; Terim, 1998; Türköz, 2013; Uluç, 2007; Uysal, 2009; Ünal, 2013; Yılmaz, 2004; ,Yılmaz, 2010; Zülkadiroğlu, 2013). In comparison with the sense of vision in research on perception, the other sensory organs were secondary or excluded. So in these fields, less research has been performed and also these studies indicate that non-visual senses have been thrown background and less research was done about them. These researchers who studied on non-visual senses asserted that the problem should be dealt with more studies and that non-visual senses play a significant part in people's perception (Aytuğ, 1987; Belir, 2012; Demirörs, 1994; Marckwardt, 1944; Massaro, 1984; Metz, 2011; Naeem, 2010; Sherman, 1970; Türköz, 2013; Yılmaz, 2010).

In literature studies, it is ignored that non-visual senses have importance in spatial perception. However, touch is the most fundamental sensation, the eye is

composed of skin specialization and even all senses touch the environment (Pallasma, 2005). Therefore, the sense of sight is connected to a variety of different parameters except for the sense of touch and skin. It can additionally conclude that the sense of vision and its parameters in these studies are hegemonic.

In these visual perception studies; studies mainly conducted under the leadership of color, light, movement, time, and texture (Ahunzade, 2014; Ayber, 2009; Ayyıldız, 2000; Dede, 1997; Demirörs, 1994; Demirtaş, 1994; Dinçer, 2011; Farrel, 1977; Farzin, 2010; Hochberg, 1983; Massaro, 1984; Terim, 1998; Türköz, 2013; Uluç, 2007; Uysal, 2009; Ünal, 2013; Yılmaz, 2010; Zülkadiroğlu, 2013). Besides these studies, vision studies are not limited to adults and healthy individuals. Various visual perception studies in infants and people with disabilities have been conducted (Belir, 2012; Eimer, 2004; Farzin, 2010; Massaro, 1984; Türköz, 2013, Yılmaz 2010).

In these studies, color and light were the main concerns for visual perception because according to these studies, with the help of light; space became visible and colors were the fundamental parameters that defined spaces. Light defined the depth of the space with shade and shadows. Light makes spaces three dimensional. In other words, with the help of light; the proportion of rooms, size, and shape became visible. Light pointed out that it cannot study alone without considering its relationship to color because they had a relationship that each affects the other. Adjustments in hue, chroma, and value are the variables that play a major role in color and with help of these variables the perceived quality of spaces and environments have been examined (Ahunzade, 2014; Ayber, 2009; Ayyıldız, 2000; Demirörs, 1994; Demirtaş, 1994; Dinçer, 2011; Farrel, 1977; Farzin, 2010; Hochberg, 1983; Terim, 1998; Uluç, 2007; Uysal, 2009; Yılmaz, 2004).

In addition, in the studies conducted in the literature, colors were also examined in terms of their impacts on the individual and space. For example; using the color red, it is not suitable for bedrooms because it has an effect that accelerates metabolism on individuals rather than calming one. It is also an attention, dangerous situations color like fire and its equipment (Ahunzade, 2014; Ayber, 2009; Demirörs, 1994; Demirtaş, 1994; Dinçer, 2011; Terim, 1998; Uluç, 2007).

Besides color and light parameters, the visual perception studies done in the literature are based on the movement and time factors. Movement, time, speed and

space concepts associated with different time zones, different time periods of the perception of the spaces were investigated. Through the movement, the perception can change in the space over time were investigated and the potentials of the spaces were examined through these changes. While perceiving the architectural environment and space, it has emerged that a moving individual perceives much more than a static individual's single-order perception and experiences of spaces were differently (Ayyıldız, 2000; Dede, 1997; Demirörs, 1994; Terim, 1998; Uluç, 2007; Ünal, 2013; Yılmaz, 2004).

Factors of movement, time and speed concept both work on pedestrians and with different transportation vehicles in literature studies because with help of different transportation vehicles' speed an individual's perceptual experience change based on these vehicle speeds. Different speeds could cause different perceptual experiences in space or in an environment. When the scale differences occurred at high and low speeds were taken into consideration researchers found out the differences in the perception of the space depending on the time and speed. With the help of a high-speed vehicle, an individual can perceive less than a low-speed vehicle. As the speed decreases, the perceptions of the individual around him/ her and his/her focus on his/her environment will increase (Ayyıldız, 2000; Dede, 1997; Demirörs, 1994; Terim, 1998; Uluç, 2007; Ünal, 2013; Yılmaz, 2004).

Also, the visual perception changes as the individual moves within the architectural environment and spaces. The perception of space, depending on the movement of the individual and the speed of this movement, changes in visual perception has been the main subject of past studies. However, movement-space and time studies are not enough to explain the total spatial experience as they are limited with their focus on visual perception and other sensory organs are not included in these studies (Dede, 1997; Demirörs, 1994; Terim, 1998; Uluç, 2007; Ünal, 2013).

In parallel to these researches, visual perception studies have been conducted with infants and people with disabilities (Belir, 2012; Eimer, 2004; Farzin, 2010; Massaro, 1984; Türköz, 2013, Yılmaz 2010). In these studies, parameters such as light, color, movement and time were also studied but these studies were developed by studying these parameters with infants and disabled individuals. Although the perception of space in children and disabled individuals is similar to the perception of

space in adult individuals but it varies due to some parameters such as infants' imagination and disabilities that affect the sensory organs of people with disabilities (Belir, 2012; Eimer, 2004; Farzin, 2010; Massaro, 1984; Türköz, 2013, Yılmaz 2010).

Visual perception studies with infants were mainly performed through spatial analysis in tales. The perception and development of the concept of space in the infant were studied through these readings because their spatial experiences and memories of spaces very limited when we compare with adults. Their spatial perception analysis was carried out through the disciplines of architecture and literature. As a result of these studies, it was observed that the concept of perception was different from that of adult individuals and that the power of imagination came into play. When children make these readings, they perceive the spaces and environments with the help of their imagination much differently than adults. Children's space experiences are less than adult individuals that's why children's imagination is dominant. Consequently, the perception of space in children is much more difficult than in adult individuals because the perception of space is created using experiences and memories (Farzin, 2010; Massaro, 1984; Türköz, 2013, Yılmaz 2010).

However, the critical findings of visual perception studies are that there are a number of factors that affect spatial perception, which is common to both adults and children. These are the gender, the age, the socio-economic and socio-cultural environment in which the individual resides, their experiences, and the many characteristics they bring from their genes, which are the determinants of the spatial perception of the individual (Ahunzade, 2014; Ayber, 2009; Ayyıldız, 2000; Dede,1997; Demirörs, 1994; Demirtaş, 1994; Dinçer, 2011; Farrel, 1977; Farzin, 2010; Hochberg, 1983; Massaro, 1984; Terim, 1998; Türköz, 2013; Uluç, 2007; Ünal, 2013; Uysal, 2009; Yılmaz, 2010; Zülkadiroğlu, 2013).

In addition to them, also the "house" and the surrounding spaces play an important role in the perception of the past and future spaces for both children and adults because almost all the spaces are analyzed and experienced through the first experiences which happened at home since childhood (Ahunzade, 2014; Dede, 1997; Demirörs, 1994; Dinçer, 2011; Farzin, 2010; Hochberg, 1983; Yılmaz, 2010).

Studies on visual perception have not been developed solely on healthy adults and children. Various studies have been conducted on visual perception in disabled

individuals and children, but the number of these studies was limited. However, these studies in the literature are mostly based on the perceptions of people with hearing impairment. The number of visual perception studies with visually impaired individuals is much less (Belir, 2012; Massaro, 1984; Türköz, 2013; Yılmaz, 2010).

As a result of hearing impairment studies, it has been concluded that individuals with hearing loss are more likely to have visual perception and receive training to develop these perceptions. However, the reasons for this conclusion are due to the fact that the education system of hearing-impaired individuals based on visual elements and such individuals with disabilities perceive their location and environment through visual perception methods due to the education they receive (Belir, 2012; Massaro, 1984; Türköz, 2013; Yılmaz, 2010).

In addition, recent studies show that to perceptual systems of humans with certain sensory deficiencies can compensate with other senses to overcome this deficiency was not true. It has been argued that the excessive work of another sensory organ will negatively affect the individual. In other words, the idea that the sensitivity and the amount of work of the other senses increase after the loss of one sensation has disappeared as a result of studies conducted to date (Goldstein, 2007; Howes, 2005).

Besides visual perception, there are a limited number of studies which examined tactile perception on a space. The researchers, who aimed to look at the visually perceived space through tactile perception, explored the importance of textures and tactile perception in the perception of spaces. In these studies, the researcher examined how soft, medium and hard textured surfaces were perceived by the subjects, the psychological effects of the spaces on the subjects, and how the size perceptions of the spaces were changed when the subjects perceived the spaces. In these studies, the role of texture and touch sensation in spatial perception was investigated through the location, the hardness of textures and spaces, lighting level, light intensity and color (Aytuğ, 1987; Demirörs, 1994; Dinçer, 2011; Millar, 2008; Yılmaz, 2004).

The findings show that spatial perception of spaces with different degrees of hardness was perceived differently by individuals significantly the perception of the size of space is connected to the texture and touch sense. However, the study showed that education and gender which plays a major role in visual perception did not play a role in the perception of spaces with different degrees of hardness. In other words, gender or

education is not fundamental parameters for tactile perfection. Therefore, the texture and tactile perception of the spaces is an element to be taken into account with different parameters, so these parameters and the effects of textures revealed the importance of touching (Aytuğ, 1987; Demirörs, 1994; Dinçer, 2011; Goldstein 2007; Millar, 2008; Yılmaz, 2004).

However, there is a distinction between visual, tactile and auditory in cultural definitions. When an individual knew and named “*a lamp*” or “*a smooth surface*” texture the description was complete, and the only thing could add it would be adjective in nature. On the contrary, when an individual heard a lapping or whistling sound, it was the only feeling of a first definition which was not yet fully recognized. Although it may seem a lot more complicated than touching and seeing but it gives much clearer results when it was perceived what the sound was. Like “*lapping of a river*”, or “*the whistling of the wind in the trees*” because the sense of vision can be misleading, the sense of touch without touching it may not be fully understood but knowing what the voice is provided clear conclusions (Blessner, 2006; Metz, 2011).

Moreover, sound reflection in space provides more accurate data in comparison to the other senses on the dimensions of the space. These reflections also have an impact on the atmosphere of the spaces and the individuals’ experiences in the space. It also reveals the fact that sound has an effect on the emotions of individuals and individuals’ keep the space in memory according to their emotions. Even in spaces, they feel pleased and peaceful, they would like to spend more time (Blessner, 2006; Metz, 2011; Naeem, 2010; Sherman, 1970).

The formation of emotions on the individual about the place is not only dependent on the sense of hearing, touching or seeing. Smelling and tasting also had an effect on emotions. Much research has shown that smells and flavor play a significant role throughout the memory and emotion of individuals. Although some smells give happiness, some smells leave bad memories in the individual's memory. The best example of this situation is that the individual associates the smell of garbage with being dirty and associates the smell of lavender or soap with cleaning (Corbin, 1988; Drobnick, 2006; Pashler, 2002; Vilaplana & Toshimasa, 2015).

All these studies demonstrate that spatial perception is not only dominated by the eye and the sense of vision. Non-visual senses have essential impacts on spatial

perception as well. Although the intensity of the literature research relies on the sense of vision and the eye; the research of other senses is significant for the understanding of spatial perception. Even visual senses play a crucial role in understanding spaces, memory, and experiences. They have impacts on individuals. Even if, in architectural education and media gave importance to the eye and the sense of vision; non-visual senses have more powerful and long term memories. Their impacts on individuals are more permanent than visual senses because these senses affected different and more subjective parameters than visual ones.

To sum up, the analysis of different sensory parameters contributes to improving spatial perception understanding. Therefore, increasing the number of nonvisual senses studies, which are less than the studies of sense of vision and eye, will enhance the understanding of the spatial perception by the individual and also it will show the hierarchy and the primacy of senses in spatial perceptions, memories or even in experiences.

## CHAPTER 2

# ON THE RELATIONSHIP BETWEEN SPATIAL EXPERIENCE, MEMORY, AND SENSES

### 2.1. Definitions of Architectural Space

Space is a fundamental concept in which distinct arguments are conducted and different definitions for each researcher can be developed according to different scientific research areas. However, if we look at the primary dictionary meanings; Space;

1. That in which all object exist and move,
2. Interval or distance between two or more objects
3. Area or volume
4. Limited or unoccupied place or area (Oxford English Dictionary, 1989).

Although the word “space” (mekan) has many different definitions, the Turkish Language Institution's Turkish Dictionary provides:

1. Location,
2. Home, dormitory (TDK, 2005).

According to “*Encyclopedic Architectural Dictionary*”, space is the gap that separates man from the environment to a certain extent and is suitable for the continuation of his actions within (Hasol, 2010).

For Zevi (1993), architecture is not composed of the width, length or height of the structural elements surrounding the space but rather tries to define the space through these elements. Space is a defined void which is experienced and moved inside and



surrounded by these elements, but this should not mean that these elements are created spaces.

Like Zevi and Ching mentioned that; when we move along the spatial volume, see the shapes and objects, hear the sounds, feel the breeze, and smell the flowers that bloom in the garden, they begin to perceive the space. Space is a materialistic substance, such as wood and stone. However, in terms of its nature, it is formless. Its visual format, light quality, dimensions, and scale are entirely dependent on the limits defined by the elements of the total format (Ching, 1979).

The concept of space is interpreted in different ways for different thinkers, the common thought is the voids with boundaries, but spaces do not only consist of voids and elements that determine their boundaries. Space is a complex concept that can be defined differently according to many parameters. For Ching and Zevi, there are 3 fundamental elements of space; Void-Boundary, Movement-Time, and Light (Ching, 1979; Zevi, 1993).

## **2.2. Elements of Spatial Perception**

Elements of spatial perception have importance for individuals because these elements can change the effect and understanding of spaces. According to Ching and Zevi; the elements of spatial perception are void, boundary, movement, time and light (Ching, 1979; Zevi, 1993).

### **2.2.1. Void and Boundary**

The void and the boundary converge to form the space. It is very difficult to think separately void and boundary; since it is not possible to talk about space in the separation of these two terms. It is not enough to define a space, only with void or boundary. These two must be together for defining space (Ching, 1979, Zevi, 1993).

For Kuban (1990) voids consist of values and dimensions such as depth, length, the direction of movement, and light; the boundary is composed of subjective and objective elements. Objective elements represent unprejudiced aspects of the space, like visual elements. These elements define the space and play a role in restricting space. Subjective elements are prejudiced and personal aspects of space. Subjective elements

are perceived by senses and help to characterize the space but cannot be measured. For example; factors such as odor, humidity, heat, and light of the wine cellar (Kuban, 1990).

Ataç (1990), like Kuban, he explains the space with its subjective and objective elements. For him, each space is objective; it can be described as rational or in accordance with logic rules but also each space personal. It is perceived as subjective, emotional, or irrational by everyone who is in and moving. Some spatial qualities can affect everyone or at least many people in the same way or at least in a similar way. Objective identification and subjective understanding are closely interrelated. The objective elements of the space (the unprejudiced aspects such as walls, boundaries) shape space. However, the importance of the subjective elements cannot be ignored. Subjective elements perceived by senses and they are the features based on perception such as light, sound, heat (Ataç, 1990).

These objective and subjective elements are the fundamental factors which create space and it is hard to talk about the space without mentioning these elements. Also using void and boundary in relation to these elements; individuals can start to mention space classifications.

Space is classified in terms of environmental conditions. The effects of these conditions on humans have shown the need for shelter, security, and protection from external factors which are the most fundamental needs. These fundamental needs create spaces with help of void and boundaries, with using boundaries; individuals create shelter for protection but these spaces do not mean only closed volumes; open spaces are also a part of these.

Bruno Zevi (1990), in relation to space mentioned about boundaries and voids;

Each building helps to create two spaces, one of which is the interior determined by the building itself, and the other is the exterior of urban space between the neighboring building and the building (Zevi, 1990).

This creation of two spaces occurs by boundary and void. The boundary line of spaces create exterior and interior neighboring but F. L. Wright argued that this distinction should not be made between the interior and exterior spaces and that these

two spaces should not be considered as separate spaces because this separation is directly related to boundary and void.

According to Nornberg-Schulz, same rules apply to the interior and exterior, but both have different demands and requirements. These spaces cannot be determined by drawing definite boundaries about where the interior space ends or where the exterior space begins, because the interior space for one can be the exterior space for another (Schulz, 1988).

Bozkurt also supported this idea and said that there are no two separate spaces called exterior and interior spaces. We do not have such elements anymore. The space in which we live should be able to come out and be free to join exterior spaces. Again, the exterior space should be able to enter interior space freely (Bozkurt, 1962).

Even these spaces able to enter each other, we need to separate them from volumes. For separating a space (exterior or interior) from the volume, we need to consider that space restriction can occur through senses, not only physically. The important thing is that a human defines a space even if it is clear or not, and even if it does not form an enclosed volume, this restriction can be perceivable by the human. For example, a visual and tactual distinction created by the texture on the floor forms a border or boundary resulting in the perception of space (Rasmussen, 1959).

### **2.2.2. Movement and Time**

For Ching and Zevi; time and movement are other fundamental groups because movement and time can cause changes in perception. Besides the time and movement, speed is a sub-element of this group. When individuals describe a space, movement and time have highlighted role because the duration of the human being in that space, the speed of movement, the time zone in which it is located, can make a difference in the perception of that space (Ching, 1979, Zevi 1993).

According to Ching (1979) in the book of *Architecture, Form, Space, and Order*, he defined the relationship between time and movement as;

The path of our movements can be conceived as the perceptual thread that links the spaces of a building, or any series of interior or exterior spaces, together. Since we move in Time through a sequence of spaces, we experience a space in relation to where we've been and where we anticipate going (Ching, 1979).

Space can only be perceived by the movement of that person in that space, and it can be read when a person moves and spends time in that space, because, for the human “lives” the space he is directly related and integrated to space. The person perceives and forms the space in his mind by moving in the space (Ching, 1979). He stores in his memory what he perceives and feels the space by combining his new perceptions with his past experiences and memories (Goldstein, 2007).

Speed of movement has importance for a person. A person in motion can perceive space or object differently according to the speed of movement. As the speed of the person in the space increases, the perceptions of his/ her in the space decreases. As the speed of the person in the space decreases, the perception of her/his in the space will increase. As speed increases, attention to the environment is reduced. As speed decreases, the attention shown to the environment increases, so the number of perceived increases. In addition to the speed of the person, personal pleasures or his/her thought at that moment will be effective. It will create selectivity in the perception. For example, a hungry person will perceive places where he or she can eat mainly when he or she perceives the environment. Other shops, restaurants, and cafes will not attract his/her attention (Goldstein, 2007; Millar, 2008).

In addition to the speed of movement, time is an important factor in perceiving the space. As Lakoff (2003) mentioned time is conceptualized in space as a metaphor because it is needed in order to understand the space and the events happening in it. Space and all the events happening in that space get directly affected by this time factor. The duration of a human’s presence in the space and the time when a person enters the space while the event is happening in it are variables which can affect and change the entire perception (Ching, 1979).

Time factor used in the perception of space is at the same time more complex than other factors. For this reason, it should be taken into consideration in two groups. These two groups are the time spent in the space and the time between two perceptions (Zevi 1993).

The time spent in space plays an important role in the perception of the elements within the space by the individual. The amount of time (short or long) spent in the space is proportional to the details that attract the attention of the individual. Like the time the

individual spends in the space increases, the characteristics of the space which nestle in the memory of the individual increase. The more time spent in space, the more differences will occur in the perception of an individual, and the details which previously would not attract the individual's attention will start to do the opposite.

### **2.2.3. Light**

Zumthor says in his book *Thinking Architecture* while emphasizing the importance of light (Zumthor, 2010);

.... Sensing, smelling, touching, tasting, and dreaming in the dark that's just not enough. We want to see. But how much light do people need in order to live? And how much darkness (Zumthor, 2010).

Light is an effect that affects the perception of the space, which reveals its boundaries, voids, color, texture, and shape. The light factor is the creator of the space; the light factor makes the objects visible and therefore helps to detect the space (Zumthor, 2006).

Eldem emphasizes the importance of the light factor in the perception of the space by saying "*Perception begins with a vision, vision begins with light*" (Eldem, 1991).

Space is constructed with the help of these three fundamental elements; void-boundary, time-motion and light (Ching, 1979, Zevi 1993). These three elements of sensory stimulus are used for perceiving spaces. Light makes the space visible. Void and boundary define the space with its subjective and objective elements. Time and movement increase human perception. With the combination of these three fundamental elements, individual mention space classifications.

Henri Poincare (1905) classified the space as experiencing space and physical space according to perception. Hoogstad (1990) supported this distinction and said that there were significant differences between these two spaces. Experiencing spaces arise when the individuals perceive the space in with its senses. This space is divided into three in itself; perceived by vision, perceived by touch and perceived by moved within (Hoogstad, 1990).

According to Henri Poincare, this space is perceived and analyzed with measurable values. For example, values such as the length or shortness of a space can

be given. To say a long road about the long one, it has to be compared with shorts (Poincare, 1905).

Physical space is composed of concrete and objective components. It can be defined as the three-dimensional information that space conveys to us (Hoogstad, 1990). In other words, physical space has unprejudiced elements, this space's elements will not vary person to person and the same for everyone.

Schulz classifies the spaces in a different way. For Schulz these spaces are; abstract, existential, pragmatic, perceptual, and cognitive spaces. Abstract spaces are geometric spaces defined by four walls. Existential spaces are the renewed spaces in which a person lives and interacts at any time. Pragmatic spaces are places that integrate a person into nature. Perceptual space is the place formed in the person's mind by the person perceiving the place instantly. Cognitive spaces are the spaces formed by the perception of the space with the help of all our senses (Schulz, 1988).

### **2.3. Perception as a Cognitive Process**

Life is made sense and carried on with the knowledge and experience gathered from the environment. The objective world is formed through our senses in our personal consciousness and it is called perception. So, perception is the understanding of the environment through our senses and our kinesthetic experiences that we can count as the sixth (Ackerman, 1990).

Perception is the process by which we become aware of changes (through the senses of sight, hearing, etc.); act or power of perceiving (Oxford English Dictionary, 1989). The term "perception" in western languages has evolved from the root of the "cap" meaning to "take" in the Indo-European language group and the term of "perception" comes from the root of "taking" in the Turkish language. This term was mentioned in the Latin word "capere" with the same origin.

Perception begins with stimuli from the environment and ends with the behavioral responses of perceiving, recognizing and taking action. This journey from stimuli to responses called perceptual process (Goldstein, 2007) (Figure 1).

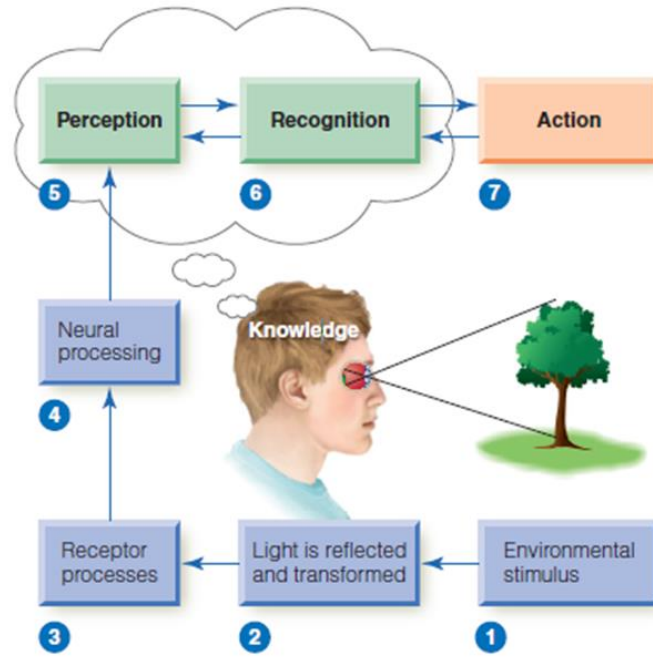


Figure 1: The Perceptual Process (Source: Goldstein, 2007)

With the human mind and knowledge, plus these seven steps occur perceptual process in human's mind. Between the times that a human look at an environmental stimulus with the help of light because light makes stimuli visible. Receptor and the neural process started to work, and then human perceives the environmental stimuli and started to recognize and take action towards it (Goldstein, 2007).

According to Lang (1987);

Perception is the process of acquiring data about the environment using our environment. Perception is active, conscious and purposeful. It's where the mind and the truth meet (Lang, 1987).

For Altman and Chemers; *“Perception is the conceptualization of people's minds by interpreting the information they receive through their senses”* (Altman and Chemers, 1980). Therefore, perception is the processes that can obtain data from the environment with the help of sensory organs.

Semra Aydınlı mentioned in the book of *“Mimarlıkta Görsel Analiz”*, perception is a mental phenomenon and comprehension of stimulant effects coming from the environment with the help of sensory organs. Gediie explained that perception has two meanings: *“awareness with senses”* and *“intelligence-informed”*. Stimulant effects resulting from the environment are first noticed by visual perception, then

become information and stored in long-term memory. Rudolf Arnheim has demonstrated the integrity of mind and senses by emphasizing that sensory perception includes mental processes such as remembering, thinking and learning (Aydınlı, 1992).

These mental processes and the integration of mind and sense have a fundamental role in individuals' perceptual process and Tunalı (1976) mention this as;

The sensible information is obtained through the organs of the senses by combining the impressions and senses of the human being from the outside world into a sensuous perception. The sensation is a phenomenon belongs to the human being (I. H. Tunalı, 1976).

Also, Baymur made a similar definition of perception. For him; perception is the transmitted stimuli to the brain through sensory organs and becomes organized and meaning from various treatments (F. Baymur, 1976). He described mental processes by sensory information as an organization and the development of meaning from information through sensory organs.

Güvenç argued that all our senses are effective and important in perceiving our environment and space. According to him, individuals perceive the space with the entire individual's senses, namely the senses of seeing, hearing, touching and smelling (Altan, 1972).

Abercrombie (1986) argued that when all senses and minds work together, individuals can perceive what is happening in their environment.

Perception of a building or object is accomplished by collecting information in two directions. The first is a series of physical activities created by the light that comes to us from the building. This is because the eye takes the position, shape, motion of the object and transmits it to the brain as information. The second is the process of comparing the new information obtained with the stored information in the brain (Abercrombie, 1986).

Also for Fueg, perception is related to individuals and their senses;

Perception, touch, and smell primarily occur with hearing and vision senses. Man is the factor of architecture. A structure can exist without the human perception of architecture, whereas architecture can exist only with human perception (Fueg, 1981).

Since the nervous system plays a major role in the detection process and is under the influence of the sensory experience, perception is not a passive process of stimuli that affect the sensory organs alone (Hilgard, 1967).

According to Rapoport, a perception is a versatile machine that works together with other senses. According to him, perception is affected by factors such as vision, smell, hearing, touch, kinesthetic and temperature. Perception is interpreted by gaining meaning through the organization of these senses. All sensory organs give information



to the individual about the environment and spaces. But this information is shaped according to the individual's conceptual structure. Comprehension includes mental processes between perception and knowledge. Comprehension is what the individual understands from the environment. Meaning is part of the comprehension and includes images. After understanding, the environment is responded with the impact and evaluation stages. As a result, the evaluation phase emerges, which includes the concepts of aesthetics and quality (Rapoport, 2004).

As Hilgard (1967) says, perception is a complex process and takes place under many factors. Actions such as acquiring information, thinking, remembering, and feeling are a part of this process. This process is also a subjective process because of the cultural structures and past experiences of people are also effective in human perception. Perception may also vary according to individuals and communities. Erkman said (1977) that

Perception is a phenomenon that varies according to people. It depends on the individual's perception systems, personality, social group, culture, and environment (Erkman, 1977).

Ertürk states that if the physical characteristics of the space such as its color, size, texture, and shape are perceived, individuals can perceive similar but if space perceives in terms of usage and the benefit, individuals can perceive differently (Ertürk, 1984).

Senses allow to experience and perceive the outside world. It is important for an individual to understand the spaces. Therefore, all psychological and physiological factors which create individual differences in spatial perception will affective in understanding the environment. Within the framework of these factors, some features of perception will emerge. These features are perceptual selectivity, invariability in perception, the organization in perception, perception of space and time, perception field, perception base, depth perception and completeness in perception (Goldstein, 2007; Gordon, 2004).

**\*Perceptual selectivity:** it is controlled by attention because it allows attention to be collected on a single sense. There are 2 main groups that affect selectivity in the perception of external and internal factors. External factors are the severity and size of the stimulus, repetition, contrast, mobility, sudden changes. Interest, needs, culture, past experiences can be counted for internal factors.

**\*Invariability in Perception:** The object must have been previously detected in order for constancy to occur invariability in because if an object detects it once, it will be perceived in the same way, even if it changes its color, shape or size.

**\*Organization in Perception:** perceptions of stimuli as a whole. In itself, it is divided into two as figure-ground perception and grouping perception. Each object is perceived by taking place on the ground in the figure-ground perception. Grouping perception is due to the characteristics of stimuli (proximity, similarity, continuity, completion, etc.) occurs with detection together.

**\*Space and Time Perception:** one of the factors that affect perception is movement and time. Objects are always perceived by spaces and the time factor is a variable that can vary from person to person. According to the characteristics of the space, the person can perceive the time spent in that space shorter or longer than normal. In addition, as the time spent in one place increases, the number of images that are stored in the memory of that place will increase.

In the perception of the space, the time and the movement in the space are effective. As you spend time in space and move, there may be differences in perception, and it may be affected by human senses.

According to Appleyard (1970), the longer the time to spend in a space, developed images will be more integrative, detailed and systematic. In a recent study, Canter drew a map of London before and after a trip to London for the purpose of traveling and realized that maps were detailed in proportion to the amount of time spent (Canter, 1977).

**\*Perception field:** Everything the individual notices around at a given time. For example, the teacher who sees the students in the school's garden creates the teacher's perception field. This area of perception may be narrow or broad, for example, if the teacher has directed the attention of two students in the school garden, the perception area is narrow.

**\*Perception Base:** Individuals does not perceive the outside world as it is. Stimulants are interpreted in accordance with each other's opposite values, such as nice – ugly, good-bad, pleasant – unpleasant. These values, which are effective in human perception, are called the basis of perception.

**\*Depth Perception:** Three-dimensional perceptions of the object are called depth perception. This is caused by environmental factors and structural features of the eye.

**\*Perception integrity:** objects are perceived as a whole rather than as individual parts. Individuals perceive objects and events in the human environment as a whole, and then it becomes special and comes to the details.

### **2.3.1. Gestalt Theory**

The word Gestalt is interpreted as a meaningful whole, which means “*form, shape*” in German, and is composed of parts with dynamic connections, according to Levi and Arnheim, who studied the psychology of perception (Arnheim, 1954; Levi, 1974).

Gestalt theory is a theory that emerged in Germany in the early twentieth century. This theory was initiated by Max Wertheimer and developed by Kurt Koffka and Wolfgang Köhler. Since the beginning of the century, the word gestalt has been applied to a body of scientific principles obtained primarily from studies in sensory perception. The basic principle is that the whole is more than the sum of the parts. A body will not clearly define when analyzed piece by piece. That's why the accretion of isolated parts cannot achieve a whole (Arnheim, 1954; Gordon, 2004; Versteegen, 2005).

In this theory, while studying the body, it is emphasized that the body should be considered as a whole, because, according to this theory, what constitutes the body is not part of the whole. The ways in which these parts come together and the ways in how they come together are important (Goldstein, 2007).

Zengel (2008) agrees on this idea and mentioned this theory as;

Gestalt psychologists argue that the whole design is different from the sum of the parts that make it up, proving that all are more than the mathematical synthesis of parts (Zengel, 2008).

The difference between the parts of the whole and the whole itself has highlighted with Arnheim's (1954) words;

In the essay that gave gestalt theory its name, Christian von Ehrenfels pointed out that if each of twelve observers listened to one of the twelve tones of a melody, the sum of their experiences would not correspond to the experience of someone listening to the whole melody.... Because the mind is always functioning as a whole. All perceiving is also thinking all reasoning is also intuition, all observation is also invention (Arnheim, 1954).

In this theory, they claim that the information obtained through sensory organs is not sufficient to make sense of it and that the brain has completed it by interpreting it. It is the opinion that the correct perception should be considered as a whole, while the parts do not make any sense when taken separately. For example, when we see a moving cat, our eyes see an object that changes the way, but what our brain perceives is that it is a moving cat or for perceiving of a melody. Individuals do not perceive only notes while perceiving melody, but the relationship between the notes, the harmony or the example in figure 2, perceiving the face which is indicated by the small dots. When a person looks at this picture as a whole, he/ she indicates a woman face but when he/she analyze it piece by piece, he/she figure out it is several dots that create a woman face drawing( Arnheim,1954; Goldstein, 2007; Gordon, 2004; Levi, 1974).



Figure 2: The Perception of the Face Represented by Dots (Source: Goldstein, 2007)

### **2.3.2. Ecological/ Environmental Theories**

The dominant way perception study was conducted from the 1950s to the 1980s was by having stationary observers look at stimuli in a laboratory condition. Gibson's concept was that this traditional way of learning perception could not explain the perception experienced by moving observers, such as pilots landing an airplane or individuals riding a bicycle or walking down the road. For Gibson, the right strategy was to study how individuals perceive how they move through the environment. Individuals' movement through the environment was the starting point of the ecological approach to perception. The ecological approach concentrates on the study of moving

objects and on how their motion generates sensory data both to guide further movement and to help observers to understand the environment (Goldstein, 2007; Gordon, 2004).

Gibson's perception theory is based on the information and not sensation. The ecological approach of perception focuses on the environmental analysis. This ecological approach corresponds to specific information that is detected by the individuals (Goldstein, 2007; Gordon, 2004).

Information-based perception theories claim that perception is information-based, and that information is not formed by stimuli, past experiences or innate knowledge, but rather by the individual's abilities. Theories of information-based perception; was created by James Gibson (1979). For them, this theory is divided into two parts, literal and schematic. Their work has generally been based on visual perception because they have explained the object's qualitative properties and perceptions. And for them, mainly effective aspect of this theory is the theory of motion (Gibson, 1979).

Environmental theory of perception is related to how a person perceives the environment. It is related to individuals' evaluation and processing technique of environmental data obtained. Individuals can only base their evaluations on sensation (Goldstein, 2007; Verstegen, 2005).

Sensation-based perception theories are formed by the development of various theories by psychologists and physiologists, and these theories argue that perception is formed through sensations. It explains how data from the environment came together in the human brain. In this theory, we perceive stimuli coming from the environment with the help of our senses and we understand the information we have obtained with our senses and create them in our minds (Arnheim 1954; Goldstein, 2007; Levi, 1974; Verstegen, 2005).

Empiricism, Rationalism, Nativism, and Gestalt theories are theories that claim that perception is based on sensations. Lang argued that these theories integrate with perception through senses (Lang, 1987). Empiricism is the first theory to be discussed. According to Gordon (2004), empiricism claims that the mind has no role in the process of acquiring information and that everything is through the senses. He claims that the only source of information is the experiment, and according to this theory, the

information is only obtained through experiments and senses. John Locke, the father of this theory, says that there is nothing in the mind that does not perceive through senses (Gordon, 2004).

According to Lang, rationalism has been suggested that innate ideas are the inferences from the senses. Rationalism and nativism argue that knowledge will only occur through reason, namely thought. Plato, Socrates, Parmenides are the main representatives of this theory. According to them, nothing perceived by our senses is real, only a reflection. Real information can only be accessed through reason and knowledge. From Plato to Descartes, rationalism and nativity have been studied together because when we were born, all information was found in our minds (Lang, 1987).

### **2.3.3. Phenomenological Theories of Perception**

Other than the biological descriptions of spatial perception, a psychological description is possible to give by human beings. Phenomenal and perceptual space is a mental space with the center of the perceiving self, which is the domain of psychology, which exists in human beings consciousness. The self also guides its eyes to an object, turns its head, and grasps its hands. Those movements often have a quality which does not appear in biological descriptions: they are purposeful, intentional (Crone, 2003). Phenomenology as a philosophical approach focuses on the constructions and contents of intention, this is to mention how things appear human beings in the world; but the world, which is perceptible by the senses, does not belong only to human's emotional or mental state (Hale, 2017).

A human being sees a cyclist riding on the other side of the road and he/she does not think for a moment that a cyclist is just part of one's emotional life. The world with senses is subjectively conditioned, but not subjective. Nevertheless, it is helpful to understand that he/she sees cyclist not only as a scientific item located in physical space, reflecting rays of lights in their personal, mentally built and colored environment. In other words, perception is based on two fundamentals: objective space and the human's mental perception and actions. The mental composition and perception contain highly diverse data obtained from eyes, ears, sensory organs, and motor receptors but all this information from senses are not always connected with each other. For instance,

when he/she looks at the tires of the cyclist's bike, tires will not look the same size but when he/ she measure the tire's size with his/ her hands, it seems to be the same. This is just one example, but in countless situations, the spatial information of the different senses can vary. That's why, human need a psychological description, in other words, a phenomenological explanation (Crone, 2003).

A phenomenological method is a common approach in which an individual must describe what he/ she perceives or indicates when a specific perception exists. To describe what he/she perceives can be at a very basic level, for example, if he/she realizes some items are considered farther away, or if he/she has a perceptive value that we call "color," or if there are distinct taste characteristics, like bitter, sweet and sour. These are the common observations that human take them granted because they happen every day in a routine cycle but this is where the research of perception starts because these observations describe the fundamental characteristics that individuals are trying to explain (Goldstein, 2007).

The emphasis on phenomenological elements of perception, which were so crucial in the Gestalt method, continues to stimulate discussion among modern theorists. The theory of Gestalt was based on the numerous findings of the researcher. The Gestalt theorists strongly thought in the creative nature of perception and the tendency to find clear, meaningful and simple solutions. Emerging features of sensory interactions present a significant challenge for all future perception theories. For others who wish to create research on perceptual systems, a view of the Gestalt theorists to focus on strong and reliable impacts could be a lesson. Gestalt's weaknesses lie primarily in its theory and explanation approach. Sometimes the theorists of Gestalt collapsed for an explanation into the trap of inaccurate description. For the most part of the theory of Gestalt was not predictive. And when the Gestalt theorists tried some kind of explanation of the impacts they had found, they made an unfortunate choice of a brain model and an equally significant mistake over the chosen level of explanation (Gordon, 2004).

At this point, in two distinctive environments, human perception occurs. First one is the natural environment where perception has developed, includes surfaces and textural elements, solid objects, multisensory stimulation patterns, movement and etc. but there is another environment which, in terms of evolution that of human culture. In

this, there are languages and symbols, two-dimensional patterns representing three-dimensional things, machines that passively move us through space. It's no surprise that human beings can usually deal with this artificial environment: they had already created it. However, how perception interacts with the artifacts of their culture may vary considerably from how it deals with the natural world. For this reason, modern phenomenologists have produced the strongest suggestions for the inclusion of subjective experience in perception analyses. They emphasized that our perception of, assume a house transcends any limited point of view: the volume or solidity of the house, even if the only aspect that is visible in the front. From alternative points of view, he/she realizes what things would look like with the help of phenomenology. Phenomenological knowledge is essential and the transcendent functioning of the brain (Gordon, 2004; Verstegen, 2005).

Perception phenomenology is a typical phenomenon of everyday experience that is the result of on-going brain, body, and world interactions according to Merleau-Ponty. With an enduring and often inspiring evocation of the “*primordial encounter*” between the body and the everyday experiences, he described how senses are fundamental in corporate life and how the body acts as an important pivot between the inner and outer worlds of the social and cultural forces. In other words, an individual’s capacity to perceive a significant quality such as color, allows them to appear a feature of their environment. It is here that an organism begins to make sense of its existence and eventually emerge in a state of consciousness at the point of contact between bodily movement and environment (Hale, 2017).

Merleau-Ponty (1962) described the interrelation of the self with its environment by saying “*The world is inseparable from the subject, but a subject who is nothing but a project of the world*”.

The philosophy of Merleau-Ponty, which was established by the German philosopher Edmund Husserl and his student Martin Heidegger on the early 20th-century tradition of phenomenology, focused on the main fact that, human beings are inevitably embodied entities. For him, the body is the first tool of achieving the world but the body is not as a static object with its physical shape or anatomical structure rather the body as a set of options and opportunities for action. Perception is an act of the entire body is fundamental to world experience. For him, the sensory knowledge



provided by the body is effectively human being's primary data source: it is not a barrier but a connection to the spaces and to the environment. It is not a source of mistakenness and failure (Merleau-Ponty, 1962).

In Merleau-Ponty, the sensory qualities of light, sound, temperature, and materiality can be seen in terms of the primacy of the body in the perception of spaces as something like "*primordial language*", which is often only unconsciously perceived by constructing individuals on their world experiences. Perhaps these opportunities are best demonstrated in the structures of phenomenologically inspired designers such as Peter Zumthor and also Steven Holl. Architectural authors such as Juhanni Pallasma also attempted to emphasize the possibly be considered liberating the power of returning to the fundamental values of form, space, and materiality with help of phenomenological approach (Hale, 2017). Moreover, a remarkable work on the senses has taken place in a wide range of disciplines over the last few decades: from history and philosophy to geography and sociology, from law and medicine to literature and art criticism. Even so in literature, there are few studies that examined all senses as though sight, hearing, smell, taste, and touch and analyzed the interaction between them. However, senses interact with each other in different combinations and hierarchies. At the point when the senses are disregarded or when they are examined separately, all the interaction between them are lost (Howes, 2005).

Peter Zumthor emphasizes the importance of this interaction by saying "*...to experience architecture in a concrete way means to touch, see, hear and smell it*" (Zumthor, 2010). This phrase demonstrates that interaction between all senses has a decisive role for individual experiences and their perceptions because there will be meaningful understanding when all senses work together.

In the book of "*Encounters*" by Pallasma (2005) also support this relation with saying;

Every significant experience of architecture is multi-sensory.... space is measured by the ear, eye, nose, skin, tongue, skeleton and muscle. Maurice Merleau-Ponty emphasizes this simultaneity of experience and sensory interactions as follows: My perception is not a sum of visual, tactile and audible givens: I perceive in a total way with my whole being: I grasp a unique structure of things.....which speaks to all my senses at once (Pallasma, 2005).

With the help of all senses, individuals begin to define their environment. When they have enough stimuli from their sensory organs, the sensation begins to occur as catalog like touch, taste, smell, hearing, and vision (Ackerman, 1990).

The majority of the data that drives the human perceptual system is supplied by the sense of touch, hearing, vision, taste, and smell contribute to the process that generates a sensory environment of an individual as a whole (Pashler, 2002). Even though this system should be seen as a whole, this will make it easier to interpret the overall system in the examination and comprehension of each sensory perception method.

In the architectural production process and in the meaning of the space, a point of view has been developed that places the sense of sight in a position superior to other senses. This point of view is also referred to in the literature as “*eye-centric*” point of view. The central point of view is expressed in the international literature as “*vision through the eyes of the mind*” and “*vision without the body*” and it is concluded that vision is superior to all other senses and that it is a unique production of knowledge. However, this point of view has ignored the process of experience in space and the relationship between space and space through the body of the individual (Ackerman, 1990; Millar, 2008; Pallasma, 2005).

The physical relationship of the individual with space and the physical memory, movement and time that emerged as a result of this relationship was not taken into account. Therefore, the central point of view has started to be questioned and the perception of touch on the body and the space that is connected to it has become important. The main reason for this is that space can be perceived not only by seeing but also by body experiences. Juhanni Pallasma (2005) stated that it was necessary to experience space with the whole body in order to understand the architecture and that only the visual evaluation would be insufficient to perceive the whole (Pallasma, 2005).

For Zumthor; touch has dominancy oversight and like Pallasma, Zumthor highlighted the importance of touching overseeing in perception with saying; “.... *The perceptual world is guided by the touch, being more immediate and welcoming than the world guided by sight...*” (Zumthor, 2005).

The touch phenomenon, unlike the eye-centered view, is understood by the interaction of the individual with space physically during the experiences. This physical perception of the individual indicates that thinking and meaning of space are not only central to the eye. Although spatial perception is considered to be visual, this belief is not true because visual stimuli are not more dominant in spatial perception. In order for the perception of space to take place correctly, all sensory organs (vision, touch, hearing, smell, taste, and kinesthetic) must interact with the environment. Studies in the literature show that spatial perception is an accurate perception when the stimuli from the outside world are detected by all sense systems (Cowan, 2006).

To think the senses work of each other and to assume that seeing is superior to other senses means to separate the sense of sight from the body, which is not an accurate approach. Only the sense of sight cannot provide a complete and accurate perception without the body. Howes (2005) in his book of *“Empire of the Senses”* put in the words of a Russian writer for emphasizing this situation;

In reality, all five senses can be reduced to one—the sense of touch. The tongue and palate sense the food; the ear, sound waves; the nose, emanations; the eyes, rays of light. That is why in all textbooks the sense of touch is always mentioned first. It means to ascertain, to perceive, by the body, hand or fingers (Howes, 2005).

Studies have shown that touch sensation is the first developing and differentiating sensation among all types of senses. In Montague's (1978) *“Touching: The Human Signification of The Skin”*, as stated in her work, even the corneal layer, which is transparent, is the specialization of the skin.

[The skin] is the oldest and the most sensitive of our organs, our first medium of communication, and our most efficient protector ... Even the transparent cornea of the eye is overlain by a layer of modified skin. Touch is the parent of our eyes, ears, nose, and mouth. It is the sense which became differentiated into the others, a fact that seems to be recognized in the age-old evaluation of touch as “the mother of the senses (Montagu, 1978).

For Ackerman (1990), touch is the oldest and the most urgent sense because of the relationship of trust connected with physical closeness. Unlike the feeling of confidence given by remote viewing, the sense of touch is to accept the contact of a foreign object or body with his/her own body. The sense of touch teaches the difference between our own body and others. Like Pallasma mentioned before touch integrates human to the environment while vision separates human from the environment (Pallasma, 2005).

Touch sensation is indispensable for the living body. Even newborn babies who have not yet opened their eyes will approach their mothers, and the feeding instinct is the most fundamental example of the importance of the body's touch. Mothers and newborns do an enormous amount of touching. Being touched by mother is the memory of love which stays with human life long (Ackerman, 1990).

Touch filled our memories with details because it clarifies and teaches us we live in a three-dimensional world. Even the fact that the desire to touch the surfaces in the process of perception is almost reflexive is because the individual wants to connect with space through the body. The signs that say "please do not touch" are another example of this reflex because the superiority of the eye in recognizing objects from a far distance is balanced by its inferiority in seeing those very close (Ackerman, 1990; Goldstein, 2007). The commonly visual experience is illusory and fooled perception of space or environment. The sense of appreciation is mainly about the sense of touch because human seeks confirmation by actual physical contact that's why touching has an importance on perception. Touching is the short way of learning of depth and contour of spaces when we compare with eyes (Jay, 1993).

However, touching is not just a physical activity. Touching can also occur without physical contact. Pallasma (2005) says that;

We are not usually aware that an unconscious element of touch is unavoidably concealed in vision; as we look, the eye touches, and before we even see an object we have already touched it (Pallasma, 2005).

In other words, the perception of the environment or object by the body is also a kind of touching because, during the perception process, the body comes into contact with the environment.

Maurice Merleau-Ponty (1962) said, "*Seeing is touching objects with gaze...*" because all senses are extensions of the sense of touch. The specialization of the skin creates senses. Skin is touching the environment by forming other sensory organs, in other words touching the environment so all sensory experiences are related to touch and tactility (Pallasma, 2005).

Touching the space is integrating the space over the body and perceiving it exactly. Going downstairs while holding the iron stair railings can give the individual a sense of security but also this these handrails' heat will increase with the body

temperature of the individual. While walking on wooden parks, the creaking of the parks will leave a mark on the space. The scents of the body and the materials used in the space will be evidence of the past there. All these experiences are examples of how the body touches the place. During these experiences, there is no limit between space and body. Space touches the individual, the individual becomes part of the space, and space is perceived as a whole with the individual.

According to Charles Moore and Robert Yudell in the book of *Body, Memory, and Architecture* (1978)

.....We have been observing that the human body, which is our most fundamental three dimensional possession, has not itself been a central concern in the understanding of architectural form; that architecture, to the extent that it is considered an art, is characterized in its design stages as an abstract visual art and not as a body-centered art.... We believe that the most essential and memorable sense of three-dimensionality originates in the body experience and that this sense may constitute a basis for understanding the spatial feeling in our experience of buildings.

.....The interplay between the world of our bodies and the world of our dwelling places is always in flux. We make places that are an expression of our haptic experiences even as these experiences are generated by the places we have already created. Whether we are conscious or innocent of this process, our bodies and our movements are in constant dialogue with our buildings (Moore &Yudell, 1978).

Merleau-Ponty (1962) makes the human body the center of the experiential world.

“Our own body is in the world as the heart is in the organism: it keeps the visible spectacle constantly alive, it breathes life into it and sustains it inwardly, and with it forms a system.....sensory experience is unstable and alien to natural perception, which we achieve with our whole body all at once, and which opens on a world of interacting senses” (Merleau-Ponty, 1962).

Although for Pallasma (2005), not the whole body but its skin and hands are in the center of perception and the experiential world in respect to touch experience. For him;

‘[H]ands are a complicated organism, a delta in which life from the most distant sources flows together surging into the great current of action.... The skin reads the texture, weight, density, and temperature of matter. The surface of an old object polished to perfection by the tool of the craftsman and the assiduous hands of its users seduce the stroking of the hand. It is pleasurable to press a door handle shining from the thousands of hands that have entered the door before us... (Pallasma, 2005).

Touching the place means that the individual experiences it and space transmit their own characteristics to the individual. Each place is unique, as individuals, because the texture, sound, heat, and smell of each space are different. These differences in space, that is, the touching of space, create differences in the perception of the

individual. The emergence of the effects of tactility on spatial experience is different from that of the eye centered phenomena. However, the effects of touch on spatial experience can also be examined through the atmosphere, material, and sensation (Zumthor, 2006).

There is a strong relationship between body, skin, and atmosphere. Especially the atmosphere of houses because the atmosphere of houses is like skin in terms of experience the warmth. The experience of the house is also an experience of warmth. A sense of homecoming or experiencing a familiar space's atmosphere is always stronger than a light in the window of a house (Holl, 2006).

The atmosphere of the place is the most comprehensive sense of the spatial perception that passes from space to individual. The relationships established by the individual with space are influenced by the atmosphere of the place, and inevitably the individual creates feelings and memories based on his / her past experiences. It is possible to interpret the atmosphere of the space as an involuntary recall or a feeling of being worn out in the materials of the space during the perception of the space. Because the atmosphere of the space is affected by many factors, such as the ratio of light entering the place, the smell, the sound and the materials found in the space.

Experiencing the atmosphere of space much more than perceives space with sensory stimuli. Like Rasmussen (1959) mentioned;

It is not enough to see architecture; you must experience it. You must observe how it was designed for a special purpose and how it was attuned to the entire concept and rhythm of a specific era. You must dwell in the rooms, feel how they close about you and observe how you are naturally led from one to the other. You must be aware of the textural effects, discover why just those colors were used, how the choice depended on the orientation of the rooms in relation to windows and the sun. Two apartments, one above the other, with rooms of exactly the same dimensions and with the same openings, can be entirely different simply because of curtains, wallpaper, and furniture. You must experience the great difference acoustics make in your conception of space: the way sound acts in an enormous cathedral, with its echoes and long-toned reverberations, as compared to a small paneled room well-padded with hangings, rugs, and cushions (Rasmussen, 1959).

The experiencing space or atmosphere happens with all senses, they support each other. Its materials, visual element or echoes in the space helps individual in his/her perceiving process because all these sensory elements add different characteristics to an environment. The acoustic, the echoes and the sound in that space can vary individual's perception.

Sound is defined as pressure waves in the air being diffused, and during this diffusion objects that create sound is needed. Every space is a sound generator and the surfaces which the sound hits during diffusion are different. Also, every space's sound can be different. Sounds play a crucial role in the perception, differ in each space according to the size of the space and characteristics of the materials used in (Blesser, 2006; Cowan, 2006).

Even the sound cannot be seen; the noise has great power over spatial perception and experiences with its impact on the characteristic of spaces. *"Sound is invisible but has the power to change the space characteristics we occupy"* (Schulz-Dornburg, 2000).

Sound helps human to interpret and communicate with the environment because even it is invisible, on earth almost everything can make a sound even architecture (Ackerman, 1990; Blesser, 2006). Therefore it's not right to ignore the sound or sensory stimuli just because we can't see it physically.

Can architecture be heard? Most people would probably say that as architecture does not produce sound, it cannot be heard. But neither does it radiate light and yet it can be seen. We see the light it reflects and thereby gain an impression of form and material. In the same way, we hear the sounds it reflects and they, too, give us an impression of form and material. Differently shaped rooms and different materials reverberate differently (Rasmussen, 1959).

Sound measures the space and makes its scale apprehensible. It means that we can experience and perceive space with the help of sound. In some spaces sound echoes, in others, it does not. Some spaces have good acoustics features arouses pleasant sentiments whereas poor acoustics arouses unpleasant sentiments in an individual because the sound incorporates human with its environments. It creates an experience of interiority and connection (Pallasma, 2005).

The sound of a space and the perception of it differ for different individuals. However, sounds in a space help an individual perceive a space auditory. The creaking sound of hardwood in an old house or the sound emitted when walking on the stones of a patio give clues about space and help the individual perceive the space (Rasmussen, 1959).

Sound provides information about space and at the same time, it enriches the sensory experience. It provides a three-dimensional atmosphere (Blesser, 2006; Goldstein, 2007). For example; the echo of a doorbell can provide information about the

interior of the house. The introduction to a house by a doorbell or doorknob links an individual up with both auditory and tactile senses. Before visual perception of a house, the echo of a doorbell in the house offers hidden knowledge about the interior of the place. Sound of a doorbell of a house without furniture or a deeper sound of a doorbell reflected from furniture give information about that house's interior (Bachelard, 1969).

The sounds of the spaces or the elements of the sense of touch are not sufficient to detect a place. It is necessary to reinforce perception with other senses. Smell and taste, for example, are senses that will increase the effect of perception because they are more valid and long-lasting in an individual's memory.

In the modern city, the smell is an important indicator. The smell is a stimulant that can evoke various feelings in individuals and leave an impression on them (Drobnick, 2006; Pashler, 2002). The human needs only eight molecules of a substance to trigger an impulse of smell and with the help of these eight molecules human can detect more than 10,000 different odors. Individuals have a sophisticated database of scents in their memory and the most persistent memory of space is generally its smell (Pallasma, 2005).

Forgotten events or memories can resurface with the scents linked to them, therefore a scent is an effective stimulant. We may miss smelling some scents as they strongly linger in our minds whereas some unpleasant odors may disturb us. The magically beautiful scent coming from a bakery is a positive example. On the other hand, some negative stimulant effect examples of the smell are garbage trucks or hospitals with intensive disinfectant odors that will cause you to feel uncomfortable as you pass by. Each space has its distinct scent based on the materials used, events ongoing and individuals in that space. Therefore, almost every individual has an olfactory memory of spaces which arouse different feelings (Ackerman, 1990; Drobnick, 2006).

A smell can help retinal memory for remembering a forgotten space or memory. *“The nostrils awake a forgotten image and fall into a vivid dream. The nose makes the eyes to remember”* (Pallasma, 2005). Memory scents are more permanent and evoke the parameters of a person. And even a person forgets about a visual memory of a space, smelling helps them to recall and remember.



Like Bachelard writes; “*I alone in my memories of another century, can open the deep cupboard that still retains for me alone that unique odor ...*” (Bachelard, 1969).

Goldstein (2007) gives reference to Kushner in the book of “*Sensation and Perception*” for emphasizing the importance of smell.

We have five senses, but only two that go beyond the boundaries of ourselves. When you look at someone, it’s just bouncing light, or when you hear them, it’s just sound waves, vibrating air, or touch is just nerve endings tingling. Know what smell is? ... It’s made up of the molecules of what you’re smelling (Kushner, 1993, p. 17) (Goldstein, 2007).

Scents can be unexpected, momentary and fleeting. They are a combination of molecules. In space, they can make a difference by changing human’s perception and the experience of the space. The nose, which is one of our main sensory organs, is not an organ that can be shut down on demand. It is a mute and continuously working sense.

“Smell is the mute sense, the one without words. .... We see only when there is light enough, taste only when we put things into our mouths, touch only when we make contact with someone or something and hear only sounds that are loud enough. But we smell always and with every breath. Cover your eyes and you will stop seeing, cover your ears and you will stop hearing, but if you cover your nose and try to stop smelling, you will die...” (Ackerman, 1990).

In addition, the information stored in memory for the longest time is the data obtained through olfactory perception. Every individual’s memory stores at least one space-based on smell. This information causes differences in how space is perceived by the individual (Cowan, 2006; Drobnick, 2006).

When we use words such as smoky, sulfurous, floral, fruity, sweet, we are describing smells in terms of other things (smoke, sulfur, flowers, fruit, and sugar). Smells are our dearest kin, but we cannot remember their names. Instead, we tend to describe how they make us feel. Something smells "disgusting" "intoxicating," "sickening," "pleasurable," "delightful," "pulse-revving," "hypnotic," or "revolting" (Ackerman, 1990).

For this reason, olfactory perception is at least as important as other senses in the perception of a space. They are the most direct senses in all senses because we name them through main objects, and they do not need any interpretation. Their effects are immediate, like disgust with the smell of garbage. Individuals can forget what they see or hear but they remember odors (Goldstein, 2007).

For example; Marcel Proust’s description in the book of “*Remembrance of Things Past*” after eating madeleine cookie:

The sight of the little madeleine had recalled nothing to my mind before I tasted it . . . as soon as I had recognized the taste of the piece of madeleine soaked in her decoction of lime-blossom which my aunt used to give me . . . immediately the old grey house upon the street, where her room was, rose up like a stage set to attach itself to the little pavilion opening on to the garden which had been built out behind it for my parents . . . and with the house the . . . the square where I used to be sent before lunch, the streets along which I used to run errands, the country roads we took when it was fine (Goldstein, 2007).

Like in Proust's description, everybody has a similar experience that a memory unlocked with an odor. Odors and memory have a relationship between each other, and an odor can bring back someone in time like in the example of madeleine cookie. So, we can say that odors not only affect how people perceive the world or environment at that moment, they also affect how they relate the world or environment with their memories (Howes, 2005).

Besides, it also creates a much stronger perception when the sense of smell is supported through the sense of taste. Stimulants of these senses are much longer-lasting in individual memory. The individual may forget the surface he/she touches or the music he/she listens to, but he/she does not forget a taste or smell.

Taste perception is the sense that works together with other senses especially with the sense of smell. With the help of stimulation receptors in the tongue, taste perception can occur, but it is the weakest sense by itself regarding space's perception. Contrary to other senses it does not cause a perceptual process in a space by itself, therefore it is not mentioned frequently regarding space's perception. However, it is important because a complete perception can be formed when all senses are working together, and in space, the sense of taste works together with other senses (Ackerman, 1990; Cowan, 2006; Goldstein, 2007).

When individuals enter a space, they do not think about perceiving the taste of it. However, a sense of taste is formed in the mind about that space through ascent in that space which affects the olfactory perception or color which affects the sense of sight.

It can easily be said that in addition to taste perception, olfactory perception also works together with color, in other words, visual elements. An example to this situation is when an individual sees the package of food; a perception about its taste gets recalled via the individual's past experiences such as thinking a pink ice cream package contains strawberry ice cream or as Rasmussen (1959) mentioned below there are some certain colors which work together with memories.

... But regardless of how cigars are packed, we cannot imagine them in pink or mauve containers. We think of these colors more in connection with soap and perfumes, and they recall odors which are inimical to tobacco. We associate certain colors with masculine or feminine attributes. Thus, "tobacco" colors are suitable for the study, "perfumed" ones for the boudoir... (Rasmussen, 1959).

Or when someone enters a bakery, the scent coming from the bakery reminds him/her the taste of food that he/she had eaten in the past just like in Proust's madeleine cookie. Wansink (2010) emphasizes this by stating "*Taste stays in our minds as it stays in our mouths.*"

Smelling an odor and its taste associated with past experiences and memories. These experiences and memories in mind have the potential to return to emotional reactions. They can create good and bad effects. If a taste is good, they often create pleasant emotions on individuals (Corbin, 1988).

The first thing a human being taste is the milk from mother's breast and it is the first pleasant experience of an individual. This experience accompanied by love, warmth, and sense of security. It means a first intense feeling of pleasure, first emotional experience and first memories which involves childhood. So, the taste is an intimate sense, the human cannot taste things from a distance. This perception depends on touch in terms of both the contact of the food with the tongue, hand, mouth and even eyes (Ackerman, 1990). They become more potent when all of these sensory organs are together. They all influence each other, even if not noticed. For example, even if the sense of tasting cannot be reconciled with the sense of seeing in the first place, the individual can imagine the taste of the food he/she sees based on his/her past experiences. Given all these experiences it is a fact that the most complex of all senses is the sense of sight, which is affected by the most elements.

The last human sense to fully develop was vision and its complexity is always a hard situation for progressive evolutionary theories. It remains also the last senses in the fetus to evolve, which only becomes true to survival sometime after the birth (Jay, 1993). Sight is significant, like all other sensations for the body.

Seventy percent of the sensory receptors of the body cluster in the eyes, and with help of eyes, we can analyze and realize the world so we can say that vision is the main device of thinking and mind (Ackerman, 1990; Arnheim, 2009).

The sight has been considered as the royal and the dominant senses in Western culture. According to Plato, vision is the greatest gift of human beings and vision need to be considered as the “mind's eye” (Pallasma, 2005).

The sense of sight as the dominant sense is either a cultural result or a result of the increase of arts which close to the visual field such as printings, maps, written texts and painting that come with the Renaissance (Cowan, 2006; Pallasma, 2005).

Peter Sloterdijk summarizes the impact of vision;

.... During the Renaissance, the five senses were understood to form a hierarchical system from the highest sense of vision down to touch. The Renaissance system of the senses was related with the image of the cosmic body; the vision was correlated to fire and light, hearing to air, smell to vapor, taste to water, and touch to earth (Pallasma, 2005).

However, Pallasma (2005) mentioned this separation differently, for him, all senses have an interaction with the environment in integrity and only sight separates human from the environment while other senses unite; “*The sight separates us from the world, while the rest of the senses join him*” (Pallasma, 2005)

This separation is due to the fact that the eye is isolated from the environment it is the organ of distance, but all other senses have interactions, nearness, affection, and intimacy with the environment. To taste or touch, the human need to be close to its object. To smell or hear again nearness and interactions has importance but for vision, there is no need for closeness, intimacy or interaction. A human can visually perceive from a distance without making any contact (Ackerman, 1990; Pallasma, 2005).

According to Güngör, for visually perceive; light, a healthy eye and a normal functioning visual center in the brain are required (Güngör, 2005). This three have importance because unlike human think visual perception happens in the brain, not just in the eyes. A human can remember scenes from earlier years with their memories and mind (Ackerman, 1990). Visual perception, therefore, does not only mean visual ability. It means that visual stimulation is interpreted in the mind. Seeing a cat is an act of our sense of sight, but knowing it is a cat, is the result of a series of actions in our minds (Goldstein, 2007).

In order for visual perception to occur, the individual has to be psychologically prepared to look and see. Here; what the individual wants to see, what he needs to see through the image confusion surrounding him is important in the process of visual perception (Inceoglu, 2004).

Perception and vision are realized in a process. Visual perception is made up of neural processes such as recognition, attention, and meaning. Visual perception is generated through stimulants. Factors such as past experiences and cultural differences can be effective in the realization of this process. For these reasons, it is a process that changes according to the individual, so the human experience is important in this process (Goldstein, 2007).

The most useful and common interaction between perception and memory takes place during the recognition of what is seen. The visual knowledge gained in the past not only helps to recognize the nature of an object or action in the field of view but also determines the existing object in the system of things that make up our entire worldview (Arnheim, 2009).

Other senses can also stimulate memories and feelings, but the eyes are great at perceiving. A visual image, for example, a photo can remind a war, a tragedy or a happy memory. One gesture can symbolize a feeling but without light can we see or remember all of these? The answer is no. The light has importance, everything becomes noticeable by light.

### **2.3.3.1. Light**

Light is one of the factors affecting visual perception. Light is an important element that enables the perception of the spaces, the forms, color, texture, objects and more (Ackerman, 1990; Arnheim, 1954; Millar, 2008; Rasmussen, 1959; Zouni, 1985; Zumthor, 2006).

While Güngör (2005) emphasizing the importance of light he said that the fundamental elements of visual perception are light, eye and brain. Lack of one of them prevents this realization from happening. Although the eye and brain are stable elements but the light is a variable element. Light's intensity, inclination, and color can change. Because of this change, differences arise in the appearance of objects and structures (Güngör, 2005).

The use of light at different angles, intensities or colors creates different effects on the space. The importance of the light factor in the perception of the space is emphasized by Eldem (1991) with saying "*perception begins with a vision, vision begins with light...*" because light enables the objects and space to be visible and emphasizes the shape and texture. The applied light can change the perception of the space completely by causing shade and shadow according to different shadow lengths.

Light can conceal and reveal the features of the space (Rasmussen, 1959; Zumthor, 2006).

Franz Fueg (1980) emphasizes the importance of light and shadow in architecture;

Perception of architecture takes place with visual and hearing senses and also with touch and smell senses. Man is the factor of architecture. First of all, architecture reveals itself on the building surfaces and in the spaces formed by them. Architecture reveals itself in mass and spaces and in the spaces formed by them. Architecture, self-mass and spaces and their dimensions, proportions, light games, rhythm, colors, structure elements show itself in connection and separation. Architecture is a plastic formation that has a different effect depending on the viewer's location and light shadow conditions (Fueg, 1980).

The light's location and condition of shadows allow the perception of depth. With the help of light, a human can perceive a space three dimensional with the advantage of depth factor. Also, with the help of light, depth can create different perceptual properties of spaces, and it shows these properties differently such as larger or smaller rooms. Individuals perceive the space larger while it is small or spacious while it is flattened (Rasmussen, 1959). That's why it is a truism to say, light has different effects on objects, spaces and space's atmosphere.

To know where an object is, we need to know its distance or depth. Although it seems easy to perceive the depth of an object, it is an important gain in terms of the physical structure of our eyes (Atkinson and the other, 2006).

With the help of light and depth, the form will be visible. The form is one of the elements that have the potential of changing the qualities of spaces and has an effect on architecture. In a situation where different forms are used in the same places; it can be seen that space has changed in terms of visual perception and different meanings are installed on it. It affects our spatial perception, as much as depth, shade, and light (Arnheim, 1954; Rasmussen, 1959; Zumthor, 2006).

Eyes were created to see the forms in light; shadows and light reveal the forms; cubes, cones, cylinders, and pyramids are very important geometric forms that light reveals (Corbusier, 2010). In other words, light makes the object visible and show its form.

*"Form is not something we work on,"* said Zumthor (2006) because with help of light human choose, combine and understand the materials, anatomies, structures. With light, the form will be visible with its depth, form, color, and texture (Zumthor, 2006) but without light, it is not possible to imagine any visuality. As Sir Francis Bacon noted,

*“All colors will agree in the dark” (Ackerman, 1990).* In dark, it is not possible to talk on colors or any visual appearance because it is not possible to visualize the environment or objects.

### **2.3.3.1. Color**

Colors are one of the factors that directly affect our visual perception. They are perceived and shaped by the presence of light. As they show themselves in the true light, they change according to light intensity and angle. Colors make sense for us to see and perceive the space and they are always the one being reflected (Ackerman, 1990; Arnheim, 1954; Zouni, 1985).

To define the color; Hasol (2010) stated that *“each of the senses that occur in the eye, according to the nature of the reflected rays by the hitting the objects”*. Light and color are the inexhaustible duos working together.

Color preferences vary according to many factors. Even if the color is the same, the meaning of it may be different. Therefore, colors have become the subject of research in many different areas. In physics, color is examined through its relationship with light, and in chemistry, it is studied through color pigments in paint. In psychology, it is examined by its effects on human beings. In architecture, the differences in spatial perception and the atmosphere of the created spaces were examined (Goldstein, 2007; Howes, 2005).

Colors have psychological and physiological effects on people. Some colors make us feel comfortable but some of them make us feel nervous. At the same time, color perception can vary from person to person, culture to culture, so it is not possible to talk to clear data when examining the effects of colors on individuals. While colors affect the tastes of individuals, they are influenced by many factors such as gender, age, culture, traditions, country, the fashion of the period, and past experiences. Colors can shape the emotional states of individuals in the psychological sense as positive or negative. They can create a very powerful spiritual effect on an individual such as sadness, vitality, joy, stagnation, pessimism, excitement and appetite. For example, while the effect of hot colors on individuals is stimulating, cold colors are calming (Millar, 2008).

In history, the same color can play different roles and meanings in different countries or cultures. In one country, while color can symbolize sadness and another may represent joy. In addition, due to some events, the meanings of colors have changed over time. For instance, yellow was a sacred color in ancient China, symbolizing the power of pre-Christian orphans, because yellow looked like gold. At the beginning of Christianity, this color was perceived as downgrading. Green, found in abundance in nature, is the symbol of life, fertility and vitality-the power of life. The idolaters used green in ceremonies and therefore the Christians banned the use of green. According to Muslims, green is associated with holiness and religiosity (Kalinlar, 2001).

However, seeing colors with the use of light and depth are not sufficient and enough for a complete understanding of visual perception. In relation to colors, for a total understanding of the environment and for increasing the impact of visual perception, textures have significance. As long as this importance, with help of light usage a color or a surface can vary according to its texture.

Rasmussen (1959) said that for emphasizing the importance of textures;

...It may not be surprising that we can see such differences with the naked eye but it is certainly remarkable that, without touching the materials, we are aware of the essential difference between such things as fired clay, crystalline stone, and concrete....(Rasmussen, 1959)

For understanding the difference without touching the surfaces, the surfaces' textures play a great role. It makes the surface readable and understandable (Rasmussen, 1959). Textures are efficient in the spatial atmosphere and individuals experiences.

### **2.3.3.2. Texture**

Textures describe the surfaces and give structural information about the surfaces that they describe. They allow a surface to be perceived by seeing or touching about its roughness and softness. In order to detect the textures, to have information about the surfaces in which they are located, besides the visual sense, there is also a need for the sense of touch. Because the surface that looks soft can be hard, the surface that looks hard can be soft. Materials with weak textural effects can be enhanced and improved with depth, while well-qualified materials can give a better effect on smooth surfaces without depth or decoration. That is why it is not enough to detect the texture only with the sense of sight (Pallasma, 2005; Rasmussen, 1959).



While visually perceiving textures, it is not easy to distinguish between the properties and qualities of that surface. For this reason, it is more useful to touch the rough structure to distinguish the textures and detect them by feeling textures (Ackerman, 1990).

The textures that we perceive by touching, feeling and we can distinguish from the roughness of our hands are called “natural, real” textures, while the textures that are perceived only visually are called "artificial" textures. Natural textures are the textures that are perceived when they are touched and supported by individual vision. The reason they are called natural and real is that they exist in nature that they are an imitation of nature and their form does not change according to senses (Millar, 2008).

Many researchers have used the term texture to describe certain qualities related to the visual perception of a surface and have only considered texture as a visual phenomenon. However, since natural texture can be perceived as both visual and tactile, as mentioned earlier, both forms of perception result in an experience together. Even if the natural texture is only perceived visually, the tactile nature of the surface is formed as a visual and tactile impression as a result of the memories of previous tactile experiences affecting perception in the mind (Aytuğ, 1987).

In other words, natural textures are textures that can be proven by the reality of perception. For example, when we look at an object from a distance, we cannot clearly distinguish whether the textures on the object are tactile or visual textures. Not being in contact with the object with just looking it from a distance can produce misleading results but when individuals contact with the object, the perception of the surface of the object will be an integrated perception. This contact allows us to learn about the tactile properties of that texture on the surface of the object and to experience the object (Pallasma, 2005, Zumthor, 2006, Zumthor, 2010).

The use of textures in the interior spaces also creates different effects on the surfaces. Textures can show spaces larger, flattened or longer than they are. For example, with the usage of textures a high-ceilinged space can be a lower space or long space can be a shorter space. This feature of natural textures helps to bring the space to the desired feature with the manipulation of visual perception with simple visual tricks (Rasmussen, 1959).

Like Hall (1966) mentioned; F. L. L. Wright has given importance to texture usage in his designs. He has highlighted the textural properties of the materials and has even used the materials which it considers to be inadequate as textures by artificially texturing them. By doing this, Wright aimed at people to touch their fingers in his

designs. He wanted people to meet the surfaces of buildings to enhance the space experience (Hall, 1966).

Artificial textures are the textures that can perceive only visually. Although the individual can perceive this texture as real, actually it is only a surface that applied texture effect and these surfaces cannot be felt when touched by hand. For example, usage of wallpaper on the interior space surfaces which has given a bark texture (Millar, 2008).

In the perception of artificial textures, light and roughness on the surface can detect that texture differently. It can create different shade and shadows and make it feel as if the qualities of that surface are different. Since it is a texture, it can be perceived as hard, light, rough, and heavy. This is related to the direction and intensity of light. However, the difference between these textures and the natural textures is at this point. In artificial texture, the shadow effect may be minimal or may not be, but in natural texture, there will definitely be a shade and shadow effect. Artificial textures do not have texture properties such as real textures; the feeling that occurs when you touch or want to be perceived by hand is not the feeling of the texture, it is the feeling of the surface. For this reason, such textures are the imitations of natural textures and they are not real. Even they are not real and imitation of natural elements, both natural and artificial textures play crucial roles in the atmosphere of spaces and environment with the help of light, shade, shadow, and color. They can easily change the space both in positive and in a negative way and also they have the potential to change the individual's experiences and memories in that space.

#### **2.4. On Experiences, Memory, and Imagery**

Experiences, memories, and imageries have different effects on spatial perception. Even their effects and meanings are different, they contribute to each other and work as a whole while an individual perceives his/ her environment because all of them use environmental stimulus obtained from senses.

### 2.4.1. Experience

The experience of the environment always involves several senses. A particular smell or music can make us re-enter a space which completely forgotten by the retinal memory. In other words, the nose can make the eyes remember. In fact, this is actually true for all of the sensory organs because, with help of sensory organs, the body knows and remembers the memories, the body can imagine past experiences (Pallasma, 2005).

Like Bacheard (1958) mentioned, memory and imagination have a strong relation;

I alone in my memories of another century can open the deep cupboard that still retains for me alone that unique odor, the odor of raisins, drying on a wicker tray. The odor of raisins! It is an odor that is beyond description, one that it takes a lot of imagination to smell (Bacheard, 1958).

An embodied memory plays a significant role in remembering a space or environment with the help of stimuli because we transfer all bodily experiences to our memories. The places we have visited before, grownup places or recognized places will be a part of bodily experiences and integrated with self-identity (Goldstein, 2007; Millar, 2008).

Body and its experiences play an important role in personal memories and self-identity because the body is the main tool for perception and self-identity comprises what a human being perceives from memories and experiences.

...I confront the city with my body; my legs measure the length of the arcade and the width of the square; my gaze unconsciously projects my body onto the facade of the cathedral, where it roams over the moldings and contours, sensing the size of recesses and projections; my bodyweight meets the mass of the cathedral door, and my hand grasps the door pull as I enter the dark void behind. I experience myself in the city and the city exists through my embodied experience. The city and my body supplement and define each other. I dwell in the city and the city dwells in me.... (Pallasma, 2005).

Spaces that experience bodily have a strong impact on human perception because it has a role in self-identity such as childhood houses. They are directly affected by personal backgrounds and experiences (Bacheard, 1958).

For our house is our corner of the world.....It is our first universe, a real cosmos in every sense of the work. The house is one of the greatest powers of integration for the thoughts, memories, and dreams of mankind... (Bacheard, 1958).

House means the first experience of a person; it is the first universe of self because it starts to shape human's past, present, and future from the moment, he/she begin to live in it. In the childhood house, the first experiences of the individual begin

here. In the cellar, the attic or the rooms of this house are the first game places and contain first experiences. Climbing the stairs is first learned in this house. Pressing the doorbell and echoing the sound inside the house are experienced in this house. For these reasons, these houses which are experienced before and primarily; create the oldest, detailed and lasting memories for individuals (Bacheard, 1958; Pallasma, 2005).

Like Pallasma (2005) said in the book of “Encounters”;

I cannot bring to mind a single window or door from my own childhood as such, but I can sit down at the windows of my many memories and look out at a courtyard ..... recognize there the dark warmth and special smell of the rooms ....I am not able to recall any longer the exact image of my grandfather’s table, but I can still imagine myself sitting next to it.... (Pallasma, 2005).

### **2.4.2. Memory**

Perception of space is given meaning by space’s physical characteristics and the individual’s memories about that space, his past experiences, in other words, his whole life’s influence. The perception of space by the individual is linked to the individual’s social and psychological connotations, and this connection causes each individual’s perception of the same space to be different. As social and psychological connotations differ in every individual, they cause the imagery in the individual’s memory to be different. The individual’s process of giving meaning to space creates a difference in the process of getting informed about and evaluating the space. The process of perceiving the space can be as diversified as the number of individuals assessing the space because every individual’s memory and the contents of their memory is different from each other’s (Goldstein, 2007).

There is another process which works sequentially with senses while individuals’ senses play a major role during the perception process of the space. That is the cognitive perception process helped by the knowledge accumulated in the memory of the individual. During this process, the individual may relive and perceive the space using the remnants of the knowledge in his memory, and he may use his past experiences. When the individual perceives a new space, he/ she compare that space with the previous knowledge in his/ her memory and reestablish the space in his/her memory like in his/ her childhood house. Therefore, like the time the individual spends in the space increases, the amount and quality of the data he is going to record in his

memory about the space are also going to increase (Bachelard, 1969; Goldstein, 2007; Groh, 2014).

According to Oxford English Dictionary memory is;

1. Power of keeping facts in the conscious mind and of being able to call them back at will; preservation of past experience for future use
2. Something that is remembered; something from the past stored in (Oxford English Dictionary, 1989).

Once space is perceived by the individual, it is stored and kept in the individual's memory; the information about the perceived space is transmitted to the brain and being perceived by brain means interpreting the perceived knowledge through past experiences. Permanent memory of a space is explained in Özak's statement as throughout life, connecting and recording to memory the sensations about a space, perceptions, learning, experiences and recollections not only with their own components but also the phenomenon inside them, with the characteristics of the space and life, in other words with its context. Which can be found in his work called "*Bellek ve Mimarlık İlişkisi Kalıcı Bellekte Mekansal Öğeler*". According to them, permanent memory of space happens through three steps; sensory phase of the space, perception of the space, and coding the space into memory (Özak, 2008).

The sensory phase of the space is the first step of permanent memory, and external physical stimuli are important during this phase. Data such as color, texture, shape, sound, scent, image, light define the physical stimuli of the space with the assistance of senses such as auditory, tactile and olfactory. They help the individuals while he/she perceives the space. In other words, an individual's sensory organs and physical stimuli in space work together, in order to make the space perceivable (Groh, 2014; Özak, 2008) (Figure 3).

The interaction of physical stimuli and senses affects cognitive and mental processes of the perceptual process. Physical stimuli of the space, color, texture, sound, scents and the variety of these stimuli are perceived by the help of various senses, but during this process, every individual makes a different evaluation and reaches a different result. The reason behind the differences in individuals' evaluations and perceptions is the effect of different parameters on perception such as gender, social

structure, family values, cultural influences, age, personal preferences, physical or environmental changes (Goldstein, 2007; Groh, 2014).

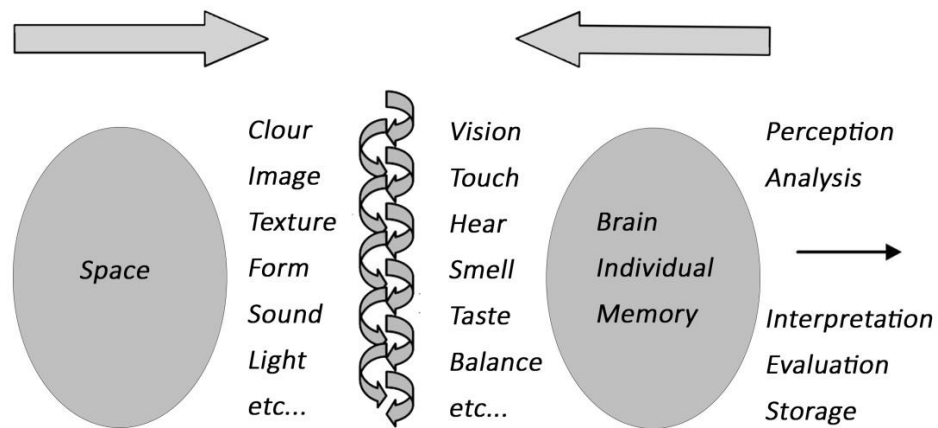


Figure3: The Sensory Phase of Space (Source: Özak, 2008) (Such as the processes in which individuals remember their childhood home)

Not every individual perceives spaces the same way because of the differences mentioned above, but the space perceived differently by different individuals is stored in memory for the long term, coded into memory as a result of processes such as comparison, association, and this results in the third process in permanent memory. According to Özak; permanent space memory is formed by the long term retention of the codes associated with lifestyle in memory and the context which starts with the process of perceiving the space (Özak, 2008).

While space is being perceived, the relationship formed with space differs in every individual. Therefore, the permanency of the space in the memory is proportional to the importance that space carries for the individual as well as the relationship the individual forms with space. The more space carries importance and meaning for the individual, the more permanent it will be in the memory. An individual's recollections, experiences, and senses are effective in storing, associating and comparing a space in memory. A space effective in an individual's memory can be recalled in that individual's life cycle. This recalling process occurs by keeping the space in memory for a long period of time. For example, the smell of a cookie individual eats reminds the individual of his grandmother's house, her kitchen, or the childhood home (like Proust's madeleine cookie example) which carries great importance for every individual always being the space which leaves the most persistent and longest-lasting marks on memory.

Childhood house and its rooms can be a strong example of these kinds of memories. Like Bachelard and Pallasma mentioned before, the house is the first universe of an individual; it is the first source of all memories and it is the common experience for everyone (Bachelard, 1969; Pallasma, 2005). Bachelard (1969) said for strength the bodily memory and emphasize the importance of memories which have strong meaning for the individual;

The house we were born in has engraved within us the hierarchy of the various functions of inhabiting. We are the diagram of the functions of inhabiting that particular house, and all the other houses are but variations on a fundamental theme. The word habit is to worn a word to express this passionate liaison of our bodies, which do not forget, with an unforgettable house,' he writes of the strength of the bodily memory (Bachelard, 1969).

An individual's recollections, the spatiality of these recollections, and the characteristics of a space stored in the mind are also related to these codes. Spaces are importance where individuals spend their childhoods, their houses or spaces in their recollections hold more space in their permanent memories compared to newly experienced spaces. As Gaston Bachelard states in "*Poetic of Spaces*" or Jennifer Groh discussed in the "*Making Space: How The Brain Knows Where Things Are*"; the reason of these research on "the house and units of the house" is that they are stored in permanent memory and hold importance in an individual's perception of space more than anywhere.

An individual's spatial memory about his house and units of the house is a complex structure because the house carries great importance with its spatiality and experiences it creates in the individual's mind. House and its units create different meanings in memory according to where the individual lives, his past, and future. They lay integrity and meaning to the individual's spatial experience. Home is the reflection of an individual's lifestyle, and memory is the product of the individual's lifestyle. As Bachelard (1969) states, "*home is the first universe of the individual*" therefore, the individual acquires meaning to be stored in his memory, and the first experiences regarding the space in his home. These acquirements are going to pave the path for all the spatial perceptions and act as the fundamental stimulus.

The house the individual grows up in is physically recorded to the individual's psychological world, beyond the memories of the individual, and no matter how much time passes, the experiences in that first home will act as the prime example for the following experiences. This is similar to the example when an individual climbs the

stair, he will remember his first stair climbing reflex in the house he first grew up in or even finding a way home from school. These kinds of memories are instant and automatic; they are the memories which are as a key to an individual's life with their knowledge and perception (Bachelard, 1969; Groh, 2014).

Bachelard (1969) links the individual's relationship with his/her home to the individual's senses. He states that the information acquired through sensory organs plays an important role in spatial recollection within the space-memory relationship. From this perspective, sight, hearing, smelling, tasting, and touching which play a role in perceiving a space are associated with the individual's memory and are effective in recalling from memory. Whether space is perceived as cold or warm by the individual, the geometry of the house, the space of the rooms all holds spaces in the individual's memory. For example, an individual considering conversations made in the warmer spaces of the house where he spent his childhood as warm is associating the physical characteristics stored in the memory of the individual with the space in the permanent memory. In addition, these associations also show the emotional bond the individual forms with space. As the intensity of the emotions increases, the recollection rate and the level of space in memory increase (Bachelard, 1969; Groh, 2014).

The emotional bond formed with space does not only create a space perception formed by sight, hearing, smelling, touching. It combines these senses with feelings such as joy, fear, curiosity, happiness, sadness, and haste, excitement, thus creating a permanent perception of the space in memory, and leaving its mark in the individual. Spatial characteristics backed by feelings such as happiness and fear turn into longer-lasting memories in the mind, and they become easier to recall. For these reasons, in the latter stages of his life, the individual creates similar living environments to his initial home and includes in his new life the characteristics of the spaces in his initial home which made him feel happy (Ackerman, 1990; Groh, 2014).

As a result of all these, regarding the characteristics of the spatial data remaining in the memory, it can be said that they do not consist of just physical data. For example, it can be said that the meaning of a house is not formed by its physical structure, because it is introduced that in the individual's memory spaces include various psychological, cultural and social meanings. Therefore, it is more accurate to store the



characteristics of the spaces in the individual's memory when all these parameters are together.

All these parameters used for creating the mental image of memory, space or objects because all these features have different importance on images. Their physical parameters affect individual's experiences so their knowledge and images on their minds (Kosslyn, 1991).

### **2.4.3. Imagery**

According to the Oxford English Dictionary (1978) Imagery is;

1. Mental picture or idea, the concept of something or somebody
2. The use of images, or figures of speech, in writing

Abstract values that are etched in the memory of an individual through senses are images. Space is the foundation of these images. The images formed in every individual's mind differ from each other, this difference happens because perception is different in every individual. Therefore, images are a reflection and representation of truth and differ for every individual. Also, real things are touchable for example trees, whereas in images (image of a tree) this physicality lack. In imagery, an individual can visualize objects that are not physically present in the environment but in perception, we see objects that are physically present in the space (Cohen, 1976; Kosslyn, 1991).

Images can be formed in the mind through the perception of the senses, or later by thinking about or associating a perception. The past experiences of an individual can create an image in his/her mind regarding an object that the individual does not recognize or know and make it perceivable (Goldstein, 2007; Gordon, 2004, Kosslyn, 1991). Images are very short-lived, whereas visual memories are more enduring. An individual can create images of things that never actually seen before, but an individual cannot have visual memories of things we have never seen or imaged before so for memories, they need to physically exist (Kosslyn, 1991).

According to Locke's definition "images are reproduction in the mind of a sense that is formed by physical perception" and he defends that the concept of space was acquired through tactile and visual senses (Mitchell, 1994).

Like Cohen (1976) mentioned abstract values which have a low image potential is hard to reproduce and recall in the mind but the values that have high image potential are easier to recall. “... *Lists of words like truth, importance, democracy is harder to recall than lists of words like cake, giraffe, and flag....*” That’s why; the imagery is related to human consciousness and it is effective in recognition and memory. Also, for this reproduction, the original images, the real things are stored too for descriptions and for taking references for recalling. So, it is not possible to deny or minimize the function of imagery in mind. It is a strong medium to understand, analyze and recall memories for spaces or objects perception (Cohen, 1976).

Space is based on perception, experience, and accumulation rather than volume the borders of which are defined by objects. The past experiences of an individual, with the help of the senses, form a space in the mind as an image. Spatial images are images formed in the mind as a result of experiencing the space and these images are felt with space’s texture, scent, and taste and heard with space’s sound. The individual perceives a space completely when he uses all his sensory organs (Goldstein, 2007; Pallasma, 2005; Rasmussen, 1959; Zumthor, 2006).

All physical and mental emotions and senses play a role in the creation of spatial imagery. Therefore, what the individual sees, hears, smells, feels, physically perceives are effective in creating spatial imagery. In other words, all senses help an individual create images in his mind. Physical manifestations of these images reflect themselves in physical behaviors. The feeling of smelling its scent when an individual sees the picture of a flower or recalling the spaces where he spent his childhood when he eats a food are examples to this notion but the imagery is much more than just visual images. Imagery also produces an image of a taste when someone sees a colorful packaging for food (Nanay, 2010).

When an individual sees an object, his/her mind can represent its invisible parts and the way he/she represent these invisible parts of an object is related to perception. First, he/she perceives that object and then identifies the objects missing parts according to his/ her past experiences and memories. Then he/ she create the image of an object in his/ her mind with the help of past knowledge. That’s why remembering an odor or recalling a memory has importance for every individual (Kosslyn, 2010; Nanay, 2010).

Spatial images are formed in the mind as a result of experiences and every individual forms space's mental image differently because everybody has different experiences and memories by their lifetimes. Space is an image and occupying an abstract value in an individual's mind are explained in Gaston Bachelard's book "*The Poetic of Space's*" from the house because everybody has an interaction with their childhood house and these interactions are quite similar to each other. In the book, the house is more than the attic and the rooms. These spaces are in connection with those who live in them. These spaces are sometimes shaped by the events that took in space, and sometimes the spaces shaped the ones who live in it. A luminous and spacious attic may be the playground that is loved by a child, but a dark and stuffy attic may be an element of fear for the same child (Bachelard, 1969).

These memories which effected from the personally experienced event have a strong power on images of these places. The recalls of these spaces can differ from these two people because of their past experiences and perception of the space. According to human perspective perceiving, remembering and imagining is related information flow. Different senses make different contributions to them. For example, vision supplies information about color, texture, motion while other senses contribute different features. These contributions are effective because they are related to the spatial image that can recall or reproduce from the image of the space. With the help of senses, perception of the image of the space will increase and this increase will directly affect the spatial image in the mind (Byrne, 2010).

There is a relationship between the spatial image and the image of the space. Spatial image is the result of an individual perceiving the world through his senses, and the sight and other senses come into play in this part. While the act of seeing belongs to reality, because images are representations of visual objects, they belong to imagery. There are social and individual differences between images in the mind and real images. This is because various factors such as experiences, social classes, education, cultural environment, gender differences play a role in the creation of imagery in relation to visually. Based on the examples given above, the image of the attic can represent fear for someone while others can feel happy in this kind of spaces (Bachelard, 1969; Kosslyn, 2010).

## **CHAPTER 3**

# **A CASE STUDY ON THE HIERARCHY OF SENSES REFLECTED IN POSITIVE AND NEGATIVE MEMORIES OF A SPACE**

### **3.1. Process of the Case Study**

This study is an analysis of the data collection and evaluation process, especially with respect to the discussions in architectural education and media that visual perception as predominant in spatial perception and non-visual senses are secondary sensory organs. This research aimed to understand the hierarchy and the interaction of senses in spatial perception in participants' memories.

This chapter presents a case study conducted in 2017 and 2018 in the school of architecture in IYTE with the architectural students for understanding the hierarchy of senses as they were conveyed in the texts as answers to two questions. These questions were asked to collect the memories of the respondents on the spaces they remember as the most and least pleasant. Thus, the case study focuses on the spatial features and their interpretations in the memories, rather than an experimental approach which examines a present space in terms of its perceptual qualities.

This study begins with a literature review for evaluating respondents' texts. For these evaluations, fundamental concepts of senses and perception are examined through memory and imagery in spatial perception.

The spatial perception of respondents and which senses are used in conveying their experiences more predominantly in spatial perception were investigated. In this process, writings that include spaces as positive or negative in respondents' memories

were requested from respondents. This phase is concluded by examining of all texts sentence by sentence and determination of senses used in each sentence.

In two questioned task process memories, which have affected us positively or negatively in respondents' minds have been examined. While examining the texts of the students, approaches to express the spaces in writings, the senses emphasized during the space descriptions and the densities of these senses were analyzed with priority.

The memory texts studied in this open-ended questionnaire are the texts written by the second, third and fourth-grade students of the Department of Architecture in IYTE. They were asked to describe the two places in their memories that affect them positively and negatively, the places they remember in their memories as the most and least pleasant.

The two questioned task was conducted with the following sequence:

1. Second, third- and fourth-class students in the architecture department of the Izmir University of Technology Institute have participated. No distinctive factors were taken into consideration when the respondents participated in this case study. Factors which can affect the perception such as age, gender, socio-economic level, nationality were ignored. And also, none of the participants in this task has a sensory disability which can affect his/ her perception of space.

2. The participants of the study were asked to think about the places that affect them positively and negatively. These spaces are the spaces they remember in their memories as most and least pleasant.

3. I have asked them how they perceive these places and how they place them in their memories.

4. Each participant was asked to describe these places in their memory separately as negative and positive.

5. It was explained to the participants that their identities would remain anonymous.

6. Each text has been examined individually in order to tease out the phrases that affect sensations and perception. All texts have been divided into two groups as positive and negative memory texts before coding began. In order to obtain clearer and more coherent results, this separation process has been carried out.

After this separation, for analyzing texts, every single phrase coded according to categorizes. These categories are firstly related to the general atmosphere of memory spaces and they were; definition/ description, interpretation through senses, defined interpretation. While analyzing the atmosphere of spaces, texts are coded according to space or part of a space for highlighting the importance of spatial elements. At the same time, each phrase examined through spaces as the exterior, interior, and transition spaces. After this analyzing process, every phrase coded according to sensory organs (hearing, touching, seeing, tasting, and smelling), body and movement.

When all these processes were completed, these texts' results were examined according to literature research and pioneers writings in order to find a hierarchy or an interaction between senses in spatial imagery from negative and positive memory space texts. With this study, it is aimed to provide data related to senses and to break the prejudice that visual perception is dominant for all conditions.

### **3.2. On Interpretation**

In the research performed, it was revealed that positive and negative memories express different experiences for each individual because, for every individual, the most and least pleasant memory could not be the same. The reasons for having different memories and being different among individuals have many different factors such as lifestyles, past experiences, family structures, tradition and custom (Goldstein, 2007).

The lifestyle is the behavior of the individual, which has been developed against interactions during childhood, and which are influenced by factors such as the family, cultural and social environment. Lifestyles are directly related to the individual and his/her self. Individuals organize all their behaviors according to their lifestyle. The lifestyle has a role in the individual's standard of judgment, interests, abilities, thoughts, reactions, habits, feelings, and most importantly the environment and the events they experience (Wilkie, 1994).

The lifestyle shapes according to contact with its environment and perception. According to Wilkie (1994), lifestyle is shaped by three factors. How we are raised, our personal interests and values, our demands and wishes in our daily life. These three factors play a major role in the perception of the spaces and the environment. Just as every individual is unique, the way individuals live is also unique. As a result, perception is expressed as “may vary from individual to individual” (Goldstein, 2007).

Nevertheless, individuals who come from similar social classes, cultures, and environments show more similar perceptions and similar approaches than individuals who are completely opposite to their lifestyle. The perception that is a process of gathering environmental information, organizing and making sense is comparable for individuals who similar to each other in terms of their culture, social classes.

In this study, respondents are quite similar in terms of their lifestyles. They were all students from the department of architecture. Even their raising styles are different because of their families, their personal interest and demands could be intersecting at a common point because of their architectural education and educational history such as their high schools.

The fact that all of the respondents participating in the study were students who received architectural education shows that they can unite in a similar way of perceiving spaces. At least, they want to convey their experiences through their senses in their memory texts because of their architectural knowledge. Thus, this situation reveals the fact that the participants can unite at a common point and that space can be perceived close to each other by all participants. It demonstrates that respondents can develop comparable relationships with their senses when defining, remembering and recalling spaces from their memories.

Their common interests demand, and expectations regarding their space education reveal more general and valid results compared with those of others in completely different fields. However, these respondents will be able to relate the spaces to their senses more than different field respondents because their educations and lifestyles are similar to each other. Therefore, when they perceive their environment or recall a memory from his/her past experience; these memories or perception will be affected by his/her educational knowledge so, in these memory texts, the way of

explanations will be comparable with each other and will not vary as much as different field person' texts.

The perception which is shaped by senses, in which many research and discussions are conducted, and can be different person to person, is the way of explanations of environment, and spaces. This explanation is concluded by using five main senses: vision, hearing, touch, taste, and smell. In addition to them; body, movement, and atmosphere are also included as secondary channels of perception (Pallasma, 2005; Rasmussen, 1959; Zumthor, 2006; Zumthor, 2010). For this respondent group, using these sensory organs and perceiving spaces will be similar according to their similar lifestyles. By examining negative and positive memories considering this similarity in terms of lifestyle, demands, and interests, it is estimated that similar results can be obtained in the literature study.

As a result of this study, 86 texts were obtained. From these 86 texts; there were 26 negative memory space texts and 60 positive memory space texts. However, from the remaining 60 positive texts, 26 positive memory texts have been selected randomly, because only 26 of the texts were associated with negative memory spaces. It was believed to be more compatible with the accuracy of research results with the equivalent amount of positive and negative texts.

In this case study, there were in 26 positive (pleasant) and 26 negatives (unpleasant) memory texts were obtained for examining the respondents' memories from space. After the texts were separated as pleasant memory and unpleasant memory texts, the texts were analyzed by taking into consideration sensory organs and parameters that affect perception. Words in sentences that appear to be related to the senses are grouped. For example, very large spaces, dim light, cold weather, foul smell.

For clearer results, all the texts examined as single sentences and these sentences were classified under fundamental groups. After this examination three groups were formed as "definition/description", "interpretation through senses" and "definition interpretation". Even though the group names are quite similar, there are differences in their details and contents.

If there is a clear explanation of where it is, if there is no perceptual element, if there is a general conclusion for everyone and if there are no predictable elements in



sentences, then that sentence is classified as the definition/description. For example: “*I’m in Rome now*” sentence is an example of this group. It is same for every individual and it cannot vary person to person. There is no variable that can change according to individual perception and it is same for everyone. It reflects a specific situation, location or activity and the sentences classified in this group do not contain any variables.

Interpretation through sense is for the sentences that give feelings that have more sensations and will not be the same for everyone. In this group, in these kinds of sentences, there are some variables which can change according to individual perception and predictions. For example: “*maybe it was the only building that I felt the smallest, Pantheon.*” sentence. It is an example that can vary person to person, and it has perceptual elements that cannot be same for everyone. In this sentence, body and its experience can vary from person to person, and everyone will not perceive this situation the same. If the expression “*smallest*” is used, this leads to a problem that needs to be explained through the body because this is a proportional variable and it reveals the necessity of comparison when explaining. It may not be small for another person to call small for one because it is a bodily experience and it gives proportional clues with using bodily elements.

Defined interpretation is considered to be sentences we see details about the space but also, we support them with senses. This group is like the combination of definition/ description and interpretation through senses. For example: “*I enter the place by passing large-scale columns*”. In this group, space is defined by sensory organs and can vary from person to person. For example, “*large scale columns*” can change according to person. It is a bodily experience and for saying large, it needs to be a comparison object. Maybe when this sentence first analyze, it can be considered as the group of “*interpretation through senses*” because of “*large column*” expression but this sentence is explaining much more than the group of interpretation through senses. In the group of *interpretation through senses*, there is a limited potential, this group contains just with proportional or sensory variables but this group is different from the Interpretation through sense group with it’s with subordinative and descriptors. In this group, there is also a description according to space. Space described with its columns and it is understood that this sensory variable also gives clues about the entire space.

After this grouping, the texts were analyzed according to characteristic enclosure types of spaces because without space there won't be a place. Everywhere is space and for examining these texts, there were three main groups such as exterior, interior, and transition spaces. If the respondents mentioned about open spaces such as gardens, it is an exterior space. If they mentioned about rooms of a house it is interior space and if they mentioned about both two spaces and in-between spaces it was count as transition spaces.

The reason for the classification of texts over spaces; to discover in which places the positive and negative texts take place mostly and to see if there is a common point. In addition to this, it will be examined what kinds of senses and feelings dominant in positive and negative spaces are according to the space classification. While doing this classification, it aimed to find common generalizations such as while interiors are associated with happiness and sense of touch, while exteriors are associated with fear and sense of vision for understanding the importance of senses and emotions on this case study.

In addition to these three spaces, for such generalizations, these groups had to be developed. Accordingly, new and additional groups were formed. There were two other groups as space or part of a space for analyzing the atmosphere of spaces. If respondents mention about a space generally, for example just wrote his/ her travel to Rome, it was group as space but if he/she mentioned about details in that space, its atmosphere or elements of that space it was group as part of a space and each sentence analyzed according to these grouping and but signs as much as the elements.

As a continuation of these sentence analyses, the texts were grouped again to examine the sensory organs and sensation. This grouping is “*visual*”, “*tactile*”, “*auditory*”, “*olfactory*”, “*gustatory*”, “*body*” and “*movement*” to understand the hierarchy of senses in negative and positive memory spaces.

Tactile was perceived through interaction or having contact with the object or space. Those related to the sensation of touch, pressure, pain, and feeling or direct touch were addressed in this sensory organ. Heat and humidity include in this sensory organ because the skin has importance in the sense of touch, just like the hands. It is directly affected by stimuli.

The auditory sensation is perceived through ears. Olfactory sensations perceived through the nose and gustatory sensation perceived through the tongue. Usually these two sensory organs, gustatory and olfactory work together.

The “visual” elements were related to the principle of seeing and perceived by eyes such as “*red sofa*” but the grouping of these parameters, which was first made, was a general sorting. In the process of continuation of analyzing texts that it also revealed that this group needs to the separation of details within itself.

The “visual” group should also be divided into “*light*” and “*image*” within itself because these two parameters directly related to visual elements. With the help of light, spaces become visible and three dimensional. Light creates shade and shadows; this pair reveals the qualities of space and indicates its depth.

When someone hears or reads a word, their minds immediately create its image. The mind does it in accordance with their past experiences and knowledge from their surroundings (Goldstein, 2007). According to Gestalt theory, one of the fundamental cognitive theories, human mind complete these deficiencies with the help of their previous knowledge. In this completion and creation process, images are created in an individual’s minds and while these texts are analyzed, these images are called visual elements.

The sentences we tell about a space comprises of visual elements. The reason for this is that when an individual says a sentence, they immediately formed an image in individual’s minds (Goldstein, 2007). So, in this case, should these elements be classified under the name of visual sense? Or are the words used in those kinds of sentences only to describe the atmosphere of the space or part of the space? Or are they bodily images such as the adjective of narrow?

In this group, there were some challenging conditions while defining spaces from memories such as expressing a texture or walking the path from memory. The sentence “*I was walking on a stony road*” will be the best example of this situation because when this sentence is first analyzed, it was possible to put it in the group of visual elements because it mentioned about “*walking on a stony road*”. However, was it a correct decision? Can we understand the textures or stony road without seeing it? Is it

possible to talk about feeling the surface's texture? Does the expression of stony road sufficient to be classified as visual?

After these discussions and searching from literature, the results I obtained as a result of these questions were very different from my first analysis. The answer was “no” for the first question because it was not a correct decision to categorize this phrase as a visual because literature, thesis, and articles showed that categorization of senses must be different than my first thought.

For categorizing a sentence or a description as visual, it needs to be same when someone cannot see. When the individual ignores his/her sense of vision, if the data he/she obtains change; it should be called as visual. However, if there is no change to the data obtained, it would be misleading to call it as visual.

In this sentence without seeing that road, we can identify and describe it as stony with our tactile perception. An individual can perceive a stony road texture and its feeling through his/ her feet. Through his/ her body and bodily experience, he/ she can experience that path and perceive it as stony without seeing it. Therefore, this sentence has a duality but it needs to be count as tactile, not visual. On the other hand, if the sentence was “*I was walking on a white stony road*” it would be called as visual, due to the use of white adjective because it was not possible to define a space or object as its adjectives like white, without seeing it. Thus only such cases as visual should be called.

These five fundamental senses have more strict rules in these texts but when in these texts said “body”, it is referred to move a little further away from its main meaning. For categorizing phrases as the body, it has a wide range all other senses because this term can use for giving scale and proportion in these texts. Also, this term can use for expressing bodily feeling and situations with relation to the environment. For example, it is preferred for situations that are perceived with the help of the body such as “*crowd and congestion*” because human express the situation of being crowded with help of his/ her body. Individual talks about his/her bodily experience and his/her body's sensation of congestion while he/she said, crowd. Either when an individual says “*feels like ants, I feel the smallest in between all structures*”, again is a bodily expression but this time it is a much more different than the previous example. Because the previous example shows a psychological experience and it is not necessary to have physical contact in such samples. They are more related to psychology but in these

examples “feels like ants, I feel the smallest in between all structures”, they are also quite physical because they show scale and proportion. They are talking about the physical features of a space or environment. For saying small, it must contain a comparison situation because it needs to be compared with a tall or huge structure. In other words, there must be another variable for comparing or there should be pre-acquired information and data about the size of the ant or objects.

“Movement” is another sense that can be included in the body or the touch group because in movement group, there is always a relation between both body and touch such as “*when I lifted my head, the moment I stepped into the space, to push on the rubble, to move on the running step and breathing, etc.*” sentences from texts. These sentences in the texts do not only describe the act of movement, but rather the movements and actions that take place through the body. When someone says “*the moment I stepped into space*”, it was a bodily experience. With help of feet and his/her bodily experience, an individual can understand that he/she was entered a space and it was not just related to movement because individual can differentiate the space changing from the change of airflow, increasing or decreasing of the ambient noise or he/she can distinguish the floor texture where he/she stands. Therefore, even if this categorization is called as the movement group at the beginning of the analysis, it will later be included in the body or touch category.

The texts were reviewed phrase by phrase after all of those fundamental categories, according to those groups. For each group, each phrase has been examined individually. While the text sentences examined, the elements that belong to the groups, signs are placed under the column of the group as much as the number of existing elements. The prevalent groups in these texts were tried to identify with the signs placed in the sentences as much as the number of elements. (Table 1)

Table 1: Analysis of Sentences from Memory Texts

Sentence	Definition/ Description	Interpretation Through Senses	Definition Interpretation	Space/ Part of a Space	Touch	Vision	Body	Auditory	Movement	Smell/ Taste
Positive Text 1										
1	X									
2			X	X						
3				XXX	X	X				
4			X	XX		X	X			
5			XX	X		X				
6			X	XX		X	X			
7		XX	X		X		X			
8		XX						X		
9		XX	XX	XX	X	X	X		X	
10			X	XXX		XX				
11		X	X							
12		X		XX		X	X		X	
13		X								
14	X	XXX		X						

### 3.3. Findings

The idea that visual perception and sensation was more dominant than other senses was again questioned with the guidance of these results after the analysis process of 26 positive and 26 negative memory spaces which are selected from 90 memory space texts. The goal was to discover the dominance and the significance ranking of the senses in the light of these outcomes and to break the centrist assessment of the vision in the media and architectural education.

In studies performed, it was identified that not only the sense of vision but also other senses (hearing, touching, smelling, tasting, hearing even body) get involved in perception process and recalling memories. All senses, not only visual perception, have been observed in texts which are analyzed according to categorization. In other words, it's not correct to assume and claim that the perception of space only requires the sense

of vision or visual perception or even a single sensory organ has a prevailing because all sensory organs should take a part in the process of perception and all the senses are interrelated. It was a more accurate conclusion after text evaluation to say that all senses perform together.

In fact, it is important to perceive not only the senses but also places in these texts where negative and positive memories pass through because space differences or mentioning about part of a space can be decisive for perception. As can be seen in the first table; space and its parts are a group included in the categorization. One of the most important reasons for its inclusion in this categorization is while examining the memory places, analyzing and figuring out whether the senses or spaces or spaces' parts have priority during the perception.

Therefore, during this examination, it was concluded that in order to achieve clearer results, text analysis should be detailed according to the places where the spaces are located. It would be useful to separate the spaces as interior-exterior or transition spaces. By examining whether space differences affect the dominance of senses in texts, it was aimed to find a hierarchy or a ratio of their primacy of senses in spatial imaginary and also to reach definite conclusions according to spatial perception from these memory texts.

To decide hierarchy and primacy of senses in spatial imagery texts, the spaces where texts pass were also important because space differences can contribute to variations in the perception by the sensations of the individual. While an individual is affected differently from the interior spaces; he/she can be affected in many different ways from exterior or transition spaces and these effects can also change the feelings felt by the individual. Therefore, it needed to analyze how the spaces in the texts are classified in these positive (pleasant) and negative (unpleasant) memory spaces. (Table 2)

In 26 positive texts; 11 of them were interior spaces, 9 of them were classified as exterior spaces, and 2 of them were transition spaces. These spaces were; 11 houses, 4 square/ streets, 3 historic places, 3-holiday places, 1 museum, 1 stadium, 1 café, 1 cave and 1 corridor of a house.

Table 2: Space Analysis in Positive Texts

POSITIVE TEXT	Exterior Space	Interior Space	Transition Space	Name of the Space
1	X			historic place
2		X		house
3		X		house
4		X		house
5		X		house
6		X	X	house+courtyard
7	X			holiday places
8		X		museum
9	X			historic place
10		X		house
11		X		house
12	X			stadium
13	X			historic place
14		X		house
15	X			square/streets
16		X		cave
17	X			square/streets
18	X			holiday places
19		X		house
20			X	corridor
21	X			house
22	X			square/streets
23		X		cafe
24		X		house
25	X			square/streets
26	X			holiday places

House and corridor can be count as a group. Historic places, cave, and square/streets can count as a group of city and its parts; holiday places, café, and stadium can be count as entertainment activities so we can say that these texts were mentioned as 12



of the texts were related to house and its elements, 8 of them are cities and its elements, 6 of them related to entertainment activity spaces.

In addition to all these, all the places mentioned in the positive texts are places that are far from the element of stress and unhappiness. No respondents to the study associated positive memory spaces with stress, oppression or restlessness. In contrast to these feelings, positive memory spaces have been placed in memory as happy moments and have been associated with elements of peace and joy. Moreover, these spaces are usually grand family houses, their gardens, and courtyards. These spaces constitute the majority of houses described in these texts and also all in these houses, there is no fear or negative sensational situation. In these texts, even if respondents describe infancy or childhood memories, these moments have clearly taken place in their minds when people are pleasure and satisfaction in their memories. Apart from the group classified as house and its elements, the city and entertainment activity spaces were described as just like the houses over happiness. All senses in positive memory spaces are dealt with positive meanings and pleasurable elements.

In 26 negative texts; 22 of them were interior spaces, 3 of them were classified as exterior spaces and 1 of them was transition space. These spaces were 4 square/street, 3 bus ride, 3 café, 3 dormitories, 3 hospitals, 2 bazaars, 2 house, 2 museums, 1 classroom, 1 corridor, 1 inside of a building, 1 subway ride. (Table 3)

These 2 houses, in negative memory texts, are the exact opposite of those in positive texts. These houses are mostly described as elements of fear and oppression and individuals expressed their unhappiness in these places in these negative memory texts. All of the spaces mentioned in the negative memory texts were described over the disturbance. All negative texts are always expressed through the suffocating of the body and the experiences that can be acquired through the body.

It was found that most of the spaces discussed in negative texts were always dealt with through the body or there was contact with the body. For example, hospitals also contain the element of contact with the body. Examples of needle contact with skin, hospital rooms, hospital corridors, disinfectant odors touching the nose are always associated with the body and its experience. Another instance of this circumstance is the dormitories, cafes, and bazaars because the crowds of these places in the texts, loud

noises, the physical contact of the people, the airlessness of the environment is at the beginning of the elements discussed and expressed.

Table 3: Space Analysis in Negative Texts

NEGATIVE TEXT	Exterior Space	Interior Space	Transition Space	Name of the Space
1		X		cafe
2		X		house
3			X	corridor
4		X		dormitory
5		X		cafe
6	X			square/ streets
7		X		bus ride
8		X		classroom
9		X		subway ride
10		X		dormitory
11		X		dormitory
12	X			bazaar
13		X		cafe
14		X		museum
15		X		interior of a building
16	X			bazaar
17	X			square/streets
18		X		bus ride
19		X		hospital
20		X		bus ride
21	X			square/streets
22	X			square/streets
23		X		museum
24		X		hospital
25		X		hospital
26		X		house

It was found that most of the spaces discussed in negative texts were always dealt with through the body or there was contact with the body. For example, hospitals also contain the element of contact with the body. Examples of needle contact with skin, hospital rooms, hospital corridors, disinfectant odors touching the nose are always associated with the body and its experience. Another instance of this circumstance is the dormitories, cafes, and bazaars because the crowds of these places in the texts, loud noises, the physical contact of the people, the airlessness of the environment is at the beginning of the elements discussed and expressed.

These texts examinations have shown that the classification of spaces in terms of exterior, interior or transitional spaces were more effective when describing emotions and feelings rather than senses. Also, this classification method for spaces was not successful for 52 texts (positive, negative) because in some text's spaces were intertwined with each other and identification point of them was not clear for saying exterior, interior or transition. Due to this relatedness, although not a very successful grouping method, the interior was more dominant. This order was followed by exterior and transition spaces in both of the positive and negative memory spaces texts. Despite such a ranking being reached, instead of separating it as an interior, exterior, and transitional space, it would be better to deal directly with the places it passes through because clearer and more consistent results can be obtained.

To reach a general conclusion, positive texts are predominantly used in houses, historical or holiday places. On the basis of these results, negative texts are found in many different places than positive texts. However, we can say that both positive and negative these texts are explained with features that can be experienced through the body and not with a single sense but as a whole of senses. For example; the bus and the subway rides in the negative texts were explained through the congestion on the body, emitted bad odors and the airless feeling of the bus or in the positive texts, the memories of the house are conveyed through the experiences of the body.

For the spaces analyzed, it was observed that the senses function as integrated and as a whole. Their combinations describe spaces and expressing a space through a single sense was not possible. Therefore, the sum of these combinations should be considered.

Whether the texts were positive or negative, the most dominant sense in both in order of was visual, body, auditory, smell/taste. The sense of movement and touch remained in the last places in this order.

140 visual, 42 Body, 35 auditory, 28 smell/taste, 26 tactile, 25 movement elements were found in the sentences of positive text; 51 visual, 28 body, 24 auditory, 22 smell/taste, 16 movement, and 7 tactile elements were investigated in sentences of negative texts.

In almost every text, visual elements have importance and take an active role. However, as mentioned above, does the sense determined as visual for an examination of the texts involve the sense of sight? In the sentence, *“I’m passing through the corridor”*, is *“the corridor”* as a visual element or is *“the narrow corridor”* in *“I’m passing through the narrow corridor”* categorized as visual.

*“The stone texture of the walls was very nice and even though it was summer, the house was very cool, and it felt spacious.”* is one of the positive sentences in a pleasant memory text of students. When the sentence is analyzed, it is described as *“Sense of Sight+ Touch+ Body”*.

The sentence talked about a wall and its stone texture and this stone wall counted as a visual feature but the “Stone Texture” was also a tactual factor. However, when the sentence was analyzed again, describing as “stone texture of the walls” should be classified as only *“tactual”* rather than *“Sense of Sight+ Touch”* because even without sight ability, it was possible to talk about the stone texture of the wall with touching it. With the help of hands, skin, and body, an individual can understand the stone texture without seeing it.

Also, the feeling of coolness and spacious were the factors that need to be analyzed over the body because they are bodily experiences. With the air coming into contact with human skin, we explain the sense of coldness that the body feels as coolness. Also, these factors need to count as “touch” because air touches the body, the human skin.

As a second example, *“Everywhere as far as the eye can see is covered with white snow, the smell of snow in the air, the impression that buildings are blown out of*

*the film set...*” was analyzed and the sentence was described as “*Sense of Sight+ Smell/Tasting*”. In this sentence, there is the expression of “*whiteness of the snow, the buildings are like the movie set out.*” In other words, visual images are described, and direct features are emphasized. Without the sense of sight, understanding of these expressions is not possible. This phrase's perception is affected when the sense of sight is ignored because the color white cannot be discussed.

The same case applies as in the “*...big red sofa*” sentence. The sentence was analyzed as “*sight+ body*” because a characteristic of the sofa was mentioned. Without sight, it is not possible to understand that the sofa was big and red. Again this phrase relates to the body and its experiences because a parameter or a human body needs to give an idea of a proportion of that sofa to make a comparison.

Almost all of the texts had a classification problem related to “visual” group. Therefore, the texts’ classifications were quite difficult. For this reason, I considered whether the text was in essence related to the sense of vision by imagining the author as an individual who cannot see. In other words, if space or elements of space cannot be identified or if there would be a deficiency in identification when a visually impaired was imagined, the sentence in the text was classified and analyzed as visual.

As a result of this, the dominancy or the high ratio of visual elements in positive and negative memory texts conclusion was not right. The sense of vision and eye were not dominant when these elements analyzed for an individual who cannot see.

The fact that the texts were analyzed incorrectly when they were first analyzed and that the image of a word was formed directly in the mind caused such an error. When individual said a sentence, imagery arises in individuals’ mind because of their past experiences and information acquired in their pasts. An image was shaped in their minds. The way memories were transferred into texts provided the thought of the sense of sight dominates. In fact, this is because individuals create and imagines images in their minds.

When the texts were examined again considering this visual element situation, the result was as follows; 157 Body, 35 auditory, 28 smell/taste, 26 tactile, 25 movements, 25 visual elements were found in the sentences of positive text; 58 body, 24 auditory, 22 smell/taste, 21 visual, 16 movement and 7 tactile elements were

investigated in sentences of negative texts. In other words, this number decreased to 25 when the visual sense of items analyzed as 140 in positive texts was ignored, i.e. when sentences such as someone who could not see were analyzed. For negative memory texts, this number decrease to 21 from 51.

The second analysis showed that the group of the body is the dominant group, rather than that the visual perception is not as dominant as predicted. In fact, it is not surprising that the body is dominant in an unexpected way. The body is the one who produces all the senses because of the holistic nature. It's all the senses' home. The body contains all the senses, and just as the house is of importance to individuals, the senses are of importance to the body. The body is the first and most fundamental experience tool of the individual.

In this situation, the body, rather than the visual elements, is discovered to dominate both positive and negative memory texts. For positive memory texts, respectively, hearing, smelling/ tasting, touching, seeing and movement sense were coming and for negative memory texts respectively, hearing, smelling/ tasting, seeing, movement and touching senses were coming.

This dominancy showed that body and its experiences play a major role in positive and negative memory spaces. Also, this was another proof of the main reason that the positive texts are mentioned home, garden and rooms are the facts that individuals try to perceive the space by their body and the experience of their bodies. Individuals also associate the phenomenon of home with their bodies. Just as the body contains all the senses and protects them, so does the phenomenon of the house.

In the positive and negative memory space texts examined, many different emotional states were discussed through the body and its experiences. Emotions mentioned in positive (pleasant) memory texts often include; *happiness, surprise/surprising, excitement, expectation, marvelous, calmness, comfort, timelessness, peace, happiness, delighting, belonging, confidence, coolness, pleasure, airiness, interesting, sincere, intimacy, warmth, bewildering, catchy, sense of closeness, warmth, impressive etc.* Emotions mentioned in negative (unpleasant) memory texts often include; *sense of being lost, worry, engulfment, detractive, dislikes, oppress, unhappiness, scary, desperation, sense of secession, comfortless, tiredness,*

*tension, complicated, crowded, uneasiness, claim to quit, mistrust, drastic, uninterested, unhappiness, motionlessness, distress, distracting, terrible, desperation, uncomfortable, complex, insecurity, etc.* When these feelings and emotions are taken into consideration, the skin and body are the most fundamental tool or elements of perception because all these feelings are expressed and explained through the skin and body. Individuals experience the crowd of a place through the body. Body of an individual and integrity of the body take precedence of all sense.

In addition, it has been observed that the group of “*body*” had the potential to unite with “*touch*” and “*movement*” because touch and movement are the most fundamental principles of the body. They are like subtitles of it and as Pallasma mentioned in his books, the body touches its environment, the body is integrative and the collector (Pallasma, 2005). In this case, the idea of their combination is not quite a mistaken opinion, and when they are combined, the sense of touch will be the most dominant sensation in both positive and negative memory texts but again making a this kind of categorization or generalization is not right because the body is a more general concept than the touch, and if there is to be a merger, it will be a more accurate perspective to consider the touch as part of the body. Even without the body, because no touch or sensation will occur; hierarchically or in the order of priority the body should be in the first place, followed by the sense of touch and others.

### **3.4. Discussion**

As a result of this case study, it is aimed to find a hierarchy or primacy of senses in spatial imaginary and to reach definite conclusions in spatial perception. For this purpose, students' texts were examined and found a hierarchy of senses in spatial perception. Besides this hierarchy of sense, several significant findings were reached.

One and most important one is the significance of the house idea. Like mentioned this topic in literature, the case study found out that perception of a house had major importance for individuals.

According to Gaston Bachelard, the houses are the first places where the relationships between the individuals and the environment and space will be observed most easily. The architectural environments of individuals, urban spaces, or the spaces

in which they live at the micro-level are places that can help to uncover the factors that affect their perception. These places have a major role in the individual's memory and their perceptions, the positive memory places are either from a childhood house or a grandparent house, gardens or a room of those houses. This also coincides with Gaston Bachelard's emphasis on the perception of space and the effects of the spaces on memory through the house and parts of the house (Bachelard, 1969).

House and its spaces show the first interaction with space and environment. The experiences in a house were the first experiences of individuals. Also, this experience is similar for everyone because since ancient times, in other words, from the concept of the first house that emerged with the need for protection, the first experience of all individuals with spaces takes place in these spaces. Therefore; everyone can produce similar perceptions according to their first or childhood houses.

Also, as Pallasma argues there was a strong relationship between body, home and being at home. Home, perception of being at home creates a sense of warmth in the individual. It gives confidence; arouses a feeling of embracement. It protects the individual in the house, just as the skin protects the body. Texts which were analyzed in this case study also support this idea. From these texts' findings, it was easy to understand and see this relationship in between.

As a result of this study, it was true to mention that home and the perception of being at home were common for everyone. Under favor of this community, it was easy to develop empathy. Everyone had somehow perceived the house, the rooms of the house and the parts of the house through their bodies. Therefore, the body and experiences of the body were in the center of the perception. The body was the fundamental element of perception just it can identify from case study results.

The body, which we regard as the secondary perception channel, often works with the primary sensation, the sense of touch, and in fact, has the same importance as the five basic sensory organs because the body is the beginning and continuation of the sense of touch. The main reason for this is that the sense of touch is realized through the body (Pallasma, 2005).

The result of the study confirms what Pallasma expressed before. In the findings of the case study, the body was the dominant and primary group in between all sensory



organs because it perceives the space in many ways. It has more potential over other sensory organs.

First one is the skin and body relation. The skin perceives the texture, weight, density, and heat. The body feels gravity with the help of foot, also senses density, texture, and heat. For perceiving texture, heat or density; the body needs to touch its environments. Therefore; body and touch have a direct relationship with each other. The experience of touch with the body to the environment is the best examples that show and underlined the importance and dominancy of the body in texts.

The sense of touch is important for many authors in the literature such as Ackerman, (1990), Goldstein (2007), Millar (2008), Pallasma (2005), Rasmussen (1959), Zumthor (2006). For example, for Pallasma (2005); the touch was the fundamental sense and the perception began with the sense of touch, and all the other senses were the specialization of the sense of touch (Pallasma, 2005). The fact that the results of the study confirm these ideas has a good effect on the accuracy of the study.

The reason why the sense of touch is so significant in the texts was because of the bodily memory and the features of the skin. Like memory texts showed, the body or skin did not forget anything, they had an infinite memory. The body remembers who he/she was and where he/she belonged to. The best examples of this are the fact that we don't make a special effort to remember the way back home from work, not think about how we should step up the stairs or chewing the food while eating something.

Even nearly all text contained bodily experiences from the past and from own memories. These texts identified also how the world and environment touch an individual. Also, show that while an individual analyzes environment how he/ she perceive the happenings around him/ her.

Besides these, the body play role on understanding the volume, space and environment and this role is different than skin and touch experience. It was the experience of the body, not an abstract understanding of the body. It was the understanding like Zumthor mentioned in his book of "*Atmosphere*" (Zumthor, 2006). This was the physical body with its anatomy. It was for proportional and for giving scale like it was seen in positive and negative memory spaces.

After body and touch, it was seen that the significance range of sense according to texts was same with Pallasma and Zumthor. The range is the sense of hearing (auditory), smell and tasting as hierarchically.

Each environment, space, and material has a different tone and sound. Sound reflections in space were also different from each other and had separate impacts on individuals. Spaces are like musical instruments just like Zumthor mentioned, all space has different characteristics of sounds (Zumthor, 2006). The texts clearly showed that distinction. While a museum or a building's acoustics have positive impacts for an individual, another individual can classify the same space as disturbing.

As can be seen clearly in the texts, even if the sound was invisible, the effect was present in spaces. In the negative texts, it was clearly stated that the effects of sound were present by calling “*buzzing, noisy and crowded places*” and in positive memory texts; the effect of sound was mostly demonstrated through pleasure and happiness.

Also, the effect of sound gave information about the depth of space. The borders were removed with the help of ears. The fact that the texts contained sounds from materials and these materials echoes were examples of this situation.

As Rasmussen explained in his work named “*Experiencing Architecture*”, how architecture could be seen without light, it could be heard without sound. There was no need to play music or sound in space. Space had its own sound and this sound was made up of materials in the space or sounds that resonate in the space. Each material reflected a different sound. Each room created different music because of different material usage.

The next sense in the hierarchy of the sense was the sense of smell/tasting. The nose gets tired quickly when it is compared the other sensory organs. The memory of smell is more permanent in mind compared to the memory of other senses. In Swan’s Way, like the Madeleine cookie scene, a small bite of cookies from the past to recall memories was an example of this (Goldstein, 2007). According to Pallasma (2005), the sense of smell/tasting was as significant as the other senses and it helped to the eye for remembering. While all the characteristics of a space cannot be remembered, the smell could always include memories.

According to students' texts, the sense of smell/tasting was the next range in the hierarchy of the sense. Generally, in these texts, the form of memory of this sense was more dominant and stronger compared with the other sense. These strong memories were explained with strong emotions by the help of the body. For instance, in negative memory texts, students explained hospitals and their experiences in the hospital.

In these texts, hospitals are mainly explained with strong scents such as drug smell and disinfectant smell. The odour of the spaces rather than colours or textures has been included in the students' memory texts because odours have importance in individuals' memory and forgetting odours is more difficult than other stimuli from the environment.

The following and last sense was the sight for negative memory texts and in the researches in the literature, the order of senses is like this. While the sense of sight is the last sense for texts, according to several philosophers and cultures, the sense of sight is the first and dominant sense for the human-like Pallasma(2005) mentioned in his book although he disagrees with the idea that the eye is the most dominant sense. With the help of mass production, innovation and invention of the printing press, the sense of sight was in the first place and these innovations put the sense of touch on the back banner. However, the sense of sight keeps individuals apart from the world while the other senses join them.

When the student texts were first examined, it was concluded that the sense of vision was dominant but the reason for this was the visual images in the mind. When the images created in the mind were ignored and the texts were examined secondly questioning whether their source was the sense of seeing, or whether the mind was translating them to visual expressions the idea of seeing became less dominant. In other words, the priority of vision decreased when the text has been reduced to features that could also be created without vision. As a consequence, we can state that imagery realization leads to a duality in the mind of the individual; and this could be related to our modern culture. But this awaits another exploratory research.

## CHAPTER 4

### CONCLUSION

The concept of space depends primarily on the way that an individual perceives it. Also, the concept of space depends on various factors and their limitations. These factors may be connected to the senses or may also be connected to physical elements. All our sensory organs and the information we obtained from these organs influence spatial perception. We compare these perceptions with our previous experiences in our mind which we have acquired through our senses and reach definite conclusions. These results may vary from society to society or from individual to individual according to the factors that we mentioned before such as culture, age, gender, education, social environment, etc.

Even though an individual's fundamental senses are effective in spatial perception process, several researchers have been thought and felt that the sense of sight come into prominence among these senses. However, it should not be ignored that hearing, smell, taste and tactile senses may also have priority in some cases. The smells that emerged from materials used in space or activities performed in the space, the echoing sounds in the space or the tactile characteristics of the space can be preferential compared to the sense of sight. To these, all sensory organs and their perceptions have different effects and importance for an individual.

Ears that are biologically less developed than eyes, as an effective sensory organ as eyes in spatial perception (Zeittl, 1999).The space perceived through hearing is immediately transformed into a visual space in the mind. However, the space that is transformed into a visual in the mind is weak in quality and loses its properties. The hearing space supports the visual space with the perception of direction, depth and acoustic features of that space. Similarly, volumes of heard sound, being close or distant to person, affect the perception of the person while giving an idea about the depth of the space. In addition to this, the materials used in the space and sound transmission from

space give hints about the comfort of the user and give support to person depending on the acoustics of the space. That is why each space, that becomes a visual in the mind, loses its complementary feature. Undoubtedly, the ear is not a sensory organ that can be closed with desire or reflex like the eye and it is constantly active. Therefore, the perception level of ears is more than other sensory organs and they are continuously active. Visually perfect designed space will make the users of the space uncomfortable if it is not well designed acoustically. While the creak coming from an old frame house floor may point to the movements in that space and when they are replaced with new ones, they will not even give any message about the movement in the space.

Although a sense of hearing is not as advanced as a sense of sight, sometimes we need to eliminate the superiority of visual perception. We will close our eyes to hear better, listen more carefully and make a distinction. For instance, we close our eyes to listen to rhythms in a symphony or to distinguish between two sounds. Sometimes we eliminate the visual perception's superiority to smell better. For instance, to perceive the smell of a cookie reminiscent of our childhood or to draw flower smell to feel exactly show the hierarchy of the sense of smell against the sense of sight.

The sense of smell is a sense that we cannot close with reflex or that we cannot give up for a long time. Undoubtedly, it is the fastest fatigable among all other senses however; it is the most indelible sense among the others. Our sense of smell integrates with our memory and has a significant role in our spatial perception. It has a place in our lives to remember and identify some places or times. The odors like the smell of dust and humidity from the basement, the smell in the attic, the smell of food from the kitchen, the smell of flowers arise from experiences gained from spatial perception. The smell of food from the kitchen, the house where we spend our childhood and some of the special scents coming from some of the rooms or the materials in those spaces like the wood smell of furniture are the best examples of spatial perception that are not only the result of the vision and its experiences. It is the result of all the senses working together and each individual has similar experiences.

The sense of touch has a significant place in the perception of surfaces and textures; however, it works together with the sense of sight. The hardness, softness, roughness or smoothness of the surface, the feeling of the ground when we are standing and walking, is perceived by the sense of touch. The qualities of the material that is

seen, the objects we see in the museum or the visual features of the tables are not sufficient. We feel the need to touch and handle them. It is easy to understand the reason why “touching is forbidden” is written in those places. Individuals are not satisfied while they are only seeing an object when they do not touch them. Individuals want to touch materials or objects that are seen, perceive heaviness, roughness and find out its qualities. It is not difficult to understand that the sense of touch has a significant role in spatial perception like all the other senses.

The senses of hearing, smell and touch are the function of the body like the sense of sight; are learning and perception tool of the body. Our senses always work and move together and support each other's experiences. In spatial perception process, our sensory organs help each other, interfere with each other and sometimes contradict. However, they are always communicated with themselves; this communication has a significant role in spatial perception and it is a result of bodily experiences.

As a result of this study, in spatial imagery, the senses are listed as body/ touch, hearing, smell/taste, and vision. Body and touch are the most fundamental and sincere sense as the pioneers on the subject mentioned above. Everything, all events around us are perceived and interpreted through the body. It is not possible to keep human separate from its environment because unavoidably the body interacts consciously or unconsciously with its environment but for experiencing the environment, there is no need to be an adult or child. Even the babies in the womb first encounter the voice of their mothers. Their environment is the mother's womb and still, they can experience their environments with a sense of hearing.

Hearing is accompanying the body and sense of touching in the perception process. This is due to the sense of hearing is one of the most fundamental principles that support the sense of touch and reinforces our perception of the events happening around us. Smell/taste is the next sense in the ranking. The time in memory is longer than the effects of all other senses. Smell/taste is imprinted on our mind and is catchy. It affects individuality. Comparison of the food that we ate in childhood and the food that we will eat today is another example. The effect of evocation of familiar smell demonstrates the power of smell/taste. This smell does not necessarily have to be the smell of food we ate before. Sometimes the smell of a material or even space has the power to effect of changing individuals' mood. For instance; the effect of medicine or

disinfectant in hospitals or garbage smells are very sharp and strong examples. The feeling disgusted by the smell of rubbish or the feeling of uneasiness and fear toward hospitals because of the disinfectant odor is that create on us is the example of our past experiences. Also, the smell of disinfectant creates images in an individual's mind, such as a doctor, needle, and medicine, which affect an individual's perception. These images that occur in the mind are not always required to exist visually, the mind can create them.

The sense of vision follows the other senses. There are two reasons for this situation. One of the reasons is duality in the sense of sight. In contrast with the other senses, a description of the sense of sight is more complicated. It is difficult to detect and identify the elements used when describing the space. The first reason for this is that the words that express the space form images and images in our minds. These images are the gains of past experiences of individuals, so it is not always true to say that they are about visual perception, because these images are not always meant to express visual perception. Like *Robert Rivlin* and *Karen Gravelle* note,

The ability to visualize something internally is closely linked with the ability to describe it verbally. Verbal and written descriptions create highly specific mental images... The link between vision, visual memory, and verbalization can be quite startling (Jay, 1993).

In other words, the strong connection between visual memory and verbalization or linguistic, the fact that an individual does not need to physically see an object or space, points to the confusion of visual perception. This suggests that visual perception can be misleading.

Moreover, it is risky to accept the sense of sight as absolute when we do not support it with other senses. They can be misleading when giving information about time and space. It may not produce clear results and we may not always perceive exactly what we see. For instance, a material that seems to too light could be very heavy or a room that appears to be flattened and narrow due to faulty coloration can be large and spacious or a surface that doesn't have any texture can look like it's textured. Therefore it is not correct to claim that we have achieved certain and clear findings when we have not completely experienced or perceived space through the body.

As a result of these studies, it would be wrong to say that any sense alone is dominant or prioritized because the results of the study showed that whether it is

positive or negative memory space texts, it is the body that is dominant and the priority. The body is holistic and the perception of space always takes place with the help of the body. It is never possible to speak of a single sense and its perception process. All sensory organs interact with one another at different rates, at different times, in different ways. Therefore, talk about the uniqueness of a sense in memory is not appropriate. The body is the only sensory tool that can manage the perception process alone, which holds all the sensory organs on it.

The body has great potential for all these reasons. It can remember rooms, objects, and materials in the house, the atmosphere of spaces or the experiences. The body contains deepest memories with the help of sensory organs. It is the proof of integration with the haptic world to visual, aural, gustatory and olfactory elements. As Millar cited; the body is the locus of reference, memory, imagination, and integration of experiences with the world. The body has an amazing capacity for remembering and imagining spaces with coordinance to sensory organs. Perception, memory, and imagination have a relation; the domain of body is merged with images of our memory (Millar, 2008).

In light of all that, the idea that the eye and visual perception is dominant in spatial perception processes in architecture education and the media is not accurate. On the contrary, all senses work together and perception processes take place through the body. However, if we are to talk about a hierarchy, dominance or priority, this dominance and priority belong to the body because it should not be forgotten that when the senses are not in communication with each other or as a whole as bodily, it will not be possible to create a complete spatial perception.

#### **4.1. Implications of the Study**

This study showed that when all sensory organs work together and have integration between each other, space [or environment] can be perceived and experienced accurately. The perception of a space through a single sensory organ may not produce accurate results and it may cause differences in human perception because it is not possible to limit sensory organs in the spatial perception process.



As a result of this work, it can be ensured that not only studies on visual perception in architectural education, but also studies on other senses should be handled. Currently, drawing and modeling based architectural education is prevalent in universities and the effects of other senses, other than visual sense, remain in the background in design studies. However, if senses such as smelling and hearing are involved in the design process, they will allow individuals to strengthen their perception of space.

In addition to this, it will be one of the solutions that will strengthen the perception of space by addressing the problems experienced by individuals with disabilities in design education. Especially, address their problems and their perception and experience of space. For example, it would be a good start to make design solutions that would improve a visually impaired individual's perception of space and to find design solutions that will increase the spatial perception for impaired individuals.

Besides these, alternative spaces such as restaurants, which were recently fashionable and eaten in the dark on which various projects were carried out, will both strengthen the perception of the venue and its sensitivity to individuals with disabilities.

Making installations that can be physically and bodily experienced and perceived through multiple sensory organs can also produce another result of this work. Through these installations, it will be useful to foreground the body and the experience of the body as well.

## **4.2. Future Work**

Within the scope of this thesis study, two questioned task and literature review was conducted. The research was conducted under the leadership of these two methods and no other parameters were searched.

However, spatial perception is influenced by many parameters. Several personal factors such as experiences, lifestyles, social classes, economic conditions, family structures and individual tastes of participants will have an impact on the researches. However, these factors are not considered and examined for this study.

In addition, these factors and parameters that affect the spatial perception due to the individual differences of the participants such as the social classes, genders, ages and educational status of the participants also are not considered as data in this study. For future works, researchers will be able to improve the study by adding some of these parameters for getting more customized results.

Also, in this thesis, two questioned task was conducted under the two questions which related to happy (pleasant) and unhappy (unpleasant) spaces on participants memories. For future works, researchers can use different or much more questions for their questionnaire for improving their studies.

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## APPENDIX A

### ANALYSIS OF SENTENCES FROM MEMORY TEXTS

Table.A.1. Positive (Pleasant) Memory Texts

METİN	Cümle	Tanımlama/ Betimleme	Yorumlama Hisli	Yorumlama Tanımlama	Mekan/ Mekan Parçası	Dokunsal	Görsel	Beden	Ses	Hareket	Koku/tat
OLUMLU 1											
	1	x									
	2			x	x						
	3				xxx	x	x				
	4			x	xx		x	x			
	5			xx	x		x				
	6			x	xx		x	x			
	7		xx	x		x		x			
	8		xx						x		
	9		xx	xx	xx	x	x	x		x	
	10			x	xxx		xx				
	11		x	x							
	12		x		xx		x	x		x	
	13		x								
	14	x	xxx		x						
OLUMLU 2											
	1	x									
	2		x								
	3		x		x		x				
	4			x	xx	x	x				
	5	x			x	x					
	6	x			x		x				
	7		x		xx						x
OLUMLU 3											
	1	x									
	2				xx		x				

(cont. on next page)

Table.A.1 (cont.).

METİN	Cümle	Tanımlama/ Betimleme	Yorumlama Hisli	Yorumlama Tanımlama	Mekan/ Mekan Parçası	Dokunsal	Görsel	Beden	Ses	Hareket	Koku/tat
	3			x			x				
	4	x						x			
	5	x	x		x						
	6		x								
	7	x			x		x				
	8		x		x			x			
	9			x					x		
OLUMLU 4											
	1	x			x						
	2			x	x		x				
	3		x		XX			x			
	4		x	x			x	x			
	5		x	x	x	x	x			x	
	6			x			x		x		
	7			x	x					x	
	8			x					x		
	9				XXX		x	x		x	
	10		x		x				XX		
	11		x		XX		x				
	12		x		XX						
	13	x									
OLUMLU 5											
	1			x	x						
	2		x		x					x	
	3		x	x	XXXXX		x	x			
	4	x			x						
	5		x				x			x	
	6			x	x		x				x
	7			x	XX				x		
	8		x		x						
OLUMLU 6											
	1		x								
	2				x		x				
	3	x			x		x				
	4			x	x		x				
	5		x		x		x	x	x		

(cont. on next page)

Table.A.1 (cont.).

METİN	Cümle	Tanımlama/ Betimleme	Yorumlama Hisli	Yorumlama Tanımlama	Mekan/ Mekan Parçası	Dokunsal	Görsel	Beden	Ses	Hareket	Koku/tat
	6		x		x	x		x			
	7	x			x		x				
	8		x		x		x				
	9		x		x	x					
	10		x		x						
	11		x		x		x				
	12	x			x		x				
	13	x			x						
	14		x		x		x				
OLUMLU 7											
	1	x									
	2		x		x		x		x		
	3			x	x		x				
	4	x			x		x				
	5	x			x						
	6			x	x		x		x		
	7		x		x				x		
	8		x		x		x				
	9	x									
	10	x									
	11			x	x		x				
	12		x		x						
OLUMLU 8											
	1		x		x						
	2		x		x		x				
	3		x		x		x	x			
	4		x								
	5		x		x		x				
	6		x		x						
	7		x		x	x	x		x	x	x
	8		x								
	9		x		x		x				
	10		x				x				
	11		x		x			x			
	12		x				x				x
	13		x								
	14		x		x		x				

(cont. on next page)

Table.A.1 (cont.).

METİN	Cümle	Tanımlama/ Betimleme	Yorumlama Hisli	Yorumlama Tanımlama	Mekan/ Mekan Parçası	Dokunsal	Görsel	Beden	Ses	Hareket	Koku/tat
OLUMLU 9											
	1			x	x						
	2		x		x		x				
	3		x								
	4		x		x						x
	5		x		x			x			
	6		x		x			x			
	7			x	x		x				
	8			x	x						
	9			x	x						
	10			x	x		x				
	11			x	x		x				
	12			x	x						
	13		x		x		x				
	14		x		x						
	15			x	x		x				
	16			x	x		x				
	17			x	x						
OLUMLU 10											
	1	x									
	2		x		x						
	3										
	4										
	5		x								
	6		x		x		x		x	x	
	7		x		x		x				
	8			x	x		x				
	9		x		x						
	10		x		x		x			x	
	11			x	x	x					
	12			x	x						
	13		x		x		x		x		
	14		x		x		x		x	x	
	15		x		x			x		x	
	16			x	x						
	17	x			x						
	18			x	x	x	x				
	19			x	x						

(cont. on next page)

Table.A.1 (cont.).

METİN	Cümle	Tanımlama/ Betimleme	Yorumlama Hisli	Yorumlama Tanımlama	Mekan/ Mekan Parçası	Dokunsal	Görsel	Beden	Ses	Hareket	Koku/tat
	20			x	x		x				
	21			x	x		x			x	
	22		x		x		x		x		
	23			x	x		x				
	24		x		x						
	25		x		x			x		x	
	26		x		x						
OLUMLU 11											
	1		x								
	2		x		x		x				
	3		x		x				x		
	4		x								
	5			x	x		x				
	6		x		x		x				
	7		x		x	x	x				
	8		x		x		x				x
OLUMLU 12											
	1		x		x				x		
	2		x		x				x	x	
	3		x		x				x		
	4		x	x	x		x		x	x	
	5		x		x				x		x
	6			x	x		x	x			
	7		x		x		x				
	8		x		x				x		
	9		x				x				x
	10		x		x		x				
	11		x	x	x		x				
	12		x		x				x		
	13		x		x				x		
OLUMLU 13											
	1		x		x						
	2		x		x		x				
	3			x							
	4			x	x		x				
	5			x							

(cont. on next page)

Table.A.1 (cont.).

METİN	Cümle	Tanımlama/ Betimleme	Yorumlama Hisli	Yorumlama Tanımlama	Mekan/ Mekan Parçası	Dokunsal	Görsel	Beden	Ses	Hareket	Koku/tat
	6			x	x		x				
	7			x	x		x				
	8			x	x		x	x			
	9		x		x		x	x		x	
	10		x		x		x				
	11		x		x		x				
	12			x	x		x				
	13			x	x	x	x				
	14			x	x		x				
	15		x		x				x		x
OLUMLU 14											
	1	x									
	2	x									
	3		x		x						
	4		x		x		x			x	
	5		x								
	6		x	x	x		x				
	7		x		x		x				
	8		x		x		x	x			
	9		x		x		x				
	10			x	x		x		x		
	11		x		x						
OLUMLU 15											
	1		x		x						
	2		x		x						
	3		x		x		x				x
	4		x		x			x			
	5		x		x						
	6		x		x		x				
	7			x	x				x		
	8		x		x						xx
OLUMLU 16											
	1	x			x						
	2		x		x			x		x	
	3			x	x		x		x		
	4			x	x	x				x	

(cont. on next page)



Table.A.1 (cont.).

METİN	Cümle	Tanımlama/ Betimleme	Yorumlama Hisli	Yorumlama Tanımlama	Mekan/ Mekan Parçası	Dokunsal	Görsel	Beden	Ses	Hareket	Koku/tat
	5			x	x	x	x				
OLUMLU 17											
	1	x									
	2			x	x						
	3			x	x		x		x		x
	4		x		x		x				
	5		x		x	x	x		x		
	6		x								
	7		x		x						
	8		x		x						
OLUMLU 18											
	1		x								
	2			x	x						
	3		x								
	4		x								
	5		x		x						x
	6			x	x		x		x		
	7			x							
	8			x			x				
	9		x								
	10		x								
	11		x								
	12		x			x			x		x
OLUMLU 19											
	1		x								
	2		x		x						
	3		x		x		x				
	4		x		x						
	5		x		x			x			
	6			x	x			x			
	7		x								
OLUMLU 20											
	1	x									
	2		x		x						
	3		x	x	x		x				

(cont. on next page)

Table.A.1 (cont.).

METİN	Cümle	Tanımlama/ Betimleme	Yorumlama Hisli	Yorumlama Tanımlama	Mekan/ Mekan Parçası	Dokunsal	Görsel	Beden	Ses	Hareket	Koku/tat
	4			x	x		x				
	5			x	x	x		x			
	6		x				x				
	7		x								
OLUMLU 21											
	1			x	x		x				
	2		x		x						
	3			x	x						x
	4			x			x				
	5		x								x
	6		x								
	7			x	x		x				
	8		x		x	x		x			
	9			x	x		x				
	10			x	x		x				
	11			x	x		x				
	12			x			x				
	13		x								
OLUMLU 22											
	1			x							
	2		x		x						
	3		x		x						
	4		x		x		x				
	5			x	x						
	6		x								
	7			x	x		x				
	8			x	x						
	9		x		x		x	x			
	10			x	x		x				
	11			x	x		x	x			
	12		x		x		x				
	13			x	x	x	x	x			x
	14		x		x						
	15		x		x			x			
OLUMLU 23											
	1		x		x						

(cont. on next page)

Table.A.1 (cont.).

METİN	Cümle	Tanımlama/ Betimleme	Yorumlama Hisli	Yorumlama Tanımlama	Mekan/ Mekan Parçası	Dokunsal	Görsel	Beden	Ses	Hareket	Koku/tat
	2			x	x						
	3			x	x		x				
	4		x		x		x	x			
	5			x	x		x				
	6			x	x		x				x
	7			x			x	x			
	8			x	x			x			
	9			x	x		x	x			
	10		x		x		x				x
	11		x		x						
	12			x			x				xx
	13		x								
OLUMLU 24											
	1		x		x						
	2		x		x						
	3			x	x		x				x
	4			x	x		x				x
	5			x	x		x				
	6			x	x						x
	7			x	x		x	x			
	8			x	x		x				
	9			x	x		x				
	10		x		x			x			
OLUMLU 25											
	1		x		x						
	2		x			x		x			
	3		x		x		x				
	4		x		x						
	5			x	x		x				x
	6		x		x	x				x	
	7		x		x						
	8		x		x	x	x				
	9		x		x		x				
	10		x		x		x				x
	11		x			x		x		x	
	12		x		x						

(cont. on next page)

Table.A.1 (cont.).

METİN	Cümle	Tanımlama/ Betimleme	Yorumlama Hisli	Yorumlama Tanımlama	Mekan/ Mekan Parçası	Dokunsal	Görsel	Beden	Ses	Hareket	Koku/tat
OLUMLU 26											
	1		x		x					x	
	2		x		x	x	x	x	x	x	x
	3		x		x		x		x	x	
	4		x			x					

Table.A.2.Negative (Unpleasant) Memory Texts

METİN	Cümle	Tanımlama/ Betimleme	Yorumlama Hisli	Yorumlama Tanımlama	Mekan/ Mekan	Dokunsal	Görsel	Beden	Duyumak (Ses)	Hareket	Koku/Tat
OLUMSUZ 1											
	1	x									
	2		x		x				x		xx
	3		x				x	x	x		
OLUMSUZ 2											
	1	x			x			x			
	2		x					x			
	3		x					x			
	4			x			x				
	5	x					x				
	6		x								
	7		x							x	
	8		x								
	9			x	x				x		
OLUMSUZ 3											
	1	x									
	2		x		x			x			
	3		x		xx				xx		
	4			x	xx						x
	5		x		x		x				
	6	x									
	7		x								x
	8		x		x			x		x	

(cont. on next page)

Table.A.2 (cont.).

METİN	Cümle	Tanımlama/ Betimleme	Yorumlama Hisli	Yorumlama Tanımlama	Mekan/ Mekan	Dokunsal	Görsel	Beden	Duymak (Ses)	Hareket	Koku/Tat
OLUMSUZ 4											
	1	x		x	x						
	2		x		x		x	x			
	3		x	x	x			x			
	4			x	x						x
	5		x								
OLUMSUZ 5											
	1		x		xx		x				
	2			x	xx		x				
	3			x			x		xx		
	4			x	x		x				
OLUMSUZ 6											
	1		x		x				x		
	2			x							
	3		x		x					x	
	4		x						x	x	
	5		x		x						x
	6			x							
	7		x		x		x				x
OLUMSUZ 7											
	1		x								
	2		x		x						
	3	x									
	4		x		x		x		x		x
OLUMSUZ 8											
	1		X		X						
	2		x				x	x			
	3			x	x			x			
OLUMSUZ 9											
	1		x								
	2		x				x		x		
	3		x		x		x				

(cont. on next page)

Table.A.2 (cont.).

METİN	Cümle	Tanımlama/ Betimleme	Yorumlama Hisli	Yorumlama Tanımlama	Mekan/ Mekan	Dokunsal	Görsel	Beden	Duymak (Ses)	Hareket	Koku/Tat
OLUMSUZ 10											
	1		x		x						
	2			x							
	3		x		x				x		x
	4		x		x			x	x		
	5			x					x		
	6			x	x						x
	7		x		x		x				
	8		x		x			x			
OLUMSUZ 11											
	1			x	x						
	2		x								
	3		x		x						
	4			x	x	x	x	x			
	5		x		x		x				
	6		x		x						
	7			x	x						x
	8			x	x		x		x		
OLUMSUZ 12											
	1		X								
	2		x		x						
	3			x	x				x	x	
	4		x						x		x
	5			x							
OLUMSUZ 13											
	1	x									
	2		x		x		x				
	3			x			x		x		x
	4			x				x			x
OLUMSUZ 14											
	1		x								
	2			x							
	3			x			x			x	
	4			x			x				
	5		x		x						

(cont. on next page)

Table.A.2 (cont.).

METİN	Cümle	Tanımlama/ Betimleme	Yorumlama Hisli	Yorumlama Tanımlama	Mekan/ Mekan	Dokunsal	Görsel	Beden	Duymak (Ses)	Hareket	Koku/Tat
	6						x	x			X
	7			x	x			x		x	
	8			x			x				
	9		x							x	
	10		x		x						
	11			x			x				x
OLUMSUZ 15											
	1			X	X		X				
	2		x		x		x			x	
	3		x		x		x				
	4		x		x					x	
	5			x	x		x	x			
	6			x	x						
OLUMSUZ 16											
	1		x								
	2			x				x	x		
	3		x		x			x			
	4			x	x						
	5			x	x		x				
	6			x	x		x				
OLUMSUZ 17											
	1		x								
	2		x		x		x				
	3		x								
	4		x		x	x	x				
OLUMSUZ 18											
	1		x		x			x			
	2		x				x				
	3			x	x		x	x		x	
OLUMSUZ 19											
	1			x	x						
	2		x								x
	3			x	x		x				

(cont. on next page)

Table.A.2 (cont.).

METİN	Cümle	Tanımlama/ Betimleme	Yorumlama Hisli	Yorumlama Tanımlama	Mekan/ Mekan	Dokunsal	Görsel	Beden	Duymak (Ses)	Hareket	Koku/Tat
OLUMSUZ 20											
	1		x								
	2		x		x					x	
	3		x			x		x			
	4		x		x						
	5			x	x						
	6			x				x			x
	7			x							
OLUMSUZ 21											
	1			x							
	2		x		x						
	3			x	x		x				x
	4			x	x			x		x	x
OLUMSUZ 22											
	1	x									
	2	x									
	3	x									
	4	x									
	5	x									
	6			x						x	
	7		x		x			x			
	8			x	x		x				
	9		x						x		
	10		x								
OLUMSUZ 23											
	1		X		X						
	2		x								
	3		x		x		x	x			
OLUMSUZ 24											
	1		x								
	2		x		x						x
	3		x			x		x			
	4		x	x	x		x				
	5			x			x				x

(cont. on next page)



Table.A.2 (cont.).

METİN	Cümle	Tanımlama/ Betimleme	Yorumlama Hisli	Yorumlama Tanımlama	Mekan/ Mekan	Dokunsal	Görsel	Beden	Duymak	Hareket	Koku/Tat
OLUMSUZ 25											
	1		x		x				x		
	2		x		x						
	3		x		x		x				
	4			x	x		x				
	5		x				x				
	6		x		x	x	x	x		x	
OLUMSUZ 26											
	1			x							
	2			x	x		x				
	3			x	x	x	x		x		
	4			x	x		x	x			
	5			x	x		x		x		
	6			x	x		x				
	7			x	x	x	x				
	8			x	x				x	x	

## APPENDIX B

### SENSORY TERMS FROM POSITIVE AND NEGATIVE MEMORY TEXTS

#### B.1. Positive (Pleasant) Memory Texts

<b><u>TEXT 1</u></b>	içi dışarıya kıyasla	Hayvan resimleri
Tarihiyle karşılayan	Serin	İşlenmiş halı
Şehir dokusu	Kubbede bulunan yırtık	Koyu renk
Eskinin tanıklığı	İç mekân aydınlatması	Sakinlik
Taş duvarlar	Süzülen ışık huzmesi	Zamansızlık
Yürümekten aşınmış taş döşeme kaldırım	Mistik bir duygu	Kahverengi ahşap yatak başı
Heybetli alınlık	Kendimi en küçük hissettiğim yapı	Kocam yatak
Büyük ölçekli kolon	<b><u>TEXT 2</u></b>	Rahatlık
Farklı dilden konuşan	Özgür	Saatin tik tak sesi
Kalabalık içinden yükselen	Dolapları karıştırmak	<b><u>TEXT 4</u></b>
Heyecan hissi şaşkınlık	Eski eşya sandığı	Demirli pencere
Tepkileri duydukça	Eşya ve fotoğraf	Bahçe sıkışmış
Bütüncül mekân	Eski kokusu	Kapalı etki
Kalın taş duvar	<b><u>TEXT 3</u></b>	Küçük bahçe
	Loş duvar	Kocaman palmiye

Köpeğin gürültüsü	Ahşap zemin	Sesleri duyulur
Kemik çıtırtısı	Parke çıtırtısı	Kurbağa sesi
Muhabet kuşunun sesi	<b><u>TEXT 6</u></b>	Küçük mutfak
Palmiye hışırtısı	Küçük avlu	Balkondan bakınca
Şehrin en yoğun yeri olmasına rağmen huzur	İki katlı kerpiç yapı	Evlerin pencereleri
Uzun koridor	Küçük sokak taşları	<b><u>TEXT 8</u></b>
Çarşı kalabalığı	Dar sokak	Tarihi doku
Cam cephe	Beyaz boyalı ev	Binaların arasından deniz
Göz kırpan palmiye	Küçük sahanlık	Sıcak yaz günü
<b><u>TEXT 5</u></b>	Gıcırdayan ahşap merdiven	Serin mekân
Rum evi	Soğuk kiler	Soğuk kış günü
Yüksek tavan	Mavi demir kapı	Sıcak karşılama
Geniş merdiven	Buzdan dolayı kaygan	Cam bölücü
Merdiven tepesindeki renkli camlardan cumba	Toprak zemin	Aidiyet duygusu
Ahşap	Yıkık bahçe duvarı	Rengârenk sergi alanı
Her an yıkılabilir düşüncesi	Gölge	Fısıldaşma
Büyük mutfak	<b><u>TEXT 7</u></b>	Boya kokusu
Çok sayıda oda	Sessiz	Kocaman tablo
Bahçe	Küçük kasaba	Kaybolmuşluk hissi
Bodrum katı	2 katlı	İnsanları izlemek
Su basmaları	Varanda	İnsanları dinlemek
Rutubet kokusu	Ağaçlar, çiçekler	Metal merdiven
	Evler birbirini görmez	Kitap kokusu
	Çevredekiler görülmez	

**TEXT 9**

İki tarafı yeşille kaplı

Kıvrımlı yol

Toprak kokusu

Sıcak ve bunaltıcı hava

Hafif bir serinlik

Mavi garaj kapısı

Heybetli ceviz ağacı

Giriş kapısı

Merdiven

Ambar

Yemeklerin sırrı

**TEXT 10**

Kartallı ev

Okul yakın

Şehre uzak

Kalabalıktan uzak

Sessizlik

Kapıyı tıklatıp

Merdiven

Ahşap korkuluklar

Elimi sürerek

Ufukta kaybolan dağ

Rüzgâr

Sallanan hamak

Derin nefes

Yıpranmış ahşap

İçerisi loş

İnce uzun salon

Ahşap kırma çatı

Rüzgârda vakumlanan  
ahşapYağmurda romantik  
müzik sesiÇatıya vuran yağmur  
damlası**TEXT 11**

Köy evi

Tek katlı ev

Sessiz oda

Ahşap laminant kaplı  
tavan

Turuncu perde

Kalın perde

Öğle ışığı

Portakal rengi oda

Rüzgâr

Serin esinti

Sıcak hava

Konforlu mekân

Ağaç kokusu

**TEXT 12**

Gürültülü metro

Yorgun suskun insanlar

Tek ağızdan gibi marş  
sesleriGürültüye rağmen kulağa  
hoş gelen ses

Renk uyumu

Kötü koku

İnsan ölçeği

Stat büyüklüğü

Binlerce insan

Karmaşa

Yemek kokuları

Yükselen duman

Akustik

Sesin yayılması

**TEXT 13**

Tarihi doku

Yığma duvar

Minik köy

Karanlık

Dar

Sert taş

Yığma yapı	Çiçek kokusu	Renk
Küçük pencere	Hafif müzik sesleri	Doku
İçeriye süzen ışık	Deniz kokusu	Aidiyet duygusu
Loş ışık	Mükemmel koku	Farklı duylara hitap eden mekân
Soğuk	<b><u>TEXT 16</u></b>	Çekici mekân
Kahve kokusu	Küçük boşluk	<b><u>TEXT 18</u></b>
Sohbet sesleri	Sıkışmışlık hissi	Sıcak hava
<b><u>TEXT 14</u></b>	Hayranlık uyandıran derinlik	Deniz kokusu
Çatı katı	Nem	Çakıl taşı sesi
Alçak çatı	Yosun kokusu	Dalgasız deniz
Ferah oda	Mağara dokusu	Güneşin sıcaklığı
Yanan soba	Mağara duvarlarına dokunmak	Deniz kokusu
Ahşap zemin	Elde kayganlık hissi	Bira tadı
Sarı ışık	Parlak kayaçlar	Dalga sesi
Sıcak ortam	<b><u>TEXT 17</u></b>	Kedi miyavlaması
Ahşap pencere	<b><u>TEXT 19</u></b>	<b><u>TEXT 19</u></b>
Mavi deniz manzarası	Kahveciler	Huzur ve mutluluk veren mekan
Rahat olmayan bambu sandalye	Renkli samimi mekân	Malzemeler
Şehir ışıkları	Ses	Detaylar
Havai fişek sesi	Bazen uğultu	Taş döşeme hissi
<b><u>TEXT 15</u></b>	Bazen melodi	Yakınlık duygusu
Huzur mutluluk veren yer	Keskin kahve kokusu	Sıcaklık duygusu
Loş ışık	Işık	Sohbet
Deniz manzarası	Ses	

**TEXT 20**

Samimi mekân

Arkadaş ortamı

Ahşap

Çalışanların kıyafetleri

Çalan müzik

Müzik aletleri

**TEXT 21**

İnsanı etkileyen hava

Koku

Nergis kokusu

Cam cephe

Şeffaf görüntü

Yere bastığımda  
hissettiğim sıcaklık

Özel taşlar

Asma kat

Sadelik

Farklı malzemeler

Ahşap dokusu

Beton doku

**TEXT 22**

İçeri sızan ışık

Denizden gelen esinti

Hızlı geçen zaman

Yaz günü sığağı

Islak taşlar

Hafif soğuk hissi

Hafif rüzgâr

**TEXT 23**

Kalabalık

Güvensiz

Karışık

Yolda kaybedilen zaman

Kargaşa

Mükemmel yapılar

Sıcak

Güvenli

Dar sokak

İştah açıcı koku

Sıkışık satış alanı

Ahşap merdiven

Küçük masa

Enfes koku

Servisin kokusu

Ağızda bıraktığı tat

**TEXT 24**

Yoğun ağaç kokusu

Büyük pencere

Döşeme malzemesi

Sedir kaplama

Sedir kokusu

Koyulaşan döşeme

Taş doku

Serin

Ferah

Aydınlık

Aydınlatmanın verdiği  
sarılık**TEXT 25**

Üşümek

Beyazlık

Bembeyaz kar

Kar kokusu

Film seti hisli bina

Dokunma isteği

Beton yapılar

Eski

Tarih kokan

Basıp gömüldüğünüz

**TEXT 26**

Kumun sığağı

Sığağı hissetmek

Deniz sesi

Hafif esen ılık rüzgar  
Denizin kumun kokusu  
Kahkaha  
Muhabbet edenlerin sesi  
Koşup eğlenen çocuk  
Sıcak havlu

## **B.2. Negative (Unpleasant) Memory Texts**

### **TEXT 1**

Gürültülü mekân  
Yemek ve kahve kokusu  
Loş ışık  
Sevmediğim müzik  
Ruhumu daraltan mekân

### **TEXT 2**

Çok büyük bir mekân  
İçinde kaybolmak  
Soğuk hava  
İçerisi soğuk  
Açılmış aydınlatma

Beyaz floresan

### **TEXT 3**

Küçük dükkânlar,  
Depolar, tuvaletler

Dükkânın içi  
Sıkıntı  
Kapalı yer  
Oradaki ses  
Rahatsız edici ses yankısı  
Üzerimde büyük baskı  
Tuvaletten gelen ağır  
koku  
Işıksız  
Tenha  
Çay kokusu

### **TEXT 4**

Yurt odaları  
Küçük oda  
Çalışma masaları  
Balkon kapısı

Yemekhane  
Yemek kokusu  
**TEXT 5**  
Basık koridor  
Yuvarlak camlı kapı  
Karanlık

Loş ortam  
Yoğun ses  
El göz hareketi  
Ahşap bar

### **TEXT 6**

Korna sesleri  
Kalabalık  
Bağırış çağırış  
Siren sesleri  
İnşaat sesleri

Karmaşanın göbeği	Basık	Loş ışık
Yalnızlık	Rahatsız	Dışarıya çıkma isteği
Çaresizlik hissi	Sıcak	<b><u>TEXT 11</u></b>
Soru soranlar	Soğuk	Kantin
Birbirine karışan ekmek, döner, yemek kokuları	Havasız	Gri soğuk oturma grubu
Egzoz kokuları	Yeteri kadar ışık almayan	Beyaza boyalı ahşap
<b><u>TEXT 7</u></b>	<b><u>TEXT 9</u></b>	Turuncu yırtıklı oturma alanı
Uzun otobüs yolculukları	Mutsuz yüz ifadeleri	Reklam panoları
Konforsuz mekân	Suskun insanlar	Soluk renkli çıktı
Küçük koltuklar	Çarpık yapılaşma	Yanmış yağ, kızarmış et, patates kokusu
Üşümek	Camdan baktığımda	Gürültü
Terlemek	Bacalardan çıkan siyah duman	Baş ağrısı
Horlama sesi	<b><u>TEXT 10</u></b>	Ahşap sandalye
Ağlayan bebekler	Yurt yemekhanesi	<b><u>TEXT 12</u></b>
Kusan yolcular	Kalabalık	Pazar yeri
Pis kokular	Gürültülü	Karışık
Ayak kokusu	Yemek kokuları	Kalabalık
Oda parfümü	Artan Kişi sayısı	Yürürken çarpan insanlar
Renk cümbüşü	Konuşan insanlar	Bağırış çağırış
Aydınlık	Küçük ve basık salon	Sesler
Karanlık	Görevli seslenmeleri	Meyve sebze kokusu
<b><u>TEXT 8</u></b>	Çatal bıçak sesleri	<b><u>TEXT 13</u></b>
Mimarlık stüdyoları	Ağır koku	Sigara bölmesi
Geniş	Aydınlatma	



Girişteki tuvalet	Uzun ve dar koridor	Ciddi ifadeli doktor ve hemşireler
Parlak beyaz renk	<b><u>TEXT 16</u></b>	Suluk ve rahatsız mobilyalar
Parlak ışık	Bağrış çağrış	
İçerideki yoğun koku	Kalabalık	<b><u>TEXT 20</u></b>
Yoğun ses uğultusu	Sıkışıklık	Dar hareket alanları
Düzensiz masalar	Hareketlilik	Diğer insanlara dokunmak
Yüksek tavan	Islak beton yerler	Havalandırma problemleri
Yoğun koku	Çıplak beton kutu	Koku
Yoğun uğultu	Loş, nemli, soğuk mekân	İnsanların nefesi
<b><u>TEXT 14</u></b>	<b><u>TEXT 17</u></b>	<b><u>TEXT 21</u></b>
Kalabalık	Dışarıda yalnız kalmak	Sıvasız
Zor yürümek	Az ışıklı	Islak kokulu Alan
Yürüyen rehber	Tenha mekân	Koşar adım soluksuz ilerleyiş
Kapalı turuncu şemsiye	Soğuk hava	
Havasız	<b><u>TEXT 18</u></b>	<b><u>TEXT 22</u></b>
Ter kokusu	Camları açılmayan	Dar sokak
Dar koridor	Kalabalık	Kalabalık
Yapışık bedenler	Sıkışık mekân	Birçok ses
<b><u>TEXT 15</u></b>	Havanın nemi	Kaybolmuşluk hissi
Terk edilmiş fabrika	Zor nefes almak	<b><u>TEXT 23</u></b>
Ürpertici deneyim	Dışarıyı görememek	Kalabalık
Molozlara basarak ilerlemek	<b><u>TEXT 19</u></b>	Beton yığını
Tedirginlik	Soğuk hastane ve hastane odaları	İnsanların üstüne gelen mekânlar
Korku	İlaç kokuları	

#### **TEXT 24**

Yoğun ilaç kokusu

Soğuk iğnenin tene teması

Büyük kırmızı koltuk

Gerginlik hissi

#### **TEXT 25**

Atmosfer

Sıcak hava

Ağlama sesleri

Sis

Rahatsız sandalye

Ayak izi

#### **TEXT 26**

Yenilik

Eskilik

Bakım görmemiş ev

Gıcırdayan tahta kapı

Eski çeşme

Taş zemin

Tıp tıp sesi

Rengârenk kilim

Tahtanın sert dokusu

Tahta sedir

Kedi mırıldanması