THE SUPPORTIVE ROLE OF RECREATION IN PUBLIC SPACES WITH CHANGING COLORS, FORMS, AND SIZES

A THESIS
SUBMITTED TO THE DEPARTMENT OF
INTERIOR ARCHITECTURE AND ENVIRONMENTAL DESIGN
AND THE INSTITUTE OF ECONOMICS AND SOCIAL SCIENCES
OF BILKENT UNIVERSITY
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
MASTER OF FINE ARTS

By
Güzen Gilmer
June, 1999

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By

Gözen Güner

tarafından bağışlanmıştır

June, 1999

I certify that I have read this thesis and that in my opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Fine Arts.

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I certify that I have read this thesis and that in my opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Fine Arts.

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ABSTRACT

THE SUPPORTIVE ROLE OF RECREATION IN PUBLIC SPACES WITH CHANGING COLORS FORMS AND SIZES

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M.F.A. in Interior Architecture and Environmental Design

Supervisor: Asst. Prof. Dr. Markus Wilsing

June, 1999

This thesis discusses the supportive role of color, form, and size in the recreational spaces in public complexes. The basic concepts, and the relationship of color, form, and size is presented. Human responses and semiotics of color, form, and size is studied with the perception, symbolic interpretation, and psychological responses. Application of color, form and size in the interior spaces are discussed and the roles of those features are analyzed by defining the space. The definition of the recreation is presented with its significance in human life and changes in its character. Public space is defined and the emergence of public complexes is introduced. The role of recreation on public complexes is discussed with its commercial, social, and psychological features. A field research is conducted to test whether there is a difference in the preference of color form and size for different activities and for different sexes in recreational spaces in public complexes, among 100 subjects in the Bilkent University dormitories.

Keywords: Color, form, size, recreation, public space

ÖZET

KAMUSAL MEKANLARDA REKREASYONUN DEĞİŞEN RENK, FORM VE BÜYÜKLÜKLERLERLE DESTEKLENMESİ

Gözen Güner

İç Mimarlık ve Çevre Tasarımı Yüksek Lisans

Tez Yöneticisi: .Yrd. Doç. Dr. Markus Wilsing

Haziran, 1999

Bu çalışma renk, form ve büyüklüklerin kamusal mekanlarda bulunan rekreasyon alanlarındaki destekleyici rolünü sorgulamıştır. Renk, form ve büyüklük kavramlarının içerikleri ve bu kavramların birbirleri ile olan ilişkileri tartışılmıştır. İnsan tepkileri ve bu kavramlara yüklenen sembolik anlamlar, insan algısı, sembolik çözümlemeler ve pisikolojik etkiler ile birlikte incelenmiştir. Renk, form ve büyüklüklerin iç mekanlardaki rolü, mekan tanımı ile birlikte ele alınmıştır. Rekreasyon kavramının tanımı, bu kavramın insan yaşamındaki önemi, değişen kimliği ile birlikte sorgulanmıştır. Kamusal mekanların tanımı ve bu mekanların kompleksleşmesi tartışılmıştır. Rekreasyon kavramının kompleksleşmiş kamu mekanlarındaki rolü, ticari, sosyal ve psikolojik açılardan incelenmiştir. Bu komplekslerde gerçekleştirilen farklı rekreasyon aktivitielerin ve bu akiviteleri kullanan farklı cinslerin renk, form ve büyüklük tercihlerinde faklılık olup olmadığını sorgulayan bir çalışma Bilkent Üniversitesi yurtlarında 100 kişilik bir denek grubuna uygulanmıştır.

Anahtar Sözcükler: Renk, form, büyüklük, rekreasyon, kamusal mekanlar

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1. INTRODUCTION

The term public environment includes aspects such as the places of public interest environments that concern people's health, safety and welfare, including people of limited and diverse capabilities secondly, the way in which the public is involved in decisions about all our environments and lastly, the delivery of services. Consequently, public environments are places that profoundly effect public life and which are used for the common good and to effect it. They are accessible to and shared by a diversity of people and open to general observation. Public spaces are arena for social life. Public life is a forum, it is a group activity, it is a school of social learn, and it forms a common group (Brill, 1989). Briefly, public spaces are publicly accessible spaces where people go for group or individual activities.

Recreation, which has a significant role in public life, consists of activities or experiences, which are performed on voluntarily in leisure time. They are chosen by the participants either for pleasure or to satisfy personal needs. Recreation is a feeling of wellbeing and results from experiences in which the individual receives the pleasurable and gratifying response to the use of his physical, mental or creative powers. In short, recreation is any experience in which the individual directly gains personal enjoyment and satisfaction (Jensen, 1977).

During the 20th century, there has been an increasing need for recreation. As the most important factor, the need for recreation for the sake of enjoyment rather than social welfare came into being. Recreation is transformed in many forms with the changing technology today. After public parks, pubs, music halls were provided throughout the

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century, cinema and spectator sport, together with television have been presented to the public as means of leisure and recreational attractions; starting to penetrate our lives both in private and public spaces (Torkildsen, 1992).

Parallel to the changing demands of the public and the public life, recreation started to gain another important role; besides its individual character, recreational spaces have started taking place in public environments and today's public complexes have started to penetrate our lives.

Different social interaction activities, informative functions, diverse and distinctive properties rather than the main activity of the specified public space are accepted as recreational activities (Mullins, 1987).

The above mentioned criteria being the overview of the situation; this thesis aims to point out the supportive role of recreational activities that take place in public complexes considering color, form, and size; being important tools that an interior architect utilizes.

Colors, forms, and sizes are the elements that researchers had a general tendency to study as separate fundamentals in their scientific studies. However, as Itten (cited in Whitford, 1984) mentions, the features color, form and size are unique items which cannot be evaluated without one another. A color could not exist without any form and neither could exist without any size. Every form exists in the universe with a color and a size resulting in the outcome. These are such concepts that they should be dealt with relation to each other.

In addition, it is a proved fact that, color, form and size induce psychological aspects in interior spaces despite their formal role which should be to define space. They have a great contribution to the character and the aspect of a space. They stimulate some senses; mark territory and manage personal space; symbolize abstract concepts and thoughts, awake some meanings, express fantasy and fulfillment of wishes. They have the capability of creating illusions and ambiance. Moreover, they amplify self-image and personal esteem and produce an aesthetic response (Eiseman and Lawrence 1990).

Moving from this point, the role of colors, forms, and sizes in recreational spaces in public complexes are going to be analyzed in the content of this thesis. Considering the psychological significance of colors, forms and sizes in interior spaces, their contribution to the activity of recreation will be studied by conducting a field research.

To present the above mentioned information accurately, the thesis has been structured as follows:

In the introduction, a brief description of the terms: public space, recreation and the emergence of public complexes are overviewed. The significance of colors, forms and sizes in the field of interior architecture from the psychological point of view has been underlined.

Chapter 2 begins with an overview of the development stages in color, form and size and continues with brief knowledge about some basic concepts and the terminology

of colors, forms and sizes. This chapter, then, moves on to human responses and semiotics of colors, forms and sizes. Application of colors, forms and sizes in a space is the end of the chapter.

Chapter 3 starts with the topic of evolution of public spaces and recreation, then moves on to the definition of the related terms, and the emergence of public complexes are studied under this topic. The chapter than proceeds to the role of recreation in public complexes. This chapter concludes by discussing the commercial and psychological aspects of recreational activities in public complexes.

Chapter 4 is the field research of the thesis. The design of the field research, methodology, subject selection and the application is presented. It is evaluated by reviewing the results and the construction of the discussions.

Last chapter briefly summarizes the key issues that were underlined throughout the thesis and further discusses the role of color, form and size in recreational spaces in public complexes. The results of the field research are overviewed and this chapter concludes with the implications for further research.

2. COLOR, FORM, AND SIZE

In the content of this chapter, basic concepts of color, form and size are presented with relation to each other. Following these issues, human responses and semiotics of color, form and sizes are examined. At the end of the chapter, application of colors, forms and sizes in a space is handled.

2.1. THE BASIC CONCEPT OF COLOR

Color has a significant role in our life. Eiseman and Lawrence (1990) quoted that color can help to facilitate and fulfill some very basic human needs. It can identify and specify necessary objects such as animals, vegetables, and minerals, for survival and enjoyment. It stimulates and works together with all the senses: sight, smell, taste, hearing, and touch. It marks territory and manages personal space; symbolizes abstract concepts and thoughts. It recalls another time and place, which creates a sensation related to the memory; expresses fantasy and wishes fulfillment. It creates illusions and ambiance while emphasizing or camouflaging figures or objects. It enhances self-image and personal esteem and produces an aesthetic response.

Moving from the importance of color in our life; the following topic aimed to summarize the basic significant knowledge and apply this to the analysis of color in recreational spaces. In this content, the factors affecting color perception is discussed with the basic color terminology.

Mahnke (1996) mentions that experience of color is influenced from six basic features. He explains this using a pyramid. The base of the pyramid starts with the biological reactions to color stimulus which are in the psychological realm and which are beyond our control. Second one is the collective unconscious; these are the reactions based on personal experience amassed during our lifetime. Conscious symbolism, associations are the third one, which are the learned responses, impressions, and symbolism made by conscious level. Fourth one is the cultural influences and mannerism that are characteristics of some cultural regional, and group effects on the perception of colors. Fifth one is the influence of trends, fashions, and styles temporary color trends are important parts of color perception. The last one is the personal relationship to color, which express our likes, indifferences, and dislikes related to certain hues.

As Kuehni (1986) mentions that color is a large concept, which brings lots of different components together. Color sensation and perception arise from a combination of different factors. Grandis (1986) categorized these factors into five. First one is the chemical and physical factor, which is related with the physical reality of matter and light. Second one is the technical and practical factors which are the different methods of painting and the optical processes that are derived from glues, grounds, color mixtures, glazes, and so on. Third one is the visual apparatus, which transforms light rays into color sensation with their varying qualities of hue, luminosity saturation and intensity.

Fourth one is the perceptive element which depends on the different arrangements of colors where the quality and constancy of the perception are derived from, therefore

precluding any exact definition. The luminous intensity of a given color may increase or decrease; even its shade and tint may be modified according to surrounding hues. Perceptive factors as a result, influence the relationship between a painted surface and the observer's perception of this surface. The last one is the psychological factors, which form the main interest point of this study, depend on the range of variable characteristics such as: experience, sensitivity, intelligence, age, sex, culture, religion, nation, and etc. which affect the observation of color (Grandis, 1986).

The last two factors, which are the perception of colors in different organizations and the psychological responses to color, are the main subjects that are studied in the content of this thesis and which are going to be analyzed in further detail in the following sections.

Hue, saturation, and value are the basic color terms that are necessary to analyze color. Hues are the names of colors (red, blue, green, and so on). It is an obvious feature of monochromatic light that varies with wavelength and therefore is used to denote various regions of the spectrum. Value or brightness is the degree of lightness and darkness. It is the perceived intensity of light and the third dimension of the perceived color. It is the quality that differentiates a dark color from a light one. Saturation or intensity is the measure of purity, or grayness of a color. It refers to the lack of whiteness in a color in other words, how much color differs from white or gray (Zelanski and Fisher, 1987) (see Figure 2.1).
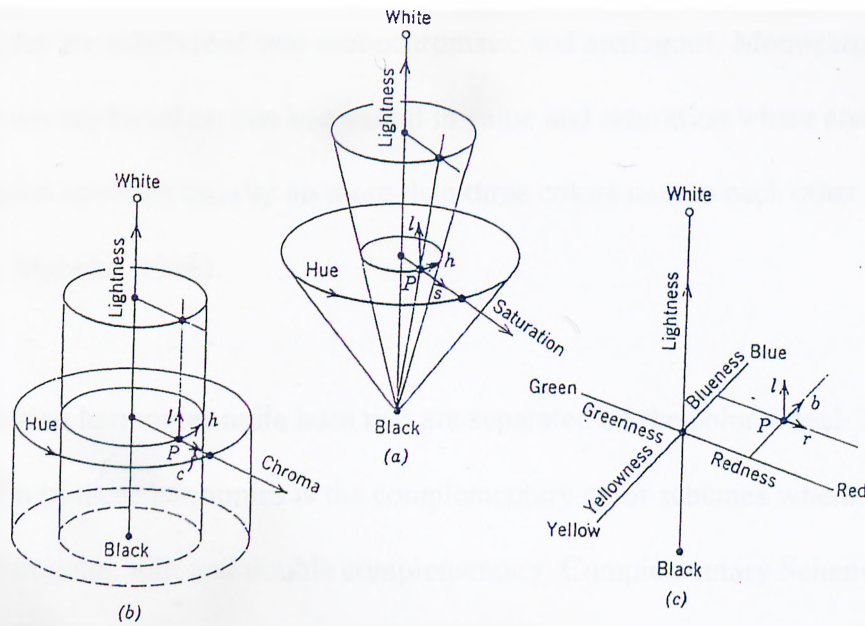
Figure 2.1: Hue, Saturation, and Value from Crozier, R. Manufactured Pleasures: Psychological Responses to Design (New York: 1994) 146.

Color circle is the basic color organization that the concepts of color harmonies and contrasts are derived from. It is the location of each primary hue, which is allocated a segment of a circle in the wheel (see Figure 2.2) (Danger, 1987).

Figure 2.2: The Color Wheel from Itten, J. The Elements of Color (New York: 1970) 31.

Color harmonies fall into two broad categories, related and contrasting. Related categories are subdivided into monochromatic and analogous. Monochromatic harmonies are based on one hue varied in value and saturation where analogous harmonies combine usually no more than three colors next to each other on the color wheel (Mahnke, 1996).

Contrasting harmonies unite hues that are separated on the color wheel. The most common of these harmonies is the complementary color schemes where it is divided into analogous, split and double complementary. Complementary Schemes are based on the hues directly opposite to each other on the color wheel. Analogous-complimentary is a modification of the complementary schemes two colors next to each other and combining them with the complementary of one of the two. Split-complimentary is consists of one or two adjoining its complementary colors where double complimentary is recommended the use of two closely related hues and their complements (Mahnke, 1996).

2.2. THE BASIC CONCEPT OF FORM

Form is among the most important features in the design field. In the content of this topic fundamental information about form is presented. Similar to color, form is also a complex concept where lots of different disciplines work with it in different context. Form is defined.

From the architectural point of view, form is defined moving from point, which is the generator of all forms. As a point moves, it leaves a trace of a line, which is

considered the first dimension. As the line shifts to a direction other than its own, it defines a plane, which is a two dimensional element. The plane extended in a direction oblique and or perpendicular to its surface, it forms a three dimensional volume (Ching, 1987).

Point, line, plane, and volume are the primary elements of form. All visible forms are, in reality, three-dimensional. In describing form, these primary elements differ according to their relative dimensions of length, width, and depth. Form is the term that is used to describe the contour and overall structure of a volume. The specific shape of a volume can be determined by the shapes and interrelationships of the lines and planes that describe the boundaries of the volume (Ching, 1987).

Most of the time the words form and shape are used interchangeably. But form and shape refers to different things as Zelanski, and Fisher mentions. Shape is a figure that appears to be flat, whereas form is a figure that appears to be three-dimensional (1984). They also define form as the actual contour of a work, the volume or mass that it carves out of space (1987).

Rawson, (1987) Whitford, (1988) Folcillon, (1992) Hildebrandt and Tromba (1985) mentioned that the most general abstract design-forms derived from basic human experience of vertical and horizontal, center and slant, are the square, circle and the triangle. Square, circle and triangle are the clear geometric forms and the most comprehended elements, and every possible form lies dormant in these formal elements.

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Interpretation of forms in a space requires some visual clues. Plane structure, overlapping, and shading is the three important visual clues that are used in form interpretation. Plane structure represents straight-sided figures as having three dimensions; one commonly used device is the depiction of several sides of planes of the figure at once, rather than only its flat face.

Overlapping can be experienced when one structure of a figure is overlapped and therefore partially obstructed by another, viewers interpret them as being lined up in a space with some degree of depth. Form is indicated by shading as well. Areas curving or facing away from a light source appear darker than areas facing the light source. Shading- the depiction of relative darkness in areas where light has light has been particularly blocked- can suggest the rounding of a form.

Plane structure overlapping, and shading can be used to create representational illusions of forms from the three dimensional world. However, since these artistic conventions are taken from familiar ways of perceiving they can also be used to create the illogical which nonetheless have an air of familiarity (Zelanski and Fisher 1984).

Forms are seen in different combinations and in different characteristics. Zelanski and Fisher, (1984 and 1987) mention that according to their identity and combinations they can be distinguished in to four groups.

First one is interior and exterior forms, where the forms refer to the outside of a piece is exterior and inside is considered as interior forms. Second one is the secondary and

primary contours, where the shape of an object's outermost extremity is considered as the primary contour and the forms developed on its surface can be considered as secondary contour. Positive and negative forms are the third group where, the positive forms are solid areas that occupy space and negative (or implied) forms or voids are the shapes of spaces that are enclosed or delineated by positive forms.

Fourth one is static and dynamic forms, the forms that are in the sense of appealing stationary and nonmoving are called static forms, where the dynamic forms are characterized by motion, change, or energy that lead to motion and change. The last one is the representational, abstract and non-objective form. Representational or figurative forms can be defined as the forms that refer directly to an object from the three dimensional world of our experience, while nonobjective forms refer to any object from our three dimensional world (Zelanski and Fisher 1987).

2.3. THE BASIC CONCEPT OF SIZE

Size is the other important feature in architecture besides color, and form. Shapes have two dimensions that are, length and width that determine the size of a shape. On the other hand, forms have three dimensions: length, width and depth that determine the size. In reality, size is a relative concept and it can not be evaluated independently. Size of a single form, whether it is big or small, can only be determined by comparing its length, width and depth with another form. Size as a physical element gains importance by its features namely, proportion and scale in spaces. As Zelanski and Fisher (1984) defines scale is the relationship of an object to its surroundings.

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In past centuries, visual scale was often related with thematic importance: the sizes of figures were based on their symbolic importance in the subject being presented. Relation to its surroundings or relations to human size are important in order to evaluate proportions (Lauer, 1985).

Proportion is a matter of relationship between lengths. It is not concerned with actual measurement but it is a relative value. For example, Golden Section is a proportion, which is a very important tool in all branches of design. The Golden Section devised by Le Corbusier has been derived from a square. It has been achieved by dividing the rectangle into two equal rectangles by drawing a diagonal in one rectangle and extending the short side of the rectangle to equal its diagonals (see Figure 2.3) (Hildebrandt and Tromba, 1985).
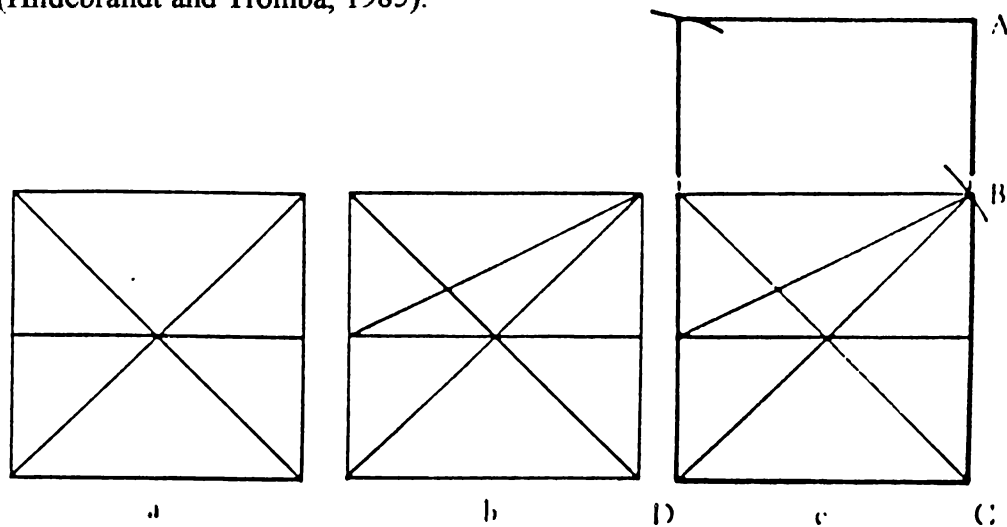
Figure 2.3: Constructing a rectangle of Golden Section from Rawson, P. Creative Design: A New Look at Design Principals (London: 1987) 89.

In antiquity, all architecture was strictly modular, as all design was worked on a modular wave. The best known example is the series of Roman Orders, according to Vitruvius: Toscan, Doric, Ionic, Corinthian, and Composite. The module chosen was the radius of the only circular element of the plan and column. The close relationship

between the numeric value of PI and the golden mean may give a clue to this choice. The dimension of the module represented the unique characteristic of every monument, and this value which varied for every monument produced such results, so that no two columns in all antique architecture are exactly alike; however, once chosen, the proportions of the various orders used throughout the same monument followed the same series (Grillo, 1985).

Proportion is the size relationship among the parts of a work. The issue of proportion can be approached mathematically. In ancient Greek, it was felt that the most aesthetically perfect size ratio between two unequal parts of a whole was 1 to 1.618 feet. In a rectangle whose short side was one-foot (0.3m) long for instance, the long side would be 1.618 feet (0.49m). Considered as the golden section, these proportions were thought to be epitome of beauty and were used in the design of masterpieces such as the Parthenon (Zelanski and Fisher, 1984).

Parts of the human body also exist in specific relationships with each other. The representational artist must bring the ratios between the parts of the body into conscious awareness, so as to satisfy viewers' sense of proper proportion (Zelanski and Fisher, 1984).

Size could only be evaluated in cases when relation with another object is present. We are led to say that such a figure is smaller or bigger than the other one when we are able to compare them with one another. The size of a figure considered referring to another well-established dimension is already a sizable entity in our minds. All the units of measure are related with the human scale. Human scale is important as a

source of permanent reference for measure, and helps to realize all creative work of a man directly related with human size and energy (Grillo, 1985).

The drawing of Leonardo Da Vinci represents one of the guiding principles of design in the Renaissance: that pure and ideal proportion was the basis of human form, and similarly, in return could be derived from it (see Figure 2.4) (Rawson, 1987).
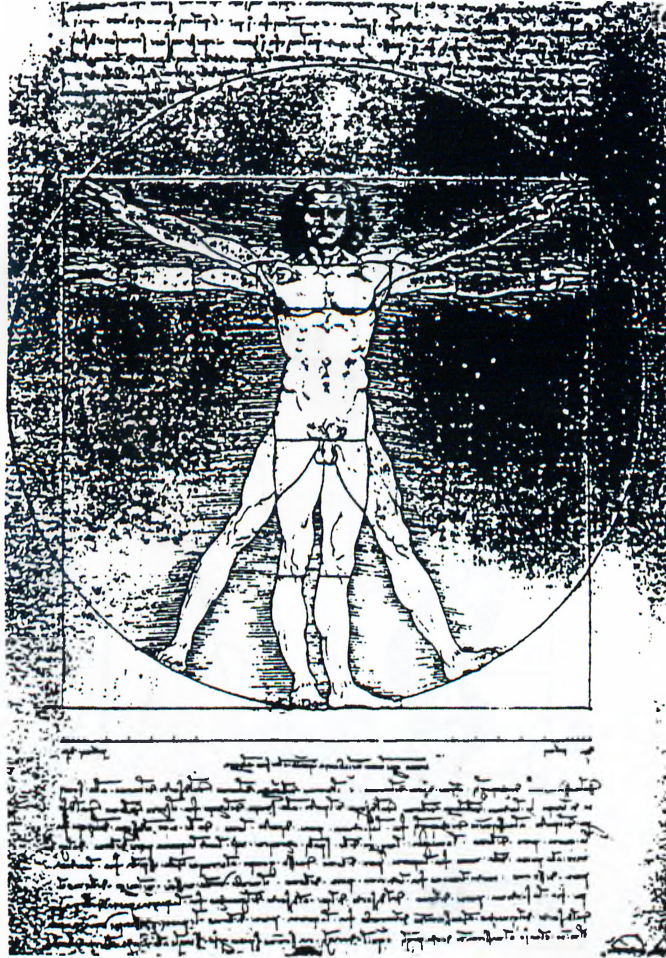
Figure 2.4: Leonardo Da Vinci, Vitruvian proportions derived from the human body, 1490 from Wittkower, R. Architectural Principles: In the Age of Humanism (London: 1988) 23.

Le Corbusier defines the modular as the harmonious measure to the human scale, universally applicable to architecture and to measuring apparatus. Le Corbusier's proportional system for architecture is also derived from the main proportions of the

human body. It invites comparison with Leonardo's scheme (see Figure 2.5) (Rawson, 1987).
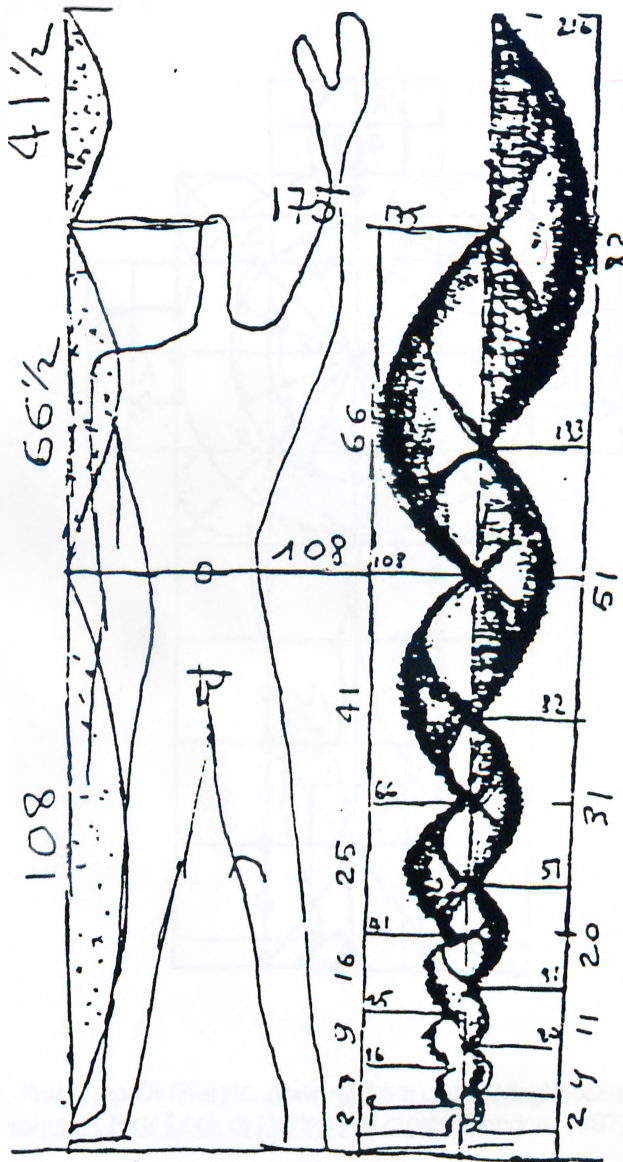
Figure 2.5: Le Corbusier, The modular, 1954 from Rawson, P. Creative Design: A New Look at Design Principals (London: 1987) 88.

Similarly, Francesco Di Giorgio worked on the human scales in the 16th century. The Italian Renaissance architect illustrates how the proportions of the ideal church

ground- plan can be derived from human body proportions. Giorgio shows, how the church is composed of the head, the body and feet (see Figure 2.6) (Rawson, 1987).
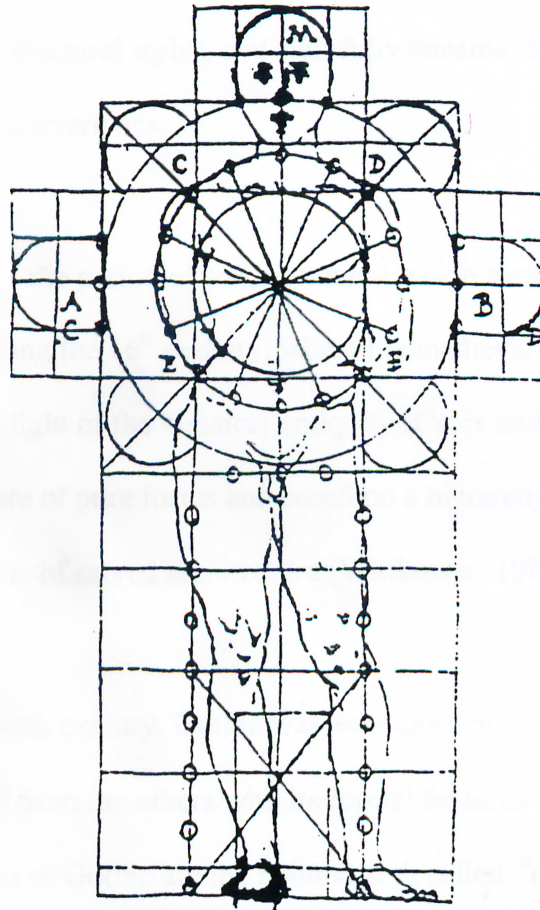
Figure 2.6: Francesco Di Giorgio, drawing from codex Magliabechiano from Rawson, P. Creative Design: A New Look at Design Principals (London: 1987) 88.

2.4. THE RELATIONS OF COLOR, FORM, AND SIZE

Form color and size are unique items they can not be evaluated without one another. As Itten thought that it was impossible to consider color apart from form, and form apart from color. Also Kandinsky and Klee who are the masters of colors follow the

same ideology and stated that without color there is no form and they do not exist without any size (cited in Whitford, 1988).

Through the history color form and size played an important role in the development of art and architectural styles, and rightfully became the most important features in the certain characteristics.

Renaissance is the period of enlightenment which started in the 14th century and continued during the 16th century, where the medieval darkness was illuminated with the rekindled light of the classical antiquity (Croix and Tansey, 1986). Renaissance is the architecture of pure forms and based on a hierarchy of values culminating in the absolute values of sacred architecture (Wittkower, 1988).

In the eighteenth century, Gothic was an important period which could be distinguished from the others with its formal features. The important formal characteristics of Gothic are the pointed arch called *"ogive"*, the vaulting supported by conspicuous intersecting arches and the flying buttresses. Various combinations of these forms have been singled out and used to distinguish national or regional aspects of gothic architecture (Branner, 1984). The division of interior space in edifices both large and small, civil and ecclesiastical alike is another characteristic feature of Gothic architecture (Grodecki, 1986).

Gothic and Renaissance shoes can be a good representative example in order to point out the characteristics of each period considering the form, and size relations; this

discrimination can easily be applied to the architecture of the date as well (see Figure 2.7).
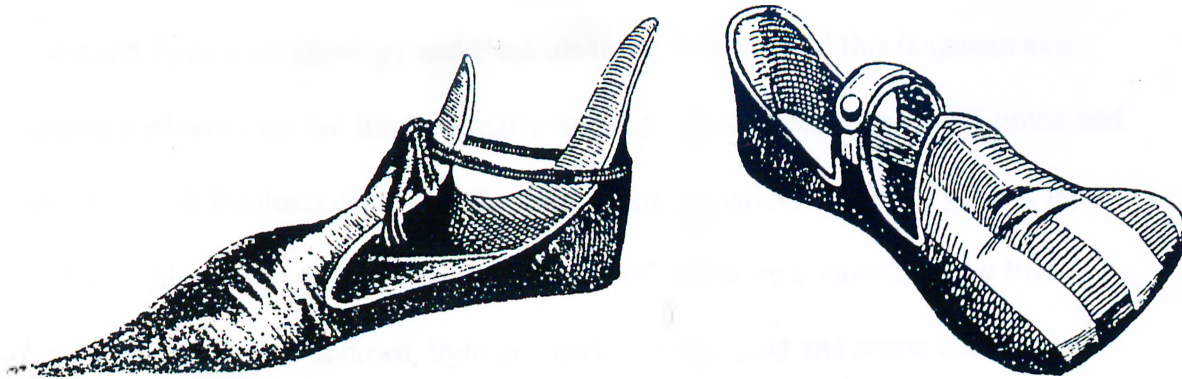
Figure 2.7: Gothic and Renaissance shoes from Gombrich, E. The Sense of Order: A Study in the Psychology of Decorative Art (New York: 1984) 202.

Baroque is considered to be more dynamic spacious and brilliant compared to the static renaissance architecture. It is also colorful, theatrical, and passionate, sensual, extra avangarde, versatile, and virtuoso. It was an age of expansion following an age of discovery, and its expansion led to still further discovery (Croix and Tansey, 1986). The most distinctive feature of Baroque architecture is its mastery of space and the forecourt principal, employed by many architects which forms its basic architectural characters (Martin, 1989).

Art Nouveau is an important period, which began at the beginning of the twentieth century with its own formal principals. Art Nouveau can be summarized with two phrases: curvilinear lines and floral patterns. Art Nouveau designers tried to convey a feeling of the dynamic forces in nature, the dynamic forms of the flowers, study of plants, and the inspirations from Japanese art brought the outcome of the curvilinear forms and floral styles (Haslam, 1990).

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Bauhaus and Destijl in the twentieth century were the two periods that developed

their own theories related to color, form and size. Bauhaus united the basic concept

color and form in its ideology and Bauhaus theorists described this language as a

system analogous to- but fundamentally isolated from- verbal language. (Lupton and

Miller, 1993). Bauhaus dealt with the three-color primaries, which are yellow, blue,

and red. Also seven different contrast effects of colors were introduced by Itten

which are: pure color contrast, light and dark contrast, cold and warm contrast,

complementary contrast, simultaneous contrast, quality contrast, and quantity

contrast (Itten, 1975). The theories of Itten, Klee, and Kandinsky related to form and

color, formed the basis of teachings in Bauhaus. Itten and Kandinsky believed that

color could not exist independent of form.

In 1923 Kandinsky, proposed a universal correspondence between the three

elementary shapes and the three preliminary colors: the dynamic triangle, is

inherently yellow, the static square is intrinsically red, and the serene circle is

naturally blue (cited in Lupton and Miller, 1993). According to Itten, (1974, cited in

Whitford, 1988) the clear geometric form is the most easily comprehended one and

its basic elements are the circle, the square and the triangle. Every possible form can

be derived from these formal elements. Kandinsky and Klee started to investigate

form, moving from the smallest element: point. Then, they moved on to identifying

three basic types of lines: the active, the passive and the medial. An active line is free

and constantly moving. The line becomes mediaeval when it describes a coherent

form. If that form is colored, than the line becomes passive, for the color serves as

the active element (see Figure 2.8).
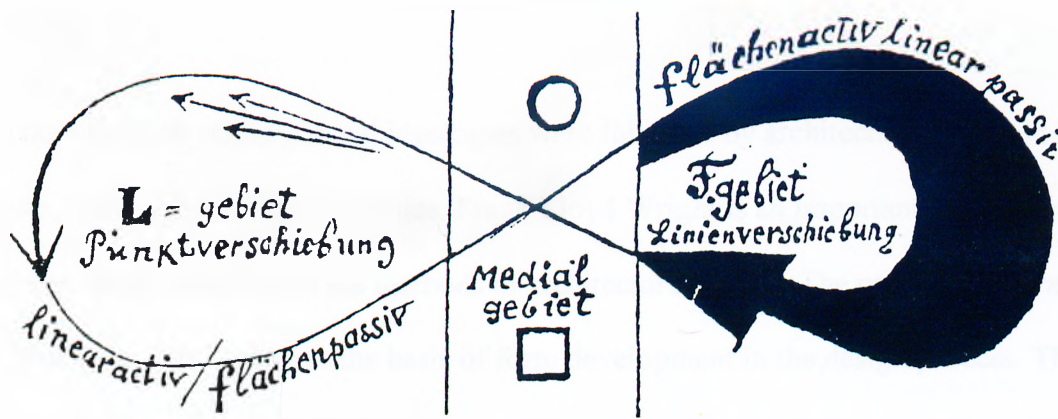
Figure 2.8: Paul Klee, diagram showing the relationship and image created from an active line and a Passive plane (left), and its opposite (right). In the center is the area in which the "medial line" comes into play from Whitford, F. Bauhaus (London: 1988) 114.

Similar to Bauhaus, Destijl was also composed of some main principles of color and form. The main design principles of Destijl can be listed as follows: stripping downs of the traditional forms of architecture, furniture, and painting or sculpture simple basic geometric components or elements. The composition from these separate elements of formal configurations are perceived as whole, while remaining clearly constructed from individual or independent elements. A studied extreme asymmetry of composition and design. An exclusive use of orthogonal, horizontal and vertical lines or elements, and the pigment primary colors, pure red, yellow, and blue, plus the neural colors and tones, white, gray, and black could be observed. These principles were modified in the following years. Diagonal lines, secondary colors such as green orange and violet and symmetrical forms started being introduced (Overy, 1991).

Van Doesburg, who was one of the masters of design in Destijl, employed primary colors for housing applications, and the complementary trial of secondary colors; violet, orange and green, for school environments. He also produced complex color schemes for the interiors of houses (Overy, 1991).

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In the twentieth century social ideologies were followed by architectural trends in color, form and size characteristics. Frank Lloyd Wright is an important name who relates his principles with his methods of architectural design. The principal *"Form follows function"* prepares the basis of form development in the design process. The origin of his assertions of dichotomy forms the underlying principles and the spirit of his work, where the superficial effect forms the architectural form (Laseau and Tice, 1992).

Le Corbusier is another name who unified his ideology with the architectural form, color and size. The humanitarian logic of his work developed around the following postulates: men are all equal, endowed with the same fundamental needs, no matter what their cultural levels are, so they have the same rights of happiness; this must be assured by the progress of technique, blending with all the services of an architect. These ideological theories form the basis of his architectural formation of Le Corbusier's works (Choay, 1987).

As it is seen color, form and size are the items that are used together and in relation to each other. The changes in the character of one directly effect the others. They are used together to characterize some periods in the history. They became the important tools in outputting of some social ideologies. So color, form and size can not be evaluated without one another. They should be hold on and studied in relation to each other.

2.5. HUMAN RESPONSES AND SEMIOTICS OF COLORS, FORMS, AND SIZES

Color, which is created by light, is actually a form of energy. This energy affects body functions like it influences mind and emotions. Today it is known that color affects cortical activation (brain waves), functions of the automatic nervous system, which regulates the body's internal environment, and hormonal activity, and that color arouses definite emotional and aesthetic association. Color affects both psychologically and physiologically (Mahnke and Mahnke, 1993).

Under this topic issues such as, perception of colors, forms and sizes, colors, forms and sizes as symbols and psychological responses to colors forms and sizes are going to be discussed.

2.5.1. Perception of Colors, Forms, and Sizes

The functioning of the human eye and the brain together, in order to interpret observations, is named as the process of perception. One set of psychological theories and resulting theories of perception is namely, Gestalt psychology. Most of the Gestalt theories and investigations are directly related with design aiming to achieve harmony and balance (Cheatham, Cheatham and Owens, 1987).

The basic principle of Gestalt theory can be summarized as such; images are first perceived as unified wholes before they are perceived as parts. This means we see the whole before we see the parts that make up the whole. Gestalt psychologists say that the perceptual capacities of a viewer are such that the eye does not initially

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differentiate each of the individual component parts of an image. Instead it will organize the components into a more comprehensible, unified whole. Additionally, Gestalt theory maintains that the eye has the capacity to absorb only a limited number of unrelated whole units. This capacity is dependent on the units' visual differences, similarities, and relative positions. Gestalt theory proposes that the eye and the brain is continually involved in an organizing, simplifying, and unifying process that produces a comprehensible and harmonious whole (Ellis, 1975).

The methods that have been developed to achieve simplifying, organizing and unifying images or forms are deletion, proximity, overall pattern, closure, alignment, and similarity.

Deletion: Deletion consists of consciously removing non-essential materials from the visual statement, so only those components that are absolutely necessary remain. Cropping is a method of deletion portion of a whole image. This image can be covering up or the view can be blocking in order to enable to visualize a new visual frame of reference (Ellis 1975).

Proximity: Individual visual units are which are next to, or near, one another can be described as being in proximity and they are usually perceived in the form of being grouped. Close-edge relations, combining, touching and overlapping, are the methods of visual grouping by proximity. The space separating the edges of the units becomes so small that instead of separating the units visually unified, the individual units can be perceived as larger whole consisting off smaller individual units. Individual units can be more closely associated than when they are physically

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combined. Individual units are placed close enough to actually touch one another; the units will visually form a larger, unified whole. Overlapping is another variation of combining. When the units are closer in value, color and texture they will be more welded visually. If all the units are exactly in value, color, or texture, the dividing outlines of the individual configurations will disappear and a single shape will be created (Ellis 1975).

Overall pattern and texture: The perception of visual gestalt as a pattern or texture is usually based on size and scale whereas the numbers of units sometimes control the appearance of a pattern or texture. Patterns and textures can be created in either two or three dimensions from anything that can be repeated. They can be created by the repetition of similar or dissimilar individual units placed in proximity (Ellis, 1975).

Closure: Another common method of visual grouping is based on the human ability to complete partial images, which is called closure. An incomplete image can be completed mentally by filling the missing pieces. However, if too many parts of an image are missing or if the distance that must be closed perceptually is too great, then the parts begin to be perceived as individual units complete by themselves (Ellis 1975).

Alignment and grid system: Alignment can be referred to as being in a state of lining up physically and optically. Physical alignment is achieved when two or more units are placed on a physically perceivable common line. Optical alignment takes place when the common line that aligns the units is not physically present in the

visual image. When two or more alignments are used together this unity creates another organizational tool called the grid (Ellis 1975).

Similarity: Size, shape, volume, direction, color, and value are the basic tools that are used for grouping by similarity; which is a method of visual simplification. Similarity in size, shape or volume causes individual units to seem to belong together. Various lines, shapes and forms are perceived similarly if they are travelling in the same direction. Individual units are perceived as parts of a larger visual group when they share a similar color, and value (Cheatham, Cheatham and Owens, 1987).

As considered by Linton, (1991) Lloyd (1988), Padgham and Saunders, (1975) colors also evoke associations with odor and taste, seem to make things appear heavier or lighter, give tactile impressions, be associated with sound, have volume and temperature associations. Colors effect such other important factors such as, the estimation of time, perception of weight and size, and perception of temperature.

Estimation of time

Color has a contradiction on the perception of time. In her experiment Linda Clark (cited by Mahnke, 1996) observed different time estimations in different colored rooms. Two groups of salesmen, having removed their watches were assigned in the separate meeting rooms one group in red room the other on the green room. The red group suggested that it had spend twice as much time in the meeting, whereas the green group thought it had spent less time in the meeting that the actual amount. On the other hand, another experiment conducted by Potter and Mikellides (cited by

Mahnke, 1996) achieved just the opposite results. Two identical lectures were presented to two audiences; one seated in the blue room, the other seated in the red room. The audiences of the blue room felt that the lecture was longer than actually it was and they got bored while the audiences in the red room found it more exciting, interesting and the time had passed quickly. It is actually not solved yet which hue actually affects the under or over estimation of time, but it is known that color definitely influences the judgements of time.

Perception of Weight and Size

Darker colors appear heavier, whereas lighter and less saturated tones seem less dense. If the hues are of the same value and intensity, the tendency is to perceive the warmer hues as heavier. Lots of researches conducted in this field.

Pinkerton and Humphrey, (1974, cited in Space Human Factors Office, 1986) in their researches used five colored lights fixed by special filters in a laboratory environment. They kept brightness constant and had each subject weigh a colored light against a white standard by adjusting a fulcrum point between the lights. At the end of the study it is observed that all the colors were regarded as heavier than white where red is the heaviest, and followed by blue, green, orange, and yellow.

Perception of Temperature

A natural association seems to exist between color and temperature in human experiences. Color has the power of to suggest warmness and or coolness. In their study, researchers Greene and Bell (1980, cited in Space Station Habitability, 1986) observed the similar results. They had the student subjects complete emotional

response, personal comfort, and environmental quality scales as well as a temperature estimate while they were sitting in triangular carrels having walls painted red, blue, and white. At the end of the study subjects perceived the red room higher in temperature although the three of them were at the same temperature.

2.5.2. Colors, Forms and Sizes as Symbols

Jones mentions that the construction and the subsequent perception of form and color and their meaning depend on the coding and de-coding of systems. These systems are color intervals and meaning differences. It is a fact that semantic systems are more complex than formal systems. The structural relationships between these systems are the key to understanding abstraction and expression in color (Harrison ed. 1987). The responses to form, color and size are not only biological but are influenced by form, color and size associations from our culture (Zelanski and Fisher, 1987).

Mahnke (1996) also mentions that color characteristic of specific cultures and groups, and the regional level play an important role on how color is experienced, used, and effected color associations, and mannerism. Lauer (1985) similarly points to this issue of symbolic color references as not being worldwide issues but issues relative to culture, thus varying from one society to another.

In western cultures, black is associated with death. However, in ancient Egypt, statues of Osiris were painted black to indicate the period of gestation when seeds are sprouting beneath the earth; black is associated with preparation of rebirth rather than

an ending of earthly life. People in the West Indies use bright colors in funerals in celebration of the soul's departure for a happier existence. In China, the color used for mourning is white (Birren, 1988).

As Birrren (1971) mentions that in many cultures red is associated with vigorous life mainly because it is the color of blood. Variations of the same hue may have different associations. In Catholic religious art, the blue of a clear sky is often used to symbolize heaven. The Virgin Mary's robe is usually painted blue symbolizing the quiet power of her serenity. When her robe is painted a darker blue-black, this symbolization can be interpreted as the expression of her sorrow over the death of her son (Judd and Wyszecki, 1975).

Yellow, on the other hand, is the color symbolizing deity in most regions. Whereas green is the sacred color of Islam. To the Egyptians, it symbolizes the hope and joy of spring. In early Christianity in 15th century, green symbolized fertility and it was the color of bride gowns, which now has changed into white, in the western world after a period of time (Portmann and Rowe, 1994).

Kandinsky's triangle, square, and circle are analogous in some ways to a system of linguistics signs. The series represent vertical links between the planes of form and color; horizontally, each plane is structured by the oppositions hot and cold, light and dark, active and passive. The most crucial difference between the verbal sign and the idea of the visual sign symbolized by triangle, square, and circle, is the arbitrariness of the link between form and concept, signifier and signified, in the verbal sign (Gombrich, 1984).

It is argued that language is fundamentally social, depending for its survival on a shared cultural agreement; in contrast, the series triangle, square, and circle symbolized the search for a language based on natural laws of perception. Yet, the series triangle, squares and circle itself bear cultural associations. Its kinship to children's toys carries the promise of generation while its geometry and spectral purity allies the truth of intuition with that of science. When the forms of triangle, square, and circle appear in design today, they function as transient signs, carrying such diverse meaning as art and the basics and modernism; they are bound to cultural meaning by the act of quotation (Lupton and Miller, 1993).

2.5.3. Psychological Responses to Colors, Forms, and Sizes

Psychology is the science that deals with the mind, with mental and emotional process, with special reference to behavior, provided it is understood that behavior includes thoughts, feelings and dreams that a person experiences (Mahnke, 1996). Color apart from the conscious, sub-conscience, and unconscious is an experience that is integral to human behavior. The human reaction to a color, a color combination and to the environment is always initially a psychological one, but it can also result in a psychological reaction (Mahnke, 1996).

Studies on the effects of color, form and sizes on human psychology date back to the ancient periods. Lautzu who is one of the famous followers of the Tao philosophy regards nature as an organic whole in which the intangible part is the most vital. The individual is asked not to be blinded by monumentary or fragmentary states of being, but to be aware of what is not seen yet destinated to come. In the philosophy of Tao,

color can be said to have two obvious aspects: constant color and apparent color. When spatial form is concerned, nature again is for incompletion. To manifest either a rectilinear or a curvilinear form, it is necessary to have light unevenly distributed along the dimension to time, nature also functioning on the basis of incompletion (Chang, 1981).

Ancient Chinese developed color, form and organization principals over an amount of time spanning for nearly 1200 years, and gathered these ideas into what is called Feng Shui principles. According to Feng Shui, the life of every human being is directly effected by two great fields of energy. First one is the constant energy of the earth, which is below us. Second, is the energy of the cosmos existing through a vast amount of space and which is above us. By using these energies positively, Feng Shui searches to create harmony and balance in life.

Using colors is the one way of reaching those harmonies. Feng Shui claims that every color has a unique vibrational frequency and the objective is to bring them all into balance with each other and all other energies in the environment. Also some colors complement the internal energy of the human beings and some do not. Another way of reaching harmonies is the use of forms. Every different form prevents different energy flows and these energy flows effect different people in various ways.

Jones mentions that it is a common belief that color and color harmonies evoke various emotional states and moods (cited in Harrison ed., 1987). The word color in

psychophysics refers to a characteristic of the stimulus, which is the visible radiant energy (Agoston, 1987).

Dove, (1992) examines color associations conducted to a large group of subjects from children to adults in his study. Hundred and fifty six subjects representing eight different age groups were asked to associate 20 feelings and emotions around 24 colors. At the end of this study, each gender chose red to associate with strength, anger, power, and pain. Another interesting result was that red was also the leading color associated with sadness by three of the youngest groups. Gray was associated with sadness, worry, and uncertainty by both genders, and for all age groups on the other hand, black was associated with fear and resistance. Yellow and red were the two colors associated with happiness and excitement and white with hunger.

Another study about the associations of color was conducted by Hupka, et. al. (1997). It was a cross cultural study conducted in Germany, Mexico, Poland, Russia, and United States aiming to find out the associations of anger, envy, fear and jealousy with the colors. The findings of universals for anger and fear and cross-cultural differences for envy and jealousy supports that there exist cultural differences in color association. Black and red were associated in all nations with anger and fear. Red is additionally connected with jealousy. Envy was associated with green in United States whereas it was associated with jealousy in Germany, Mexico, Poland, and Russia. Americans associate purple with concepts like dignified, stately, powerful, strong, masterful, and vigorous whilst, on the other hand in Poland the majority associated purple with anger, envy, and jealousy.

The discussion of color has been based on the psychological assumption that there are four unique primary colors, which are yellow, green, red, and blue. These primary colors serve as the foci in the construction of the color systems having characteristic fourfold structures. The role that color plays in the psychological aspect of our social lives requires a referencing to be made with our cultural phenomenal qualities (Maund, 1995).

The origin of color significance is based on the perception of day and night of human beings. While night brought passivity, need for slowing down of metabolic and glandular activity; day brought the possibility of action, an increase in the metabolic rate and greater glandular secretion, thus providing man with both energy and incentive (Scott, ed. 1972).

To primitive man, activity was either in the form of hunting and attacking or in the opposite state of being hunted or in a state of defense against attacks. The actions of attack and conquest are universally represented with the color red; self-preservation and defense with its complement green (Scott, ed. 1972).

The central nervous system primarily concerns itself with those physical and sensory functions that happen at or above the threshold of awareness. The autonomic nervous system, on the other hand, primarily concerns itself with the functions that take place below the threshold of awareness (Scott, ed. 1972).

Max Lüscher (cited in Scott, ed. 1972) uses colors in his *"Lüscher Color Test"* which he developed over twenty years ago. With the help of the chosen or rejected colors,

psychological information can be obtained about a person. There are eight colors used in the test. Blue, yellow, red, and green are the four psychological primaries and constitute what are called the four basic colors of the test. The auxiliary colors of the test are violet, which is a mixture of red, and blue; brown, which is a mixture of yellow red and black; a neutral gray, containing no color at all and therefore free from any affective influence; and finally, black, which is a denial of color altogether (cited in Scott, ed. 1972).

In 1923 Kandinsky, circulated a questionnaire at the Bauhaus, asking respondents to fill in triangle, square, and circle with the primary colors and to provide an explanation for their choice of color if possible. He hoped to discover a universal correspondence between form and color, embodied in the equilateral triangle, square and circle. His questionnaire aimed to come to symbolize the possibility of a visual language that would communicate directly to the mechanics of the eye and the brain, operating independently of cultural and linguistic conventions (Lupton and Miller 1993).

Responses to Kandinsky's tests show similarities. For instance, most of the respondents choose the triangle yellow mentioning about its lightness, being spiky and being awkward. Red is identified with circle by mentioning the similar explanations, which are its being punctual, point and being dynamic. Finally, square is identified with blue generally. The similar reasons for this choice were its being stable, concise, and being able to provide support (Lupton and Miller, 1993).

So and Leung (1998) studied on the effects of light, in particular color, on the activities of occupants. This study was based on the interrelationship between the physical environment, the human behavior, and experience. Two main interests of the study are the effects of lighting systems on feelings and the effects of light on people's action and the behavior. The three important concepts of the psychological effects in the study are environmental perception, environmental cognition, and environmental attitudes. The behavior of people gambling under red and blue environments can be mentioned as, red environments cause bet people more frequently, higher stakes, greater risk taken where as blue environments cause bet people less frequently, lower strakes, lesser risk taken. At the end of the study different colors were suggested in different environments such as, residential, educational, office, retail, assembly, and hospital buildings. For TV lounges the required moods are mentioned in the study, which are comfortable, calm, relaxing, tender, peaceful, restful, fresh, soft, worm, and happy. The required colors for the same environment are cream, light blue, and yellow. For dinning areas the moods are mentioned as happy, cheerful, relaxing, comfortable, peaceful, restful, worm, tender and the required color is cream, and yellow.

Another study conducted by Kwallek et. al., (1997) examining the effects of three color schemes. Red, blue, green and white were examined for 90 worker's mood and productivity, taking into account individual differences in environmental sensitivity. It is a reported that warm colors especially red, to be more psychological arousing than the cool colors especially blue, which are associated with low levels of arousal or increased relaxation. Workers in the red office reported more dysphoria than workers in the blue and green office. Low screeners reported more dysphoria in the

red and white offices than high screeners did. High screeners performed better on office tasks in the red environment and poorer in the blue, green environment than low screeners did.

An experiment was conducted by Widdel and Pfendler (1993) to examine the influence of colors on spatial performance as measured with traditional tests for twenty-nine adults. Spatial performance was significantly higher when testing material with highly saturated colors was used in comparison to colors of low saturation and achromatic shades. In the results it is showed that the tasks were performed significantly better when the cubes had highly saturated colors than when colors were of low saturation or when achromatic shades were used.

The study conducted by Valdez and Mehrabian, (1994) examined the color reactions as functions of personality and psychology. Psychological reactions to color, color preferences, color effects on emotions, and behavior are studied with two experimental studies. In the first study it is observed that men and women responded with highly similar emotional reactions to variations in color saturation and brightness. On the other hand it is statistically significant that women were more sensitive to brightness and saturation than men and they exhibited more extreme emotional reactions to varying levels of color brightness and saturation. Also in the second study it is observed that men and women responded similar emotional reactions to various hues.

On the other hand in the first study it is observed that saturated colors elicited greater feelings of arousal. More saturated colors such as red has elicited greater levels of

arousal than have the less saturated colors such as green used in the study. It is also observed that brighter colors are more pleasant, less arousing, and less dominance including than are the less bright colors. Whereas dark colors, represents emotions such as anger, hostility, or aggression and they are associated with anger, hostility, or aggression (Valdez and Mehrabian, 1994).

Despite color, form is also associated with some feelings. Square, triangle and the circle which are considered as three basic forms, where every form is derived from, also associated with some psychological meanings. A square represents the pure and the rational. The equality of its four sides and its four right angles contributes to its regularity and visual clarity. A square shape has no preferred and dominant direction. They are stable when resting one of its sides, and they are dynamic when standing on one of its corners (Ching, 1987).

The circle is a compact, introverted shape, which has its natural focus at its center point. It represents unity, continuity, and economy of form. It is stable and self-centering in its environment (Ching, 1987).

Triangle represents stability. Triangular shapes and patterns are often used in structural systems since its configuration can not be altered without bending or breaking one of their sides. Triangle is stable when resting on one of its sides. When tripped to stand one of its points it becomes dynamic (Ching, 1987).

On the other hand the psychoanalytic geometry suggests the possibility of finding essential sexual meanings for the basic shapes. Circle might be equated with woman

where triangle equated with man and the square equated with the relation between them. Similarly Kandinsky hoped to discover universal psychological meanings, which are perceptual rather than sexual, for these basic shapes. In contrast to such a search for universals, psychoanalyses insists that the meaning of a given sign is dependent on the personal and familiar history of each person, a history which is in turn shaped by the culture in which an individual grew up (Lupton and Miller, 1993).

The geometry of Psychoanalyses: This phase suggests instead that we look at the role of triangle, square, and circle in the formation of psychoanalysis as a particular theory developed in the specific texts of a specific institution rather than looking at the meaning of shapes in general (Lupton and Miller, 1993).

The Oedipal: According to Freud, the basic condition of human sexuality is described by the oedipal triangle; it is a condition of rivalry (competition with one parent for the love of the other), prohibition (the impossibility of attaining the loved object), and guilt (the piece of desiring the forbidden). Freud would insist that rivalry, prohibition, and guilt are not emotions or passions welling up from within, but rather relationships inherent to every triangulation of three parties, whether in the family itself or in the repetitions throughout adult life (Lupton and Miller, 1993).

The Circle and the Dual Unity: according to many psychoanalyst the Oedipus complex is proceeded by the pre-oedipal relationship of the mother and infant. This relationship is best described by circle, which functions in many cultures in many cultures as a symbol of unity. The Ying-Yang symbol exemplifies the ideal of dual unity, of two interpenetrating halves coming together to form a perfect whole.

Married is understood as a return to this state: the complete, self-enclosed and self-sufficient, bound together by the circle of the wedding ring (Lupton and Miller, 1993).

Psychoanalysis however insists that dual unity, the pre-Oedipal circle of two, is more imaginary from the point of view of Oedipal anxiety and jealousy than being an actual state with duration and consistency (Lupton and Miller, 1993).

2.6. APPLICATION OF COLORS, FORMS, AND SIZES IN A SPACE

Colors, forms and sizes are the most important features of the space. They both have physical and psychological role in a space. Physically they are the space defining elements. On the other hand they are the most important features of the character and the atmosphere of the spaces.

Further more, as Eiseman and Lawrence, (1990) mention they are the basic features that affect psychological responses in the spaces. They have contribution in marking territory and personal space. They cause some symbolic meanings and have the capability of creating ambiance and atmosphere in the space.

2.6.1. Definition of the Space

Space can be defined as the distance, interval, or area between, around or within things. The components of visual expression are the actual and illusionary distance, interval or area that is between, around or within the components. All visual

expressions incorporate flat, illusionary, or actual space; either individually or in a variety of combinations (Cheatham, Cheatham and Owens, 1987).

Flat Space: Flat space consists of two-dimensions: height and width and it is used in two-dimensional works. Since flat space is two dimensional, there is usually little or no illusion of depth. The resulting images are direct and appear to be flat against the surface.

Actual Space: Actual space is a three dimensional space. Actual space can be manipulated in order to create different types of spaces, which are shallow, moderate and deep infinite. Actual space is directly related with the size or scale of the volumetric objects that exist in the space. Actual space can also be defined specifically by the surrounding volumes.

Actual space is used in sculpture, ceramics, industrial design, and in architecture. In all of these disciplines, the elements of actual space are composition, unity, shape, size, and volume. Three-dimensional spaces can be observed from any direction, they have a potential of sensory appeal and they provide a sense of touch. The relationship of light and form is important in actual spaces also. The effect of light creates shade and shadow patterns on three-dimensional forms, despite the fact that value, shape and color are the important features of three-dimensional spaces (Cheatham, Cheatham and Owens, 1987).

2.6.2. The Role of Colors Forms and Sizes in Interior Spaces

Colors, forms and sizes constitute the spaces. On the other hand, they have a great contribution in the character and the aspect of the space. The location of color within the interior space can make a great deal of difference in influencing a room's character, the way it is perceived psychologically, and subsequent reactions to it. A color will influence the character of the space differently whether it is located on the floor, walls and ceiling (see Figure 2.9) (Mahnke, 1996).
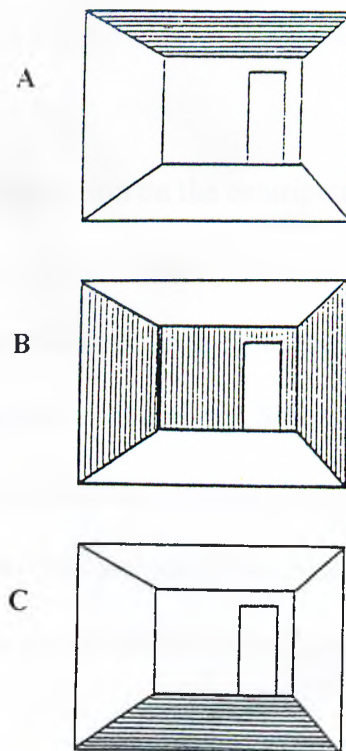
Figure 2.9: The location of color applications on different surfaces. (A) Ceiling (B) walls (C) floor from Mahnke, F. Color, Environment, and Human Response (New York: 1996) 67.

Mahnke, (1996) discusses those effects and mentions that the use of red in the ceiling evokes feelings of intrusion, disturbance, and being heavy, while it evokes aggressive and advancing feelings when used on walls and finally, evokes feelings of

consciousness, and being alert when used on floors. Contrary to this situation, blue is mentioned as celestial, cool, less tangibly advancing (if light) heavy and oppressive (if dark) when it is used on the ceiling. It is cool and distant when it is light, encouraging and space deepening when it is light in the walls. Where white on the other hand, gives the impression such as being neutral, empty or sterile, without energy.

Danger, (1987) mentions that bright hues create a mood that is energetic, vital and cheerful, and suggests sociability whereas cool hues create a quieting and relaxing atmosphere.

Color also has a contribution on the centripetal action and the complexity of the spaces. Warm and luminous colors with high levels of light produce a centrifugal action, directing attention outwards from the environment. Such environments are conductive to cheerfulness to activity. Softer surroundings, cooler colors and lower levels of illumination produce centripetal action. There is a high correlation between the chroma of a color and the perceived excitement of a space. It is indicated that complexity increases as chromatic strength increases (Mahnke, 1996).

One of the most common use of colors in interior design is to alter the perceived size of the space. Mahnke, (1996) mentions that lightness is one of the most important factors in the perception of openness in interior spaces. Light and pale colors recede and increase the apparent size, as do cooler and smaller patterns. Dark and saturated hues protrude and decrease the apparent size of a room.

Similarly Danger, (1987) mentions that color is an important consideration in perceiving the size of a space. Color can help to perceive narrow space wider or reduce the room height. Like Mahnke, he also mentions that cool colors increase the size of the space whereas dark colors produce reducing effects. Also, dark colors can make a high ceiling seem lower, and white or pale colors can make a low ceiling seem higher.

In the experiments of Taylor and Sumner, it is found that when the apparent distance of different colors are held constant, the brighter colors are seen more distant than their positions, while the darker colors are seen at their actual position. (Cited in Space Station Habitability, 1986).

Another study of Space Human Factors Office (1986) points out the importance of saturation and brightness contrast in the perception. When saturation of a color increases with respect to its background, its visible position becomes closer to 1.5 % of the standard distance. On the other hand, if an object shows high contrast with its background, it is perceived closer to 3 % of the standard distance. Increasing relative contrast by increasing the brightness and the saturation of an object compared to its background results in the objects seeming to be closer.

At the end of various researches, Space Human Factors Office (1986) reached three main results in order to increase the spaciousness with the application of colors. The hierarchy of contrast in a space is the most important factor that increases the perceived volume. The three guidelines to achieve this are as follows:

1. To keep the major enclosing bulkheads high in value and low in chroma.

2. To keep subdividing portions and elements lower in value and higher in chroma than the major surfaces

3. To keep minor elements such as trim reveals edges, fixtures, hardware and small areas of furnishings either very high or very low in value and high in chroma.

Form, size and their relationship also have a great contribution on the perceived volume of the space. Sadalla and Oxley (1984, cited in Demirörs, 1994) mentioned that physical size of a space might be different than the perceived size. Specifically, it has been claimed that rectangular rooms would appear to be larger than the square rooms of the same physical size. Besides the form, size also is an important factor in perceiving space. At the end of the studies of Sadalla and Oxley, more rectangular forms were judged as larger than the less rectangular forms of equal size.

In his studies İmamoğlu (1975) mentions that the furniture density, the function of the interior space, window size, window position, and room proportion are the important factors in the perception of spaciousness in interior spaces.

Furniture density and the organizations can be an important factor in the perception of the spaciousness in a space. İmamoğlu (1975) suggested that an over-furnished room was assessed as being less spacious than both an empty and a furnished one. Considering the size estimations, an empty room was seen larger than an over-furnished one.

Another study conducted by İmamoğlu (1975) examines the relationship between the function and the desirable degree of spaciousness of a space. It is observed that the people desire to carry out intimate-personal activities, studying alone, making love, talking with a close friend, and etc., social activities, studying with a group, eating with a group, being with friends, and etc., and public activities in interiors with different degrees of spaciousness from the least to the most respectively.

The effect of window position, window size and room proportion on spaciousness evaluation of a space is also studied by İmamoğlu (1975). It is observed that the spaces with windows on short walls were assessed as being more spacious then the ones with windows on the long sides. The spaces with continuous windows were seemed more spacious than the windows with either two bays or three bays and the square interiors are evaluated higher on space freedom.

Demirörs (1994) in her study that she analyzes the perception of spacious in interior spaces enlarges the factors that are mentioned by İmamoglu (1975) by discussing the color and light as factors of perception of spaciousness. Variations on color variables hue, chroma and value effect the perception of spaciousness.

On the other hand as Minah (1996) mentioned that color is a powerful factor in reading of form and it is the major factor in clarifying the figure ground relationship. Color is the essential factor in form perception in the environment.

Weber, (1995) claimed that architectural space is always experienced as a space that it enhances and constrains human activity. So, the perception of architectural space is

never a homogeneous or faithful recording of geometric characteristics and dimensions. Rather, every location and direction possesses a different value depending on use and meaning assigned by the inhabitants. On the other hand architectural space is always experienced, as it is compendium of sensations involving light, sound, touch, smell, temperature, and movement.

The formal characteristic of a space is a very important factor in the perception of a space. Circular forms in the space produce centricity. A shape's perceptual center does not have to coincide with its geometric center. On the other hand shapes may have any number of secondary perceptual centers, included at the edges of the shape as well as at the radial points of its contours. Shapes which are both convex and concave may actually be characterized by secondary centers located outside the spatial figure, which compete against internal centers and weaken the autonomy of the shape against its ground (Weber 1995).

The concavity of a form prevents in the space the perception of centricity and the figural character. Spaces with totally concave contours, that surrounds a person located in side them, forms spatial figures most readily. The boundaries could be perceived as being equidistant, and the perceptual concavity of space will be fully realized. However, perceptual effects of concavity may be evident regardless of where one is located in a space (Weber, 1995).

Despite, the formal character of a space can be changed by every element added to the space. Every element used in the space, either the architectural features or the

decorative elements including the furniture has a great contribution on the definition and the perception of a space.

The placement of architectural elements with in a space to subdivide it into smaller entities or articulate its appearance. In certain cases elements placed in a space can be so visually strong that they rival the perceptual dominance of the spatial figure. By virtue of their position and size, space-articulation elements can either enhance the figural character of a space, or be more dominant that they are stronger than the main spatial figure (Weber 1995) (see Figure 2.10).
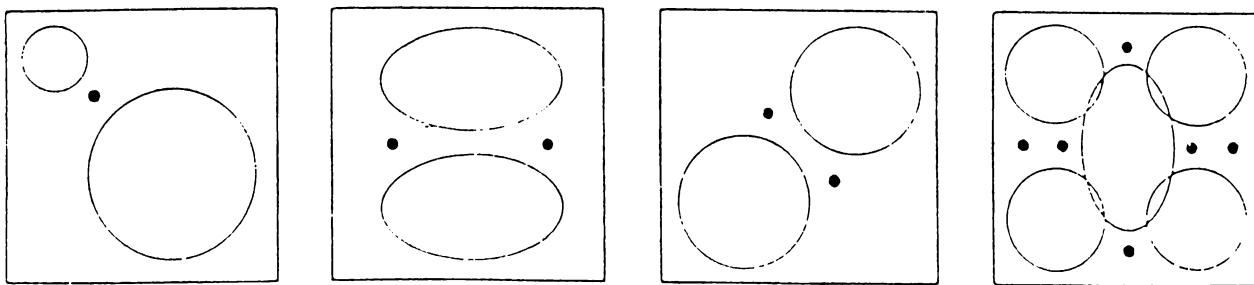
Figure 2.10: Interior Elements as Space Defining Zones within a Space from Weber. R. On the Aesthetics of Architecture: A Psychological Approach to the Structure and the Order of Perceived Architectural Space (Aldershot: 1995) 157.

Different environments require different color, form and size characteristics according to their functions, the character of the users, and the atmosphere and the mood required in that space. Color has a great importance, especially in the working environments such as offices and schools, in healing environments such as mental hospitals and health centers, and in the commercial environments such as food services.

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Mahnke, F and Mahnke, R. (1993) mentions that the most important concern in working environments is worker efficiency. The performance of the workers in the office environment is one of the most important concerns. On the other hand, it is important to provide a pleasant setting for the workers. The researchers mention some color schemes and advise to use warm gray on working surfaces.

Sundsorm (1986, cited in Demirörs, 1992) indicated that elements such as strong color, too much visual pattern, and high brightness, demand attention. Vivid design in work areas impairs productivity by seriously interfering with work tasks that require visual concentration.

Mahnke and Mahnke (1993) suggest warm and bright colors for children of both kindergarten and elementary school ages. Such a situation stems from the fact that; children are mostly extraverted by nature. Softer surroundings created by subtle and cooler hues create a centripetal action, therefore enhancing the ability of concentration. In classrooms where students face one direction, researchers advise to make the front wall a different color from the side and the back walls in order to provide the attention on one side where the board is located.

Color has a great importance in healing environments as it has psychotherapeutic effect. The color environment directly effects the welfare of the patients in hospitals and the efficiency and competence of the staff. Different requirements of different environments in a healing space such as corridors, patient rooms, operating rooms, laboratories, recreation areas, staff lounges, and etc. should be considered and

different color schemes should be applied considering the range of users, different functions and different needs.

Color also has an important role in restaurants and cafeterias. People do not eat in restaurants, which solely provide the bare necessities of the body. Users tend to be sociable in such environments, to spend an enjoyable time, together with a dining experience. The primary purpose is not eating but relaxation, together with recuperation. In this content Mahnke and Mahnke, (1993) suggest that the restaurants' color hues should appeal the appetite of customers with the colors in the red and orange region.

Chapter two presents the, basic concepts of color, form and size with relation to each other; and discusses the human responses and semiotics of them. In the light of those arguments the role of colors, forms, and sizes in interior spaces are discussed. In order to figure out the role of color, form, and size in recreational spaces in public complexes; definition of recreation and public space, the role of recreation in human life, and the emerge of public complexes are going to be discussed in the following chapter.

3. PUBLIC SPACES AND RECREATION

In the content of the third chapter the evolution of public space and recreation is analyzed. Definition of recreation is presented with the significance in human life, and its characteristic changes are discussed. Definition of public space is presented with the presentation of the emergence of public complexes. The role of recreation on public complexes is overviewed by its commercial, social and psychological aspects.

3.1. THE EVOLUTION OF RECREATION AND PUBLIC SPACES

Under the topic of the evolution of recreation and public space, the definition of recreation, and the significance of recreation in human life is presented. Following this issue, changes in the character of recreation is examined. The definition of public space and the emergence of public complexes will be overviewed.

3.1.1. Definition of Recreation

Torkildsen, (1992) defines recreation as an abstract symbol having many meanings depending on the context in which it is used. Basically, the term recreation stems from the Latin *"recreatio"* which means restoration to health. The term is related with a process that restores or recreates the individual.

The *"Dictionary of Sociology"* (cited in Jensen, 1977) defines recreation as "any activity conducted during leisure, either individual or collective, that is free and for

pleasure, having its own immediate appeal, not impelled, by a delayed reward beyond itself." Recreation is simply defined as the things that are done for fun, amusement and the activities that provide pleasure, relaxation and entertainment during free time (Jensen, 1977).

Trokildsen, (1992) also defines recreation as organized leisure activities for personal and social benefits. Furthermore, Corges and İbrahim (1996) mention that recreation is one of the aspects of the broader term leisure and furthermore, it is the active, participatory aspect of leisure.

The varied definition of the term recreation is also viewed as a process of involvement in activities of a great variety through which people achieve their recreational objectives. Another view to the term recreation perceives recreation as a result or outcome but not a process. This understanding claims that whether recreation actually occurs depends on what happens to the individual, physically, and emotionally; in other words, whether the individual reaches to a recreated state or not (Jensen, 1977).

As a process of involvement, recreation is defined as the activities or experiences that are carried on voluntarily in leisure time. The reason for the choice of recreation is the pleasure gained or the satisfaction of certain personal needs. Also, recreation can be performed either individually or collectively (Jensen, 1977).

As a result, the state of condition is defined as an emotional condition within an individual human being that flows from feeling of well being and self-satisfaction.

Recreation is characterised by feelings of mastery, achievement, exhilaration, acceptance, success, personal worth, and pleasure thus reinforcing a positive self-image. Also, recreation is a response to aesthetic experience, achievement of personal goals, or positive feedback from others. Finally, recreation is dependent on activity, leisure and social acceptance (Jensen, 1977).

Torkildsen, (1992) collects the various definitions of recreation, around four main ideas:

1. Recreation as "need serving", where each individual seeks to satisfy some inner need.

2. Recreation as "leisure-time activity", where people participate during their leisure.

3. Recreation as "value to individual and society", where the activities should provide high moral and social value for the good of the individual and society.

4. Recreation as a "re-creation", where the satisfaction of psychological needs and the process of mental balance are provided.

The specific characteristics of the recreation listed by Gray (cited in Torkildsen 1992). He stated that recreation directly involves the individual for the purpose of achieving individual values. Recreation is entered into voluntarily, usually if not always in free time. The motivating force is enjoyment or satisfaction as opposed to material or social gain. Finally, it is wholesome to the individual and society.

The appeal of certain forms of involvement varies with age, physical ability, intellectual development, and individual change. With maturity, the person's

recreation tends to change from simple to more complex and from frivolous to more serious in terms of defined personal and social objectives. As one's economic status improves his recreation involvement usually changes toward activities which are more sophisticated and socially prestigious. With advanced age, the trend is from more active to less active participation, and with people increased education tend towards structured or group-oriented activities (Jensen, 1977).

Cordes and İbrahim, (1996) explain recreation in the use of structurally different setting activities. These are public recreation, commercial recreation, corporate recreation, and therapeutic recreation. Public recreation consists of the activities that are designed to meet the needs of people of varied ages, backgrounds, and interests. Commercial recreation is the type of recreation that is offered for profit on fee basis, where the corporate recreation refers to the activities for the benefit of a specific user group. The therapeutic recreation consists of programs offered for the benefit of specific populations such as disabled people.

3.1.2. Changes in the Character of Recreation

Recreational activities are as old as the recorded history of the man. The idea of parks has been traced to the Sumerians. The idea of parks started with the Sumerian King Gudea (about 2340 B.C.) and continued to the hanging gardens of Babylonia (about 1000 BC) with the introduction of flowers to the parks. The need for the practice of the Greek games established the outdoor gymnasium. Academies, hippodromes and gymnasiums are the important portions of Greek parks (Jensen, 1977).

Land holding for recreational purposes in early civilizations was principally kept by provincial rulers for their own pleasure. By the late 13th century, public grounds were established in Italy for the leisure of all people (Jensen, 1977). In the pre-industrial period, leisure time was not scarce, as it was irregular. Religious holidays and seasonal festivals were related with the agricultural life cycle. Industrialization interrupted the traditional pattern of leisure; the number of religious holidays was reduced, and the regular workday was established by employers with the introduction of the factory in the late 18th century. Disorderly lines of popular recreation was eliminated while recreation forming, which were more conductive to the habits of regularity and required by an industrial economy (Cross, 1987).

With the increase in productivity, personal time was expanded in the 19th century, and new technologies created a commercial leisure. These new forms of recreation were designed to cope with the increased income and personal time of the working family and led to the more individualistic form of leisure (Cross, 1987).

The recreation in the United States has developed along two main themes. Natural resource oriented recreation, and municipal recreation, which is also, called community recreation. Resource oriented recreation, includes outdoor recreation up on the utilization of natural resources. Municipal recreation includes the areas, facilities and programs developed within a community of citizens of that locality (Jensen, 1977).

Davey, (1994) perceives leisure as one of the main components of civilized life, which might be one of the key criterias of civilization. Civilization implied a certain

degree of freedom for citizens, where a large part of their freedom was to be able to choose, to be able to organize their lives without reference to productive processes. In the 19th century, assembly rooms, gentleman's club, theatres, museums, pleasure gardens, and opera houses were all invented or rediscovered as building types specially devoted to leisure. In these buildings, visitors could do everything but live and work.

With this development, the theory of indoor recreation first appeared during the 1900's. Recreation was emphasized as a form of human activity that needed no other purpose, and was engaged in primarily for its own sake. Recreational activities were the activities that were performed during free time, voluntarily chosen, pleasurable and not concerned with meeting economic and social goals. This view of recreation has changed rapidly due to increasing interest of the volunteer and public agencies. Recreational activities started to be designed to make a significant contribution both to the individual and to the society. The design principles of recreational activities were determined as being goal oriented and conforming to acceptable standards of social morality (Jensen, 1977).

Fisher (1994) examines recreational activities between 1890 and 1940. Leisure time inevitably expanded and major new technologies first appeared and gained acceptance by the middle class such as bicycles, streetcars, automobiles, telephones, movies, and so on. In the late 19th century, organized lodges, and clubs started being established. Generally, applications related to the sociological model of "mass society" imply an increasing organization and top-down approach to social activities.

Leisure activities started to be described as "commodification" and commercial recreation raised and expanded to the streets, plazas, markets, and cafes.

Fisher, (1994) studied the modernisation of recreation through three common claims. The first one is organized pastime, which has replaced informal and spontaneous recreation. The second one is commercial entertainment, especially spectacles such as movies and professional sports, which have replaced self-generated and active leisure. The third one is private diversions, which have replaced collective recreations.

The 1980's were the decade of the major transition in the profession of recreation. The rapid change brought about several factors. The field expanded to include therapeutic and commercial recreation as a component of recreation. Recreation started to be more public considering the demands of the public (Gerson, İbrahim, DeVries, and Eisen, 1988).

3.1.3. The Significance of Recreation in Human Life

Jensen, (1977) claims that recreation is essential for people, it is refreshing for the body, mind and the spirit. It releases energy, tension, and emotion. It provides for human associations, recognition, response and understanding. It leads to social sensitivity and cooperation. It makes life meaningful and well rounded.

Cordes and İbrahim, (1996) mention the psychological benefits of recreation as challenge, achievement, creativity, freedom, escape from personal and physical pressure, meeting and observing new people.

Individual and social psychology of the people and the rhythm of daily life are the important features in the concept of recreation. They play an important role in the need of participation of recreation, and in determining the recreational activity type. So it is essential to have a look at the human psychology and the motives. Individual and social influences are key points in the analysis of the social psychology of recreation. Researchers examine how an individual's motives, emotions, and behaviors are influenced by other individuals, social groups, and social structures. They also analyze how people form attitudes towards recreation, and how their recreational attitudes are changed by the influence of other individuals (Seppo, 1987).

Human beings are creatures guided by needs and they work to satisfy their needs, but work is not the only fulfilling activity. Where work is felt to be useless or unnecessary it becomes demoralizing, and hateful. Apart from activity, people need inactivity like rest and sleep. These are natural, physical, and bodily needs although they show some historical, social, and individual variations.

People in the modern society; feel not only the need to rest but also some other different activities and satisfaction apart from work. They need recreation. It is based on the activities, which are unrelated to any economic goal end in them, such as hobbies, and crafts, sports, and cultural, artistic, and social activities. Unlike rest and

sleep, these are not physical needs; these are the psychological and sociological needs (Sayers, 1989).

Barret (1989) supports Sayers and mentions that besides basic necessities, such as eating, sleeping, finding a shelter, and clothing which occupy time, there are some moral obligations to be fulfilled, such as providing for one's dependence, carrying out one's professional duties, family responsibilities, and so on. Finally, there are some self-imposed necessities, which occupy one's leisure time. Recreation is a necessity for people.

Perdue and Thomason, (1987) mention that people need recreation for personal, and social development, and the commercial recreation industry is concerned with identifying, and providing those opportunities that people want, and are willing to pay.

People differ in their need for a variety of recreational experiences, so the organizational pattern of leisure programming must vary and reflect an understanding of client diversity. The organizational pattern requires the programmer to provide a great deal of the structure at the beginning of the process by designing all program components prior to inviting clients to register for participation. Organizing the competitive events requires major pre-planning time and effort. The social aspect of the recreation experience should be emphasized. Interest groups and clubs are a familiar participatory pattern of the leisure field (Farrell, 1987, 64-65).

On the other hand, Deflon (1991) mentions that people who are living in competitive and stressful environments now find ways to cope with the day-to-day impact of these pressures through a combination of relaxation and competitive leisure activities, both as spectators and participants.

Jensen, (1977) points out different kinds of recreational services which provide recreational activities. These are community recreation, outdoor recreation, and therapeutic recreation, recreation in correctional institutions, employee recreation programs, private club recreation, and commercial recreation.

Community recreation programs are the largest phase of total recreation considering the number of participants and the amount of total expenditure. Outdoor recreation is defined as the recreational activities which occur outdoors in natural environments and which directly relate the activity to that environment. Therapeutic recreation means the hospital recreation; they are recreation activities designed primarily for the needs of the psychiatric and long-term patients in the hospitals. Recreation in correctional institutions include the activities of rehabilitation which the users of the correctional institute experience success and socially acceptable satisfaction. Employee recreation programs are prepared by the companies, which employ large number of workers to provide recreational opportunities to increase the work performance of their employees. Private club recreations are the recreational activities performed by the clubs considering the special interest, nature, size and financial means. Golf or country clubs are good examples of private clubs.

Commercial recreation is a profit making business and it is based upon the enterprise

concept, which the individual or company prepares and distributes services and

products in an effort to make a profit. This fact of business life forces the successful

entrepreneur to remain sensitive and responsive to the public that is being served.

3.1.4. Definition of Public Space

The term public includes:

1. The public interests that all environments protect people's health, safety and

    welfare, including people of limited and diverse capabilities.

2. The way in which the public is involved in decisions about all our environments.

3. The delivery of services.

Public spaces reflect the individual characters, the culture of the society, the private

beliefs of the individual and public values. Public space is the common ground where

civility and the collective of senses that is called publicness are developed and

expressed. The public environment serves as a reflection or mirror of individual

behavior, social process, and our often conflicting public values (Francis, 1989).

Public life has always combined three characteristics; a common wealth for the

common good or benefit open to general observation by strangers, involving a

diversity of people, and thus engendering tolerance of diverse interests and behaviors

(Brill, 1983).

3.1.5. The Emergence of Public Complexes

The history of public space that started in Europe with the development of the street life continued with the square and the park. However, in the 1600's, public life started to be transformed by powerful and effective psychological and economical aspects, so the streets and the squares started to lose their importance in public life. By mid 1800's, the street started to lose its attraction for the public. With the founders of America and the waves of subsequent settlements, the ideas about public spaces started to change with the changing ideology of the public. With the changing demands of the public, the idea of the outdoor public rooms were formed, Piazza Di San Marcos, Rockefeller Center, Toronto City Hall Square are some examples of this principle (Brill, 1983).

In 1900's the ideology of the public street life and the outdoor public space left its place to the concept of shopping malls. Parallel to this development, public life took its place in the large buildings with the support of recreational activities and formed public complexes. Changes in public life are transforming the design and management of public spaces (Francis, 1989). During the public life, recreation with its primary goals of spectacle, entertainment and pleasure, marketing commerce, and work, have shaped public concepts such as governance, religion, and social structure, enhancing information and great deal of learning from face to face encounters with, or observation of strangers (Brill, 1989).

3.2. THE ROLE OF RECREATION ON PUBLIC COMPLEXES

Stokowski, (1994) defines leisure as more than an individual feeling or experience. It is an area of established social relationships, structures, and meanings that continue across society throughout time. Also, she perceives leisure as knowledge about how people construct recreational behaviors and meanings that are socially structured and organized, furthermore, how the extended social structures of leisure influence individual recreational choices and experiences. Butsh (1991) perceives it as a "contested terrain" for a cultural dominance.

Torkildsen (1992) defines recreation as a social process and a social institution. As a social process, recreation is considered as the event where human organisms strive to reach optimal arousal levels, the primary ingredients of which, being exploration, investigation, manipulation, and learning behavior. The outcomes of recreation as a social process are physical, psychological, social, and educational values.

Recreation as a social institution is more than a conceptual framework; it is a kind of activity or a condition of existence. It refers to all social institutions, which have been formed to meet the leisure needs of people. It includes various organizations that provide varied recreational opportunities. They are the social patterns that have distinctive value orientations; they direct the behavior of human beings and characteristically tend to be permanent and to resist change. They exist because they have been reasonably successful in meeting social needs. Recreation is a collective social setting and can thus be perceived as a social institution. Recreation is not only

individual, but is also collective. It should be recognized as a social institution with its own values and traditions, structures and organizations (Torkildsen, 1992).

Mason and Martin, (1988) discuss recreation in public life and the role of recreation in public spaces. They mention that there is a high design component in these new leisure developments. The new leisure and recreational facilities provide a new atmosphere, quality surroundings, a character and an ambiance, beside providing an ease of accessibility, and offering a sense of space to public places. Recreation is perceived as fun and entertainment, so those facilities are required by the public in the spaces that are used by the public.

Starting from this point, Carr and Francis, (1992) mention that in order to have an effective design and management of public spaces it is essential to understand the role of those spaces in people's lives, and why those spaces are used or ignored. They are designed mainly, for commercial reasons and they will be used according to the degree that they support the public needs, and changing public demands.

Recreational activities have great importance in the public spaces. They support the public activity in three main ways: commercially, socially and psychologically.

3.2.1. Commercial Aspects

Recreational activities support the public spaces commercially in two different ways. First, they increase the visitor number of that public space. Second, they increase the time spent in that public space.

Commercial providers offer recreational opportunities through retail outlets; entertainment hospitality, and leisure services travel and tourism. Amusement and theme parks offer thrill rides games of chance, sideshows, along with food and drink. Concession theme parks evolved from these attractions center entertainment on the family and invite attendants to experience a particular subject or historical era in a fantasy atmosphere. Malls are one of the best examples of public complexes where their main activity of retail outlets supported with the addition of new recreational activities such as restaurants, sports bars, nightclubs and showcases. This complexity brings an increase in the number of users of those spaces, and it also increases the total time spent.

Franck and Paxson (1989) mentions that no single public space can or should meet the needs of all users at all times. It is a common principle that public spaces vary in the degree of publicness they process and exhibit. Diversity of people and activities allowed apparent the organisations that take place within a space, the greater its publicness. Diversity of people can be achieved by the diversity of the activities. Diversity of people includes variation in age, race, ethnicity, gender, that is, other variations in appearance and behavior. A high degree of publicity also depends on the availability of different kinds of recreational activities within a public space and brings varying utilisation times.

Reasons for creating public spaces may be related to transportation, recreation, entertainment, education, commerce, health, and etc. Some public spaces through intended and used primarily for one purpose, brings the use of that public space for the limited number of users who are participating in that specific activity. But with

the transformation of other activities, the user number of that space will be increased

dramatically, and the time spent in that space will become varied (Franck and

Paxson, 1989).

3.2.2. Social and Psychological Aspects

Recreational activities that support public spaces also from social and psychological

aspects. Recreational activities provide social relationships between people and they

provide psychological satisfaction.

By nature and necessity humans are social beings. By interacting and cooperating

with one another, people not only satisfy their basic physical needs, such as food,

shelter, and rest, but also satisfy their need for affiliation, participation, and

acceptance. The process through which a novice gains understanding of the society's

customs, values and expectations is called socialisation (Cordes and İbrahim, 1996).

Recreation in public spaces similarly provides people with psychological

satisfaction. The experience of recreation provides happiness, pleasure, freedom, and

intrinsical rewards. Happiness is a more psychological well being. Happiness is often

considered to the extent which we have positive attitudes and feelings about various

aspects of our life. Participation in recreational activities provides people with the

feeling of happiness. Moreover, recreation is fulfilling the satisfaction of some needs

and desires and providing pleasure and the use of creativity. Recreation is also

important in satisfying the need of freedom. Recreation requires freedom to choose,

and this choice in turn, requires an awareness of preferences. In addition to all of this

intrinsic rewards, the benefit of doing something is the satisfaction gained from it (Russel, 1996).

Color, form and size are the important physical features of a space, which have great contribution on the psychology of a human being as it is discussed in the previous chapter. Recreational activities, which fulfil the gratification of physiological and psychological needs of the human beings participating in recreational environments, are in a direct relationship with the vital components, form, color and size. Those elements, when used in the recreational environments, thereby contribute to the success of the factors in providing the desired psychological satisfaction in those environments. Danger, (1987) supports this idea by stating that, the color design of recreational environments should differentiate from the other environments in order to provide relaxation, pleasure and freedom.

The design of the recreational areas in public spaces is an important concept in order to satisfy the social and the psychological needs of users. This thesis points out the uses of color, form, and size, which are forming the basic features of interior architecture, in order to provide the desired satisfaction emotionally in the recreation areas of the public spaces. Dormitories are selected as representatives of public spaces and a case study conducted questions the validity of the following hypotheses that have been formed.

4. THE FIELD RESEARCH ON A UNIVERSITY DORMITORY IN ANKARA

In the content of this chapter, the role of student housing in public life is presented, discussing the role of dormitories in students' life and the need of recreation in student housing facilities. Then the design of the field research is introduced with methodology, subject selection, and the evaluation of the field research with the results and the discussion at the end of this chapter.

4.1. THE ROLE OF STUDENT HOUSING IN PUBLIC LIFE AND THE NEED OF RECREATION IN DORMITORIES

Student housing has an important role in public life. They are the spaces that bring lots of people together from different social classes, cultures, religions, nationalities, and etc. in a single shelter. Despite the main aim of providing a shelter, student housing provides, learning of public life, socialization, and the improvement of academic skills.

As Winston et. al. (1993) mentions that, dormitories are the laboratories for social living; they are living and learning centers that have a great contribution on personal, educational, and social development and of the residents. Dormitories exist to provide relatively low-cost, safe, sanitary, well maintained and comfortable living quarters to the students; to promote the intellectual, social, personality, physical, career, educational and moral development of those who live there; and to supplement to enrich student's academic experiences. Dormitories serve to improve academic achievement, promote responsible citizenship, and heighten student's concern for the well being of others.

To provide the above mentioned physical and psychological satisfaction to the occupant, student housing facilities are needed, living and learning environment that enhances individual growth and development to accommodate residential life.

Recreation has an important role in the satisfaction of above mentioned needs. Recreational activities provided in the dormitories accommodate pleasure, achievement of personal needs, and provide social relations between the occupants (Yüksek Öğrenim Kredi ve Yurtlar Kurumu Genel Müdürlüğü, 1988).

In the studies that are conducted above 85 dormitories in Turkey by Yüksek Öğrenim Kredi ve Yurtlar Kurumu Genel Müdürlüğü, (1988) it is observed that students' changing attitudes and needs requires some services in the dormitories. To provide the students' physical and psychological satisfaction it is essential to present living, learning, and socializing environments. Recreational activities provided in the dormitory building are one of the most essential concerns of the students. In order to satisfy these needs the improvement of the food dining facilities, and related services, sport and play activities, development of TV and music rooms are required as the essential needs in the dormitories. The development of socializing facilities and the participation of recreation are also mentioned as an important feature to provide mental and physical health of the students.

Considering the importance of the satisfaction of physical and psychological needs of the occupants in student housing facilities dormitories are selected for the application of the field research.

4.2. DESIGN OF THE FIELD RESEARCH

Dormitories of Bilkent University are selected as a site. They are located in the campus site of the Bilkent University in Ankara. There are separate dormitory buildings for different sexes in the campus site. To minimize the probable bias depending on the sex difference, dormitories number 75 and 76 were selected considering their recreational activity opportunities offered in the buildings. Dormitory number 75 is serving for males where 76 is serving for females. They are identical in plan and they also offer the same recreational activities. In both dormitories the recreational spaces are located in the ground floor and despite the occupants they are open to public use both males and females (see Appendix B, Figure B.1).

After the application of a pilot study it is observed that the recreational area offered in the dormitory number 75 is used mainly for the commercial activity. People do not spend any time in the offered recreational area; the cafeteria is used just for the mercantile purposes. On the other hand it is reported that recreational area in 76 is used intensively by the occupants, visitors and the male occupants of the identical dormitory for the activity of recreation. After those observations it is decided to apply the field research in the dormitory number 76 which contents the both users of the two dormitory and the visitors from the other dormitories in the campus site.

4.2.1. Methodology

Dormitory number 76 is a four-story building consists of 183 double rooms. In 42 of them students stay single. In total there are 324 people are staying in the dormitory. There are kitchen, toilets, shower, ironing rooms, and working rooms located in every floor for common use.

Recreational activities are located in ground floor open to public. There is a cafeteria and a TV room provided as recreational facilities. They are located in a single space in the ground floor of the dormitory (see Appendix B, Figures B.1-B.2). This space is opened to the use of both the occupants of the dormitory and the visitors from other dormitories both male and female. The users of the space are the students of Bilkent University where their ages are in between 18-25.

The research questions of the field research are:

1. Is there a difference between different recreational activities in a public space in terms of required colors, forms, and sizes?

2. Do male and female users prefer different colors, forms, and sizes for recreational activities in public spaces?

The hypotheses of the field research are:

1. Different recreational activities in public spaces require different color, form, and size preferences.

2. Form, color, and size preferences of male and female users for recreational activities in public spaces are different.

A non-experimental survey is conducted in the field research. The aim of the study is to analyze the differences in the preferences of color, form and size for different activities, and different sexes where a comparative analyzes is required. A pilot study was conducted to inquire the evidence of the questions in the questionnaire and to observe the users of recreational areas of both dormitories.

4.2.2. Subject Selection and the Application of the Field Research

100 subjects were decided as a sample size to achieve sample diversity considering the specific user group of the recreational spaces. Quota sampling is used in the subject selection. The number of the female and the male subjects are equal in order to prevent the comparison between different sexes. As the last courses of Bilkent University is generally ends in 5:30 p.m. the study was conducted at weekdays between 6 p.m. and 9 p.m. Questionnaire was conducted in the recreation area of the 76 dormitory. Subjects were selected randomly from males and females considering their entrance order to the space.

Four page of self-administrative questionnaire was conducted to the occupants of the space. Considering the content, the questionnaire is consisted of three parts. First part is the personal information about the subject, where the information about age, sex, the time of living in the building, the occupancy number and the floor of the room were asked. Second part is related with the activities, the activities performed, and would like to perform in the space were examined with the associated colors and forms and sizes. In the third part subjects were asked to identify the colors forms and sizes dominating and would like to be dominating in the space (see Appendix A).

4.3. EVALUATION OF THE FIELD RESEARCH

After the data collection the obtained data from 100 subjects were grouped according to their age, sex, semesters living in the building, occupancy and the floor number of the room, time spend in the recreation area, activities performed and would like to be performed in the space, color, form and size dominating, and would like to be dominating in the recreation area. Two main tables were constructed including the above data for different sexes (see Appendix B Figures B.1-B.2). Chi-square method of statistical analyses is applied to analyze the statistical validity of the results.

4.3.1. Results

It is observed that 37% of the subjects were sharing their rooms with one roommate, 28% were sharing with three, 26% were sharing with two, and only 9% of the subjects were occupying alone in Bilkent University dormitories. (see Appendix C Tables C.1-C.2).

The time of the day that the subjects are using the recreation area is varying. Considering the use of the space in different times of the day, it is observed that, 54% (61) of the subjects were using the recreation area in the evening and 49% (21) of them are using this space up to one hour, 31% (22) of them are using between one and two hours, 12% (8) are spending more three hours and 8% (6) of them are spending between two and three hours in that space (see Table 4.1).

29% (40) of the subjects were using the recreation area in the afternoon, 57 % (22) of them are using this space up to one hour, 31% (12) are using between one and two hours, 9% (4) using between two and three hours and 3% (2) using more than three hours. Whereas only 9% (12) were using the recreation area in the morning, 88% (10) of them use that space up to one hour, and 12% (2) were using between one and two hours. Finally 8% (11) of the subjects were using the recreation area in the noon, 73% (8) of them spend time up to one hour, and 27% (3) use that space between one and two hours (see Table 4.1). The total number of the people spending time in the recreation area can be seen in Figure 4.1.

Time Spent in the Recreation Area	Morning	Noon	Afternoon	Evening	Total
Up to 1 hour	10 (88%)	8 (73%)	22 (57%)	25 (49%)	65 (52%)
1-2 hours	2 (12%)	3 (27%)	12 (31%)	22 (31%)	39 (32%)
2-3 hours	0 (0%)	0 (0%)	4 (9%)	6 (8%)	10 (8%)
3-more hours	0 (0%)	0 (0%)	2 (3%)	8 (12%)	10 (8%)
Total	12 (9%)	11 (8%)	40 (29%)	61 (54%)	124 (100%)

Table 4.1: Time spent in the recreation area.

Figure 4.1: Time Spent in the Recreation Area
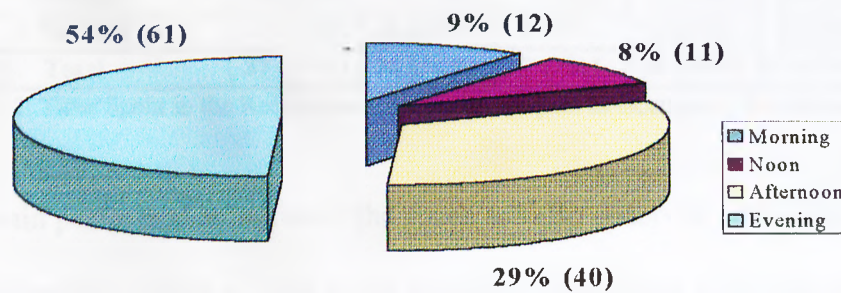
It is observed that time spend in the recreation area is changing when the occupancy number of the room, that the subjects are staying is changed. From the 37% (37) of the subjects, who are staying in double rooms, 32% (12) of them spend up to one hour in the recreation area, where 49% (18) spend between one and two hours, 11% (4) spend more than two hours, and 8% (3) spent between two and three hours. From 28% (28) of the subjects, who are sharing their rooms with four roommates, 44% (12) mention that they are using this space up to one hour, where 28% (8) between one and two hours and 28% (8) more than three hours. 26% (26) of the subjects, staying with three roommates mention that 43% (11) are staying up to one hour, 27% (7) are staying between one and two hours and 30% (8) more than two hours. From the subjects who are staying alone in

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the dormitory 9% (9), 33% (3) spend more than three hours and the same amount of

people between one and two hours, 22% (2) of the subjects staying up to one hour, and

11% (1) between one and two hours (see Table 4.2). The results are showing that the

subjects who are sharing their rooms with a roommate spend less time in the recreation

area compared to the subjects, who are staying alone in the dormitory.

Time Spend in the Recreational Area with Respect to Occupancy Number of the Room	Up to 1 hour	1 – 2 hours	2 - 3 hours	3 – more hours	Total
Alone	2 (22%)	3 (33%)	1 (11%)	3 (33%)	9 (9%)
2 Persons	12 (32%)	18 (49%)	3 (8%)	4 (11%)	37 (37%)
3 Persons	11 (43%)	7 (27%)	3 (11%)	5 (19%)	26 (26%)
4 Persons	12 (44%)	8 (28%)	0 (0%)	8 (28%)	28 (28%)
Total	37 (37%)	36 (36%)	7 (7%)	20 (20%)	100(100%)

Table 4.2: Time Spent in the Recreational Area with Respect to Occupancy Number of the Room

The main performed activities in the space are also observed. 48% (48) of the subjects

mainly perform eating activity in the recreation area where 61% (29) are female and

39% (19) are male. 36% (36) of the subjects were mainly performing socializing activity

where 36% (13) of them are female and 64% (23) are male. Finally 16% (16) of the

subjects mainly perform watching TV activity in the recreation area where the male and

female users performing this activity is equal 50% (8) male and 50% (8) female (see

Table 4.3). The total number of the subjects classified according to their main performed

activities can be seen in Figure 4.2.

Main Performed Activities in the Recreation Area	Eating	Socializing	Watching TV.	Total
Female	29 (61%)	13 (36%)	8 (50%)	50 (50%)
Male	19 (39%)	23 (64%)	8 (50%)	50 (50%)
Total	48 (48%)	36 (36%)	16 (16%)	100 (100%)

Table 4.3: Main performed activities in the recreation area.

Figure 4.2: Main Performed Activities

16% (16)   48% (48)

☐ Eating

■ Socializing

☐ Watching TV.
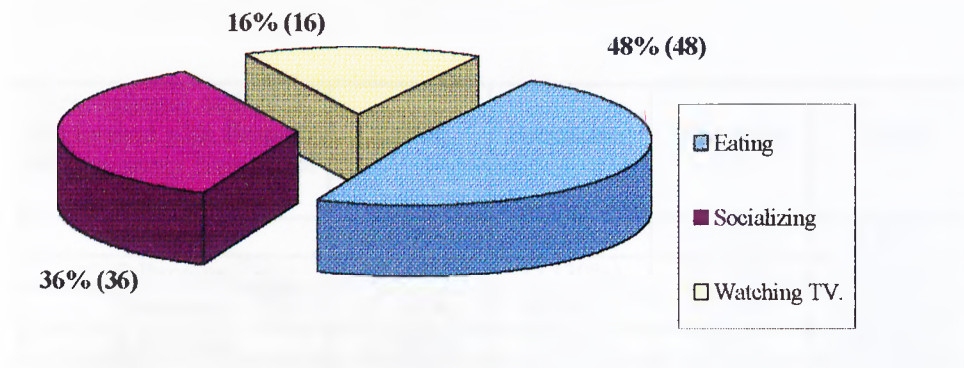
36% (36)

It is observed that activities performed in the recreational area are varying when the occupancy number of the subjects is considered. From the 36% (36) of the subjects who are staying in a double room 47% (16) mentioned that they are mainly performing eating activity, 30% (11) socializing activity, and 23% (8) watching TV activity. 28% (28) of the subjects shared their rooms with four roommates, and 54% (15) of them mainly performing socializing activity in the recreation area, 43% (12) eating activity, only 3% (1) of them perform watching TV as the main activity. From the 26% (26) of the subjects that are sharing their rooms with three people, 42% (11) of them mention eating activity as the main performed activity, 35% (9) socializing activity, and 23% (6) watching TV activity. Among 9% (9) of the subjects who are staying alone in the dormitory, 78% (7) mention eating activity as the main activity, 11% (1) mention socializing activity and 11% (1) watching TV activity (see Table 4.4).

It is observed that subjects who are sharing their rooms with four roommates mainly using the recreation area for socializing activity and the ones who are staying alone use it for eating activity mainly. The main performed activities of the subjects with one and

two roommates are the eating activity in the recreation and it is followed by the

socializing activity. This relationship can be seen in Figure 4.3.

Recreational Activities Performed with Respect to Occupancy Number of the Room	Eating	Socializing	Watching TV	Total
Alone	7 (77%)	1 (11%)	1 (11%)	9 (9%)
2 Persons	16 (47%)	11 (30%)	8 (23%)	36 (36%)
3 Persons	11 (42%)	9 (35%)	6 (23%)	26 (26%)
4 Persons	12 (43%)	15 (54%)	1(3%)	28 (28%)
Total	48 (48%)	36 (36%)	16 (16%)	100 (100%)

Table 4.4: Recreational Activities Performed with Respect to Occupancy Number of the Room

Figure 4.3: Recreational Activities Performed with respect to
Occupancy Number

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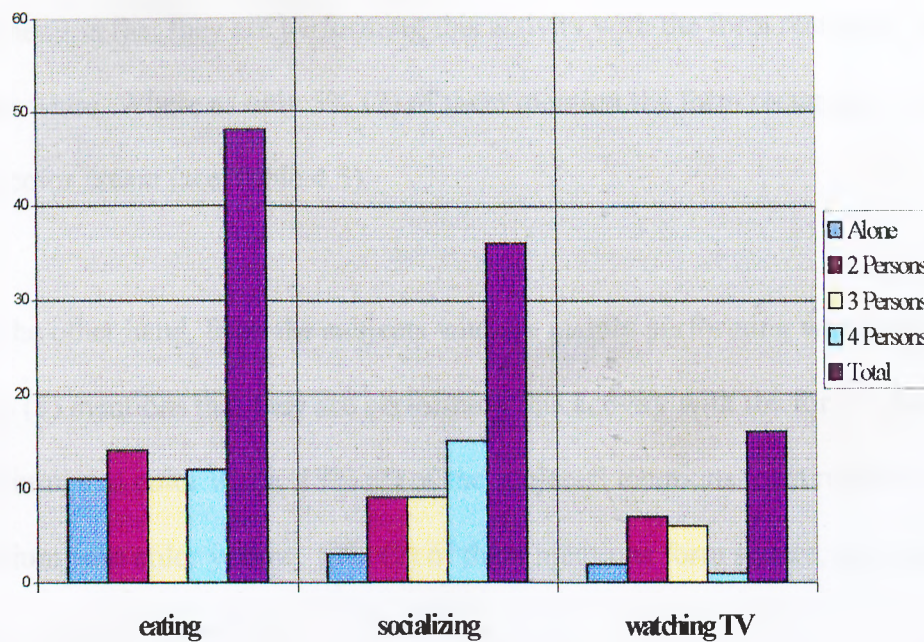
Above the subjects who are mainly performing the eating activity in the recreation area of the dormitory 35% (17) mentions that they are performing this activity with the form square, size medium, and the color white. 21% (12) mentions that they are performing this activity with form square, size medium, and color red. On the other hand 9% (4) mentions that they are performing this activity with form rectangle, size medium, and color white (see Table 4.5).

From the subjects who are mainly performing socializing activity in the recreation area of the dormitory 22% (8) mention that they are performing this activity with the form rectangle, size medium, and color white. 20% (7) mention form square, size medium and color red. 17% (6) mention form square, size medium, and color white. 8% (3) mention form rectangle, size medium, and color red for the same performed activity. Another 8% (3) mention that they are performing this activity with the form rectangle, size small, and color white. Where as only 5% (2) of them mention the form rectangle, size medium, and color cream (see Table 4.5).

On the other hand, from the subjects who are mainly performing watching TV activity, 31% (5) mentions that they are performing this activity with the form square, size medium, and color white. 13% (2) of the subjects' mentions form rectangle, size medium, and color yellow. 13% (2) of them mentions form square, size medium, and color red (see Table 4.5).

Activities Performed in the Recreation Area	Eating	Socializing	Watching TV.	Total
Medium Square White	17 (35%)	6 (17%)	5 (31%)	28 (28%)
Medium Square Red	12 (21%)	7 (20%)	2 (13%)	21 (21%)
Medium Rectangle White	4 (9%)	8 (22%)	0 (0%)	12 (12%)
Medium Rectangle Red	2 (4%)	3 (8%)	0 (0%)	5 (5%)
Small Rectangle White	1 (2%)	3 (8%)	0 (0%)	4 (4%)
Medium Rectangle Cream	0 (0%)	2 (5%)	0 (0%)	2 (2%)
Medium Rectangle Yellow	0 (0%)	0 (0%)	2 (13%)	2 (2%)
Other	12 (21%)	7 (20%)	7 (43%)	26 (26%)
Total	48 (48%)	36 (36%)	16 (16%)	100(100%)

Table 4.5: Activities performed in the recreation area.

These results are interesting although all the activities performed in the same space; the space perception of the subjects while they are performing different activities is reported different. On the other hand, considering all the performed activities that are reported with colors forms and sizes, 67% (67) of the subjects claimed that they are performing those activities in square environments where as only 32% (32) of them say that the environment is a rectangle. Also 49% (49) of the subjects mention that they are performing those activities with color white, 30% (30) mentions color red, 12 % (12) of the subjects mentions cream as the colors used during the performed activities; although the actual form of the space is a rectangle, the tables in the space are square (see Appendix B Figure B.2). Cream was used in the enclosing walls where as red is the only color that is used in the labels and on the tables as a border line whereas white is the color of the tables and the stairs as it is seen in the Figures 4.4 - 4.6.

Figure 4.4: Interior view of the recreation area of the dormitory number 76.

Figure 4.5: Interior view of the recreation area of the dormitory number 76.

Figure 4.6: Interior view of the recreation area of the dormitory number 76.

The activities that would liked to be performed in the recreation are reported with the associated colors, forms and sizes. The first mentioned activities were considered as the main activity that would like to be performed in the space.

During the evaluation of the results the mentioned activities that would like to be performed in the specified recreation area in the dormitory, are grouped in to five major categories, which are eating, playing, socializing, watching TV, and reading. The eating activity is composed of all kinds of activities that are related with eating and drinking. Playing activity is composed of the gatherings of the preferred activities, playing cards, ping-pong and billiard, considering their common color, form and size preferences.

Socializing activity is composed of the activities, which are related with meting and being with friends and with other people.

The preferred activities are analyzed with the occupancy of the rooms of the subjects. It is observed that from the 37% (37) of the subjects who are sharing their room with a roommate, 38% (14) preferred eating activity, 38 % (14) playing activity, 14% (5) socializing activity, 8% (3) watching TV and 2% (1) reading activity. Among 28% (28) of the subjects who sharing their rooms with four roommates, 50% (14) preferred playing activity as the main activity that would liked to be performed. On the other hand 22% (6) mentioned eating activity, 14% (4) watching TV activity, and only 14% (4) socializing activity s the main activities that would liked to be performed. From 26% (26) of the subjects sharing their rooms with three roommates 49% (12) mentioned that the main activity that they would liked to be perform was eating, 23% (6) watching TV, 15% (4) socializing, 12% (3) playing and only 4% (1) reading activity. Among 9% (9) of the subjects staying alone in the dormitory 33% (3) mentioned eating activity 33% (3) playing activity, 22% (2) socializing activity, and only 11% (1) watching TV activity as the main performed activity (see Table 4.6).

It is interesting to observe that the subjects, who are sharing their rooms with two and three roommates, mainly want to perform eating activity, whereas the subjects, who are sharing their rooms with four roommates, mainly want to perform eating activity.

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Recreational Activities That Would Liked to be Performed with Respect to Occupancy Number of the Room	Eating	Playing	Socializing	Watching TV	Reading	Total
Alone	3 (33%)	3 (33%)	2 (22%)	1 (11%)	0 (0%)	9 (9%)
2 People	14 (38%)	14 (38%)	5 (14%)	3 (8%)	1 (2%)	37 (37%)
3 People	12 (48%)	3 (12%)	4 (15%)	6 (23%)	1 (4%)	26 (26%)
4 People	6 (22%)	14 (50%)	4 (14%)	4 (14%)	0 (0%)	28 (28%)
Total	35 (38%)	34 (32%)	15 (14%)	14 (14%)	2 (2%)	100 (100%)

Table 4.6: Recreational Activities That Would Liked to be Performed with Respect to Occupancy Number of the Room

Figure 4.7: Recreational Activities That Would Liked to be Performed with Respects to Occupancy Number of the Room
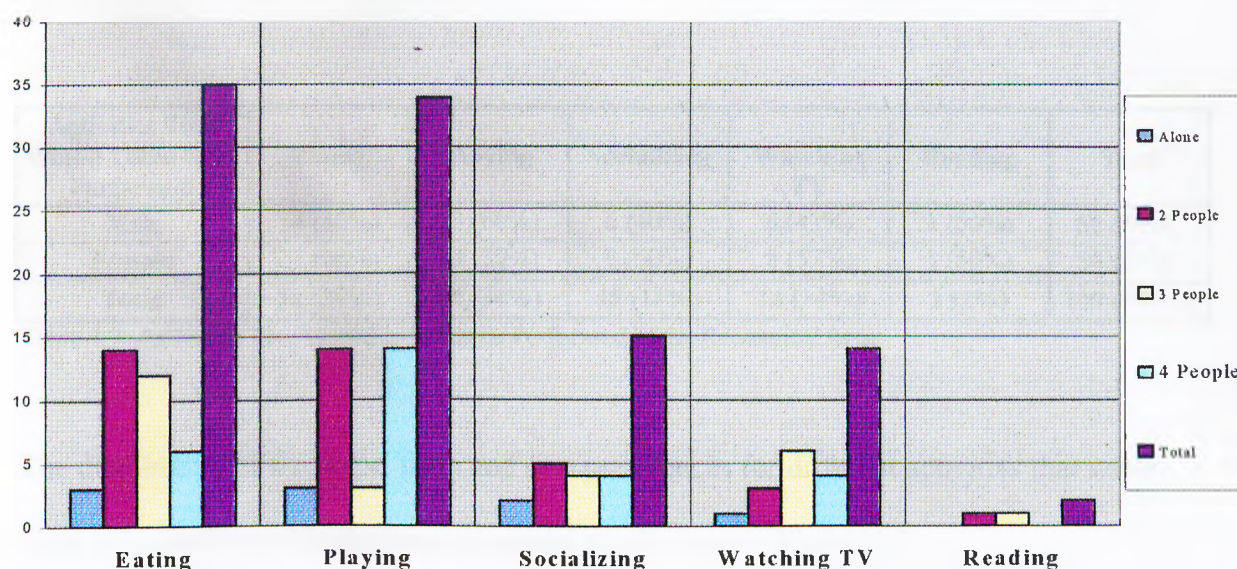
In order to construct the contingency tables, to apply a statistical evaluation, different activities were constructed in different tables where the rows are composed of forms with the sizes, columns composed of the mentioned colors, separate for different sexes. After the construction of the tables the cells, which are zero in each five table are ignored and the rest are unified, so color, form and size is converted in to singe element (see Appendix D Tables D.1-D.10). The obtained data from those tables are collected in to a single table considering the 100 subjects (see Table 4.8).

It is observed that 35% (35) of the subjects would like to perform eating activity where as 60% (21) of them are female and 40% (14) of them are male. 34% (34) of the subjects would like to perform playing activity 68% (23) of them are male and 32% (11) of them are female. 15% (15) would like to perform socializing activity 60% (9) of them are female and 40% (6) of them are male. 14% (14) of the subjects would like to perform watching TV activity 57% (8) of them are female and 43% (6) of them are male. Just 2% (2) of subjects preferred reading activity, 50% (1) of them are male and 50% (1) of them are female (see Table 4.7 and Appendix D Tables D.1-D.10).

Activities That Would Liked to be Performed	Eating	Playing	Socializing	Watching TV	Reading	Total
Male	14 (40%)	23 (68%)	6 (40%)	6 (43%)	1 (50%)	50 (50%)
Female	21 (60%)	11 (32%)	9 (60%)	8 (57%)	1 (50%)	50 (50%)
Total	35 (38%)	34 (34%)	15 (14%)	14 (14%)	2 (2%)	100 (100%)

Table 4.7: Activities That Would Liked to be Performed in the Recreation Area

The distribution of the color, form and size preferences for different activities that would liked to be performed in the recreation area can be seen in Figure 4.7.

Figure 4.8: Activities That Would Liked to be Performed

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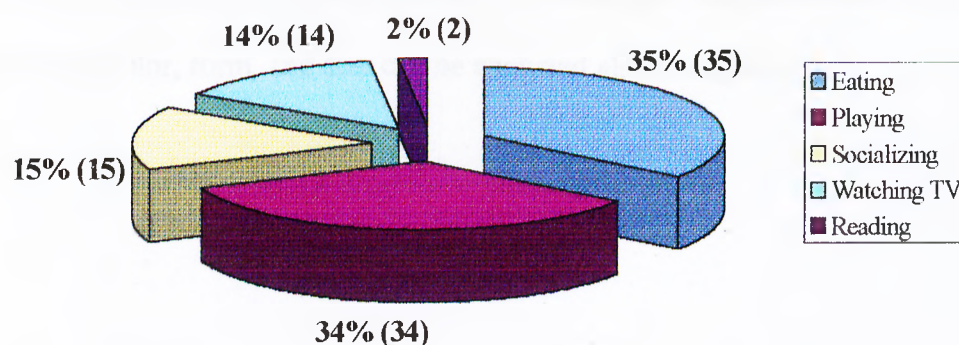
It is observed that the color, form and size preferences for different activities are varying. In order to test the validity of the first hypothesis, which is "different recreational activities in public spaces require different color, form, and size preferences, a chi-square analysis is utilized."

Eating activity is associated with large square red by 39% (13) of the subjects, large rectangle red by 11% (4) of the subjects, large square blue by 8% (3) of the subjects, large circle red by 8% (3) of the subjects. Whereas playing activity is associated with large rectangle green by 30% (10) of the subjects, large square green by 20% (7) of the subjects, medium square green by 15% (5) of the subjects, and large circle green by 9% (3) of the subjects (see Table 4.8).

On the other hand socializing activity is associated with medium circle blue by 27% (4) of the subjects, large circle red by the same amount of subjects, and large square blue by 13% (2) of the subjects. Watching TV activity is associated with large rectangle blue by the 50% (7) of the subjects, and medium square blue by 29% (4) of the subjects. Where the reading activity is associated with medium square blue and large rectangle blue among the subjects equally (see Table 4.8).

The relationship between the activities that would like to be performed with the associated color, form, and size can be analyzed also in Figure 4.8.

Activities that would like to performed with color form and size.	Eating	Playing	Socializing	Watching TV	Reading	Total
Medium Square Red	3 (8%)	1 (3%)	1 (6%)	0 (0%)	0 (0%)	5 (5%)
Medium Square Blue	0 (0%)	0 (0%)	0 (0%)	4 (29%)	1 (50%)	5 (5%)
Medium Square Green	0 (0%)	5 (15%)	0 (0%)	1 (7%)	0 (0%)	6 (6%)
Medium Square White	1 (3%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1%)
Large Square Red	13 (39%)	0 (0%)	1 (6%)	0 (0%)	0 (0%)	14 (14%)
Large Square Blue	3 (8%)	1 (3%)	2 (13%)	0 (0%)	0 (0%)	6 (6%)
Large Square Yellow	0 (0%)	0 (0%)	1 (6%)	0 (0%)	0 (0%)	1 (1%)
Large Square Green	1 (3%)	7 (20%)	0 (0%)	0 (0%)	0 (0%)	8 (8%)
Large Square White	1 (3%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1%)
Medium Rectangle Red	1 (3%)	1 (3%)	0 (0%)	0 (0%)	0 (0%)	2 (2%)
Medium Rectangle Blue	2 (6%)	2 (6%)	0 (0%)	0 (0%)	0 (0%)	4 (4%)
Medium Rectangle Yellow	0 (0%)	0 (0%)	1 (6%)	0 (0%)	0 (0%)	1 (1%)
Medium Rectangle Green	0 (0%)	1 (3%)	0 (0%)	0 (0%)	0 (0%)	1 (1%)
Large Rectangle Red	4 (11%)	0 (0%)	0 (0%)	0 (0%)v	0 (0%)	4 (4%)
Large Rectangle Blue	0 (0%)	3 (9%)	0 (0%)	7 (50%)	1 (50%)	11 (11%)
Large Rectangle Yellow	1 (3%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1%)
Large Rectangle Green	0 (0%)	10 (30%)	0 (0%)	0 (0%)	0 (0%)	10 (10%)
Medium Circle Blue	0 (0%)	0 (0%)	4 (27%)	1 (7%)	0 (0%)	5 (5%)
Medium Circle Cream	1 (3%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1%)
Large Circle Red	3 (8%)	0 (0%)	4 (27%)	0 (0%)	0 (0%)	7 (7%)
Large Circle Blue	0 (0%)	0 (0%)	1 (6%)	1 (7%)	0 (0%)	2 (2%)
Large Circle Green	0 (0%)	3 (9%)	0 (0%)	0 (0%)	0 (0%)	3 (3%)
Large Circle Brown	1 (3%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1%)
Total	35 (35%)	34 (34%)	15 (15%)	14 (14%)	2 (2%)	100 (1000%)

Table 4.8: Activities that would like to performed in the space with the associated color, form and size.

Figure 4.9: Color, Form and Size Preferences for Different Activities
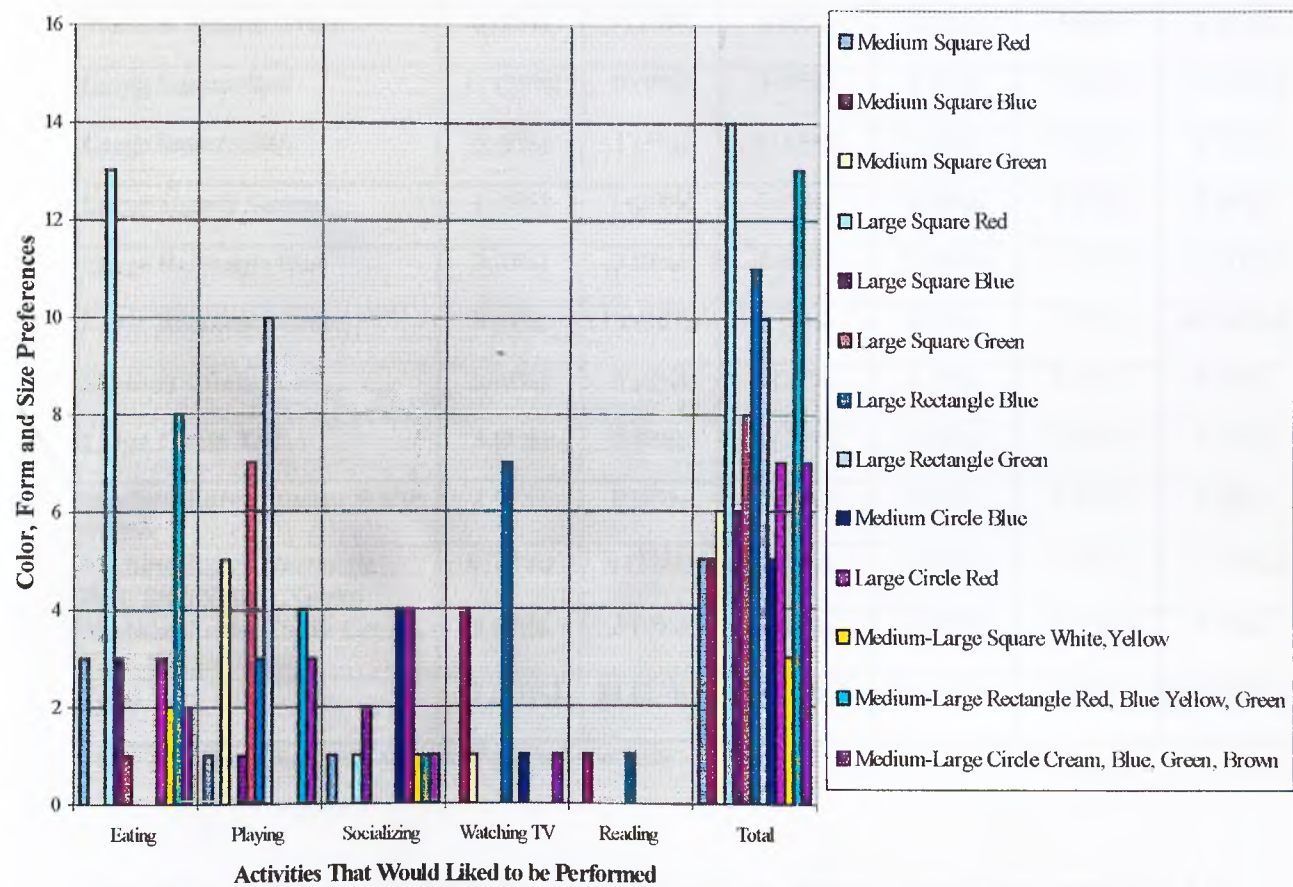
To test the validity of the first hypothesis the collected data were re-grouped considering

the significant results that are mentioned in the above discussions.

The contingency tables were constructed by collecting the little amount of the data

which are below 5% of the subject number (see Table 4.9).

Contingency Table of the First Hypothesis	Eating	Playing	Socializing	Watching TV	Reading	Total
Medium Square Red	3 (8%)	1 (3%)	1 (6%)	0 (0%)	0 (0%)	5 (5%)
Medium Square Blue	0 (0%)	0 (0%)	0 (0%)	4 (29%)	1 (50%)	5 (5%)
Medium Square Green	0 (0%)	5 (15%)	0 (0%)	1 (7%)	0 (0%)	6 (6%)
Large Square Red	13 (39%)	0 (0%)	1 (6%)	0 (0%)	0 (0%)	14 (14%)
Large Square Blue	3 (8%)	1 (3%)	2 (13%)	0 (0%)	0 (0%)	6 (6%)
Large Square Green	1 (3%)	7 (20%)	0 (0%)	0 (0%)	0 (0%)	8 (8%)
Large Rectangle Blue	0 (0%)	3 (9%)	0 (0%)	7 (50%)	1 (50%)	11 (11%)
Large Rectangle Green	0 (0%)	10 (30%)	0 (0%)	0 (0%)	0 (0%)	10 (10%)
Medium Circle Blue	0 (0%)	0 (0%)	4 (27%)	1 (7%)	0 (0%)	5 (5%)
Large Circle Red	3 (8%)	0 (0%)	4 (27%)	0 (0%)	0 (0%)	7 (7%)
Medium-Large Square White, Yellow	2 (6%)	0 (0%)	1 (6%)	0 (0%)	0 (0%)	3 (3%)
Medium-Large Rectangle Red, Blue Yellow, Green	8 (23%)	4 (12%)	1 (6%)	0 (0%)	0 (0%)	13 (13%)
Medium-Large Circle Cream, Blue, Green, Brown	2 (6%)	3 (9%)	1 (6%)	1 (7%)	0 (0%)	7 (7%)
Total	35 (35%)	34 (34%)	15 (15%)	14 (14%)	2 (2%)	100 (100%)

Table 4.9: The contingency table of the first hypothesis.

The activities that would like to be performed; eating, playing, socializing, watching TV, and reading, are tested against different color, form and size preferences. The result of the chi-square tests; x^2 = 157,39779 at df = 48, shows that the first hypothesis of the study is verified at 99% of significance (see Appendix E Table E.1).

Color, form, and size dominating in the space were observed considering the first mentioned items. 71% (71) of the subjects mentioned that square is the dominating form in the space where 29% (29) mentioned rectangle as the dominant form. 75% (53) of the

subjects mentioned square as medium, 19% (13) as small, and 6% (5) as large. 65% (16) of the subjects mentioned rectangle as small, 35% (7) of medium (see Table 4.10).

Color, Form, and Size Perception Dominating in the Space	Female	Male	Total
Small Square Red	2	3	5
Medium Square Red	6	8	14
Large Square Red	2	1	3
Medium Rectangle Blue	1	1	2
Small Square Yellow	1	1	2
Medium Square Yellow	3	5	8
Small Rectangle Yellow	3	2	5
Medium Rectangle Yellow	0	1	1
Small Square White	2	4	6
Medium Square White	15	19	34
Large Square White	0	2	2
Small Rectangle White	8	0	8
Medium Rectangle White	3	1	4
Medium Square Cream	2	1	3
Small Rectangle Cream	2	1	3
Total	50	50	100

Table 4.10: Color, form, and size perception dominating in the space.

From the 53% (53) of the subjects, who are mentioning medium square as dominant, specify white (55%, 34), red (25%, 14), yellow, (13%, 8) as the dominant color. From the 14% (14) of the subjects, mentioning small square as dominant, specify white (42%, 6), red (36%, 5), and yellow (15%, 2) as dominant colors. From the 19% (19) of the subjects, mentioning small rectangle as dominant, specify white (42%, 8), yellow (26%, 5), and red (16%, 3) as dominant color. From the 10% (7) of the subjects, mentioning medium rectangle dominant, specify white (40%, 4), red (20%, 2) as dominant (see Table 4.10).

The perception of color, form, and size dominating in the space is compared with the time spent in the recreation area. It is observed that from the 71% of the subjects who are mentioning square as the dominant form in the space, 42% of them spent up to one hour, 34% spent between one and two hours, 20% spend more than three hours, and only 8% spent between two and three hours in the recreation area. Among the subjects who are mentioning rectangle as a dominant form (29%) in the space, 48% spent between one and two hours, 33% spend less than one hour, 15% more than three hours, and 4% spent between one and two hours in the recreation area.

Among the 71% (71) of the subjects, who perceive that the environment is square dominant, 54% perceive square as white, 31% red, 11% yellow and 4% cream. From 54% (42) of the subjects perceive the environment as square and white, 45% (19) spent up to one hour, 31% (13) spent between one and two hours, 21% (9) spent more than three hours and only 2% (1) spent between two and three hours in the recreation area (see Table 4.11).

Considering the 31% (22) of the subjects who perceived the space as square and red dominant, 36% (8) spent up to one hour, 32% (7) spend between one and two hours, 23% (5) spent more than three hours, and 9% (1) spent between two and three hours.

From the subjects who mentioned square and yellow as the dominant form and color in the environment, spent up to one hour (40%, 4), between one and two hours (30%, 3), and two and three hours (30%, 3). Among the subjects perceiving space as square and

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cream dominant, 67% (2) spent up to one hour and 33% (1) spent between one and two hours in the recreation area (see Table 4.11).

Considering the 29% (29) of the subjects who perceive the environment as rectangle dominated, 52% (12) perceives white, 26% (6) perceives yellow, 13% (3) perceives cream and 8% (2) perceives blue as the dominant color in the space. 75% (9) of the subjects spent between one and two hours, 17% (2) spent up to one hour, 8% (1) spent more than three hours among the subjects who perceive the environment as white dominant. 66% (4) of the subjects spent up to one hour and 34% (2) spent between one and two hours from the subjects who perceive yellow as the dominant color. 100% (3) of the subjects who perceive the environment as cream dominant spent up to one hour where the same amount of the subjects who perceived the environment blue spent more than three hours in the recreational space (see Table 4.11).

With respect to the subjects who perceive square as the dominant form in the space (71%, 71), 78% (59) perceive it as medium, 16% (13) small and 6% (5) large. 43% (24) of the subjects spent up to one hour, 33% (20) spent between one and two hours, 18% (11) spent more than three hours, and 6% (5) spent between two and three hours from the subjects who perceive medium as the dominant size. 47% (6) spent up to one hour, 23% (3) spent between one and two hours, the same amount more than three hours, and 7% (1) between two and three hours among the subjects who perceive small dominant. 60% spent up to one hour, 20% spent between one and two hours and the same amount between two and three hours amongst the large perceived subjects in the recreational area (see Table 4.11).

In relation to the 29% (29) of the subjects, who perceive rectangle as the dominant form in the space, 69% (16) perceive the space small, and 31% (7) medium. 50% (8) spent between one and two hours, 44% (7) spent up to one hour, and 6% (1) spent more than three hours, among the subjects who perceive small as the dominant size. 44% (3) spent between one and two hours, 28% (2) up to one hour, 28% (2) more than three hours from the subjects who perceive medium as the dominant form (see Table 4.11).

The Perception of the Dominating Color, Form and Size in the Space with Respect to Time Spent	Up to 1 hour	1 - 2 hours	2 – 3 hours	3 – more hours	Total
Small Square Red	3 (60%)	1 (20%)	0 (0%)	1 (20%)	5 (5%)
Small Square Yellow	1 (50%)	0 (0%)	1 (50%)	0 (0%)	2 (2%)
Small Square White	2 (33%)	2 (33%)	0 (0%)	2 (33%)	6 (6%)
Medium Square Red	3 (21%)	6 (44%)	1 (7%)	4 (28%)	14 (14%)
Medium Square Yellow	3 (37%)	3 (37%)	2 (26%)	0 (0%)	8 (8%)
Medium Square White	16 (47%)	10 (29%)	1 (4%)	7 (20%)	34 (34%)
Medium Square Cream	2 (66%)	1 (0%)	0 (44%)	0 (0%)	3 (3%)
Large Square Red	2 (66%)	0 (0%)	1 (44%)	0 (0%)	3 (3%)
Large Square White	1 (50%)	1 (50%)	0 (0%)	0 (0%)	2 (2%)
Small Rectangle Yellow	3 (60%)	2 (40%)	0 (0%)	0 (0%)	5 (5%)
Small Rectangle White	1 (12%)	6 (76%)	0 (0%)	1 (12%)	8 (8%)
Small Rectangle Cream	3 (100%)	0 (0%)	0 (0%)	0 (0%)	3 (3%)
Medium Rectangle Blue	0 (0%)	0 (0%)	0 (0%)	2 (100%)	2 (2%)
Medium Rectangle Yellow	1 (100%)	0 (0%)	0 (0%)	0 (0%)	1 (1%)
Medium Rectangle White	1 (25%)	3 (75%)	0 (0%)	0 (0%)	4 (4%)
Total	40 (40%)	35 (35%)	7 (7%)	18 (18%)	100 (100%)

Table 4.11: The Perception of the Dominating Color, Form and Size in the Space with Respect to Time Spent

It is observed that the subjects who perceive the medium square white as the dominant color, form and size in the recreation area spent maximum two hours. The subjects who perceive the environment as small square white mainly spent between one and two

hours. The subjects who perceive medium square red as the dominant spent between one and two hour and more than three hours in the recreation area.

Colors, forms and sizes that would like to be seen dominating in the recreation area of the dormitory are reported considering the first preferences of the subjects. Two tables are constructed for different sexes considering their color, form and size preferences (see Appendix D Tables D.11-D.12). The collected data in the two tables are unified and turned in to another table, which considers color, form and size as unique items by using the above mentioned system (see Table 4.12).

As it is observed that 13% (13) of the subjects mentioned medium square blue as the dominating item in the recreation area, 85% (11) of them are male and 15% (2) are female. 12% (12) of the subjects mentioned medium square red, and 84% (10) of them are female where 16% (2) of them are male. Above the 9% (9) of the subjects who are mentioned large circle blue 56% (5) are female and 44% (4) are male. On the other hand considering the 5% (5) of the subjects mentioning the large square yellow are all composed of females (see Table 4.12, Figure 4.9).

Figure 4.10: Color, Form and Size Preferences of Male and Female Subjects
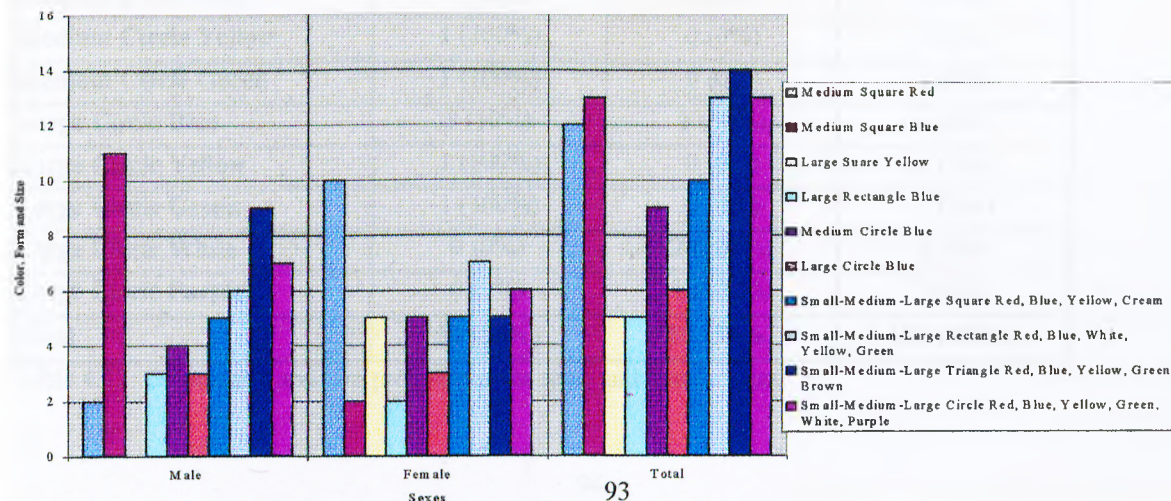
Color, Form and Size Preferences for Male and Female Users	Male	Female	Total
Small Square Red	0 (0%)	2 (100%)	2 (2%)
Medium Square Red	2 (17 %)	10 (83%)	12 (12%)
Medium Square Blue	11 (84%)	2 (16%)	13 (13%)
Medium Square Yellow	0 (0%)	1 (100%)	1 (1%)
Medium Square Cream	1 (100%)	0 (0%)	1 (1%)
Large Square Red	3 (75%)	1 (25%)	4 (4%)
Large Square Blue	1 (50%)	1 (50%)	2 (2%)
Large Square Yellow	0 (0%)	5 (100%)	5 (5%)
Small Rectangle Yellow	0 (0%)	1 (100%)	1 (1%)
Small Rectangle Green	.1 (100%)	0 (0%)	1 (1%)
Medium Rectangle Red	0 (0%)	2 (100%)	2 (2%)
Medium Rectangle Blue	3 (100%)	0 (0%)	3 (3%)
Medium Rectangle White	1 (100%)	0 (0%)	1 (1%)
Large Rectangle Red	0 (0%)	2 (100%)	2 (0%)
Large Rectangle Blue	3 (60%)	2 (40%)	5 (5%)
Large Rectangle Yellow	1 (44%)	2 (66%)	3 (3%)
Small Triangle Red	0 (0%)	1 (100%)	1 (1%)
Medium Triangle Red	1 (100%)	0 (0%)	1 (1%)
Medium Triangle Blue	1 (100%)	0 (0%)	1 (1%)
Large Triangle Red	0 (0%)	3 (100%)	3 (3%)
Large Triangle Blue	1 (100%)	0 (0%)	1 (1%)
Large Triangle Yellow	3 (100%)	0 (0%)	3 (3%)
Large Triangle Green	2 (100%)	0 (0%)	2 (2%)
Large Triangle Brown	1 (50%)	1 (50%)	2 (2%)
Small Circle Red	0 (0%)	1 (100%)	1 (1%)
Small Circle Blue	1 (100%)	0 (0%)	1 (1%)
Small Circle Yellow	1 (100%)	0 (0%)	1 (1%)
Small Circle Green	1 (100%)	0 (0%)	1 (1%)
Medium Circle Red	0 (0%)	2 (100%)	2 (2%)
Medium Circle Blue	4 (44%)	5 (56%)	9 (9%)
Medium Circle Yellow	1 (100%)	0 (0%)	1 (1%)
Medium Circle Green	1 (100%)	0 (0%)	1 (1%)
Large Circle Blue	3 (50%)	3 (50%)	6 (6%)
Large Circle Yellow	1 (100%)	0 (0%)	1 (1%)
Large Circle Green	1 (100%)	0 (0%)	1 (1%)
Large Circle White	0 (0%)	2 (100%)	2 (2%)
Large Circle Purple	0 (0%)	1 (100%)	1 (1%)
Total	50 (50%)	50 (50%)	100 (100%)

Table 4.12: Color, form and size preferences for male and female users.

Moving from the above observations to test the validity of the second hypothesis, which is color, form, and size preferences of male and female users for recreational activities in public spaces are different, contingency table was constructed by unifying the above data which are less that 5% in the total in order to provide the statistical analysis (see Table 4.13).

Contingency Table of the Second Hypothesis	Male	Female	Total
Medium Square Red	2 (16%)	10 (84%)	12 (12%)
Medium Square Blue	11 (85%)	2 (15%)	13 (13%)
Large Square Yellow	0 (0%)	5 (100%)	5 (5%)
Large Rectangle Blue	3 (60%)	2 (40%)	5 (5%)
Medium Circle Blue	4 (44%)	5 (56%)	9 (9%)
Large Circle Blue	3 (50%)	3 (50%)	6 (6%)
Small-Medium-Large Square Red, Blue, Yellow, Cream	5 (50%)	5 (50%)	10 (10%)
Small-Medium-Large Rectangle Red, Blue, White, Yellow, Green	6 (46%)	7 (54%)	13 (13%)
Small-Medium-Large Triangle Red, Blue, Yellow, Green, Brown	9 (64%)	5 (36%)	14 (14%)
Small-Medium-Large Circle Red, Blue, Yellow, Green, White, Purple	7 (54%)	6 (46%)	13 (13%)
Total	50 (50%)	50 (50%)	100 (100%)

Table 4.13: Contingency table of the second hypothesis.

To test the validity of the second hypothesis chi-square analyses is utilized. It is tested that if male and female users prefer different color, form and size. The results of the chi-square test; $x^2 = 18,171917$ at df = 9, shows that the second hypothesis is verified at the 95% significance (see Appendix E Table E.2).

Moving from the above observations to test the validity of the second hypothesis, which is color, form, and size preferences of male and female users for recreational activities in public spaces are different, contingency table was constructed by unifying the above data which are less that 5% in the total in order to provide the statistical analysis (see Table 4.13).

Contingency Table of the Second Hypothesis	Male	Female	Total
Medium Square Red	2 (16%)	10 (84%)	12 (12%)
Medium Square Blue	11 (85%)	2 (15%)	13 (13%)
Large Square Yellow	0 (0%)	5 (100%)	5 (5%)
Large Rectangle Blue	3 (60%)	2 (40%)	5 (5%)
Medium Circle Blue	4 (44%)	5 (56%)	9 (9%)
Large Circle Blue	3 (50%)	3 (50%)	6 (6%)
Small-Medium-Large Square Red, Blue, Yellow, Cream	5 (50%)	5 (50%)	10 (10%)
Small-Medium-Large Rectangle Red, Blue, White, Yellow, Green	6 (46%)	7 (54%)	13 (13%)
Small-Medium-Large Triangle Red, Blue, Yellow, Green, Brown	9 (64%)	5 (36%)	14 (14%)
Small-Medium-Large Circle Red, Blue, Yellow, Green, White, Purple	7 (54%)	6 (46%)	13 (13%)
Total	50 (50%)	50 (50%)	100 (100%)

Table 4.13: Contingency table of the second hypothesis.

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4.3.2. Discussions

During the evaluations of the results it is observed that some results are showing

significant differences from the others. Considering the color, form, and size preferences

for different activities it is observed that red is associated with the eating activity with

medium square. Whereas green is associated with playing activity mainly with the size

large and forms square and rectangle. On the other hand it is not observed any

significant preference of color, form and size for the socializing activities. Watching TV

activity is associated with the color blue mainly with the large rectangle, while a specific

preferences cannot be observed for the activity of reading (see Table 4.14).

Color, Form, and Size Preferences for Different Activities	Eating	Playing	Socializing	Watching TV	Reading	Total
Medium Square Blue	0	0	0	4	1	5
Medium Square Green	0	5	0	1	0	6
Large Square Red	13	0	1	0	0	14
Large Square Green	1	7	0	0	0	8
Large Rectangle Blue	0	3	0	7	1	11
Large Rectangle Green	0	10	0	0	0	10
Total	14	25	1	12	2	54

Table 4.14: Color, form, and size preferences for different activities.

Color form and size perception dominating in the space is another interesting result

coming out from the study. Medium square white is the most dominant item that is

mentioned and medium square red follows it (see Table 4.15).

These results are interesting when it is compared with the actual physical features of the

space, where the space itself is rectangle, tables are square, the color of the walls of

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cream and the tables are white, red is only seen in the environment in the title and labels

of the cafeteria, and as a border line on the tables (see, Figures 4.4 - 4.6).

Color, Form, and Size Perception Dominating in the Space	Female	Male	Total
Medium Square Red	6	8	14
Medium Square Yellow	3	5	8
Small Rectangle Yellow	3	2	5
Small Square White	2	4	6
Medium Square White	15	19	34
Total	29	38	67

Table 4.15: Color, form, and size perception dominating in the space.

Considering the color, form and size preferences for the dominating in the space it is

observed that male and female users showed great differences but the most significant

difference can be seen their preference for color. While both males and females have a

consensus in medium square their color preferences are totally different in the opposite

way females prefer red; males prefer blue (see Table 4.16).

Color, Form and Sizes that Would Like to be Dominating	Male	Female	Total
Medium Square Red	2	10	12
Medium Square Blue	11	2	13
Total	13	12	25

Table 4.16: Color, form and sizes that would like to be dominating.

This difference started being interesting when it is reviewed and discussed with the

implications and meanings of colors in Lüscher color test which is one of the most

famous and the most common used psychological and personality evaluation system that

is used among several similar systems in the world. In this color test, blue is associated

with a complete calm, harmony, peace and gratification. It represents the feeling of

relaxation, rest, and sensitivity. Red represents the energy, desire, and all forms of

appetite, and craving. It represents the felling of being active towards sports, struggle,

competition and the creative activities. (see Appendix F).

It is interesting to observe that while males prefer to see blue, females prefer to see red

as the dominant color in the environment. Moreover, red is the color that is associated

with the eating activity. As Lüscher (cited in Scott, ed. 1972) mentions in his color test,

that it is the color that stimulates hunger and associated with the tastes being sweet and

delicious inspiring from the existence of the foods in the nature generally in color red

(see Appendix F). A strange result for the color preference of eating activity is to

observe that males associate it with red more than females did although their color

preferences is blue in an opposite way to females (see Appendix D Table D.1-D.2).

If we evaluate the association of green with the playing activity by considering the color

psychological studies of Lüscher (cited in Scott, ed. 1972) it is observed that green

represents the psychological conditions of elastic tension. It is the expression of

firmness, constancy and resistance to change. Excitation of external stimuli builds up

with out being released, increased the sense of pride, of self controlled superiority to

others, of being in control of events or at least of being able to manage and direct them

(see Appendix F).

The association of watching TV activity with blue can be discussed as the need for relaxation, need for rest, dignity, harmony, peace and an opportunity to recuperate as it is mentioned in the Lüscher (cited in Scott, ed. 1972) color test (see Appendix F).

The perception of the red in the space as the second dominant color is another interesting outcome of the study. Considering the little amount of that color used in the space, these results support the idea that red is the first attracting color, that takes attention, provides awareness and increases the interest, additionally, red is considered as being the most dominant color according to Mahnke and Mahnke (1993) and Mahnke (1996).

During the evaluation of the perception of dominant colors, forms and sizes in the recreation area. It is observed that square is perceived as the dominant form is the space by 71 subjects and medium and small is the dominant sizes that are perceived in the space although the actual form of the space is a rectangle where the dimensions are 1300 cm x 450 cm (see Appendix B, Figure B.2).

The perception of square in the space as the most dominant form in the study can be discussed by evaluating the space organization, furniture organization, the forms of furniture used in interior spaces, location and size of openings in the space. As Weber (1995) claimed the organization of the space and the organization of the elements in a space is a significant factor in the perception of an interior as mentioned earlier in the second chapter. The recreation area can be analyzed formally in two parts. The sitting activity takes place in the first part where the tables and the TV are located. Second part is distinguished for the selling activity and the circulation (see Appendix B, Figure B.2).

This brings a separation in the space formally, so this kind of space organization can be a significant factor in the perception of square as the dominant form in the space. On the other hand, the square form of the tables that are used in several numbers in a close organization in the space, can be another factor in the perception of square as dominant in the space.

The location and the size of the openings in a space have a great contribution in the space perception as cited in chapter two from İmamoğlu (1975). The openings of the recreational space are located on the short side of the rectangle and it is continuos through the wall. This can be one of the factors, which effect the perception of size and form in the space. As İmamoğlu (1975) mentioned, continuous windows on short walls increase the perception of spaciousness where the over furnished organizations decreased in spaces.

During the evaluation of the results it is observed that the preference of size that would liked to be the dominating in the recreation area are collected around large and medium independent from color and form (see Table 4.17).

The Preference of Size in the Recreational Area	Square	Rectangle	Triangle	Circle	Total
Small	2	2	1	4	9
Medium	27	6	2	13	48
Large	11	10	11	11	43
Total	40	18	14	28	100

Table 4.17: The Preference of Size in the Recreational Area

The preference of the subjects medium and large with any form and color can be associated with the preference of the concept of spaciousness in the interior spaces, which was defined by İmamoğlu (1986) as "the state of liberty, or quality of being wide, spacious or commodious; extensiveness of area or dimensions." And it is claimed that spaciousness is a significant factor, which is generally preferred by the occupants in any space. Another factor on the preference of large as the dominant size in the space can be performed and would liked to be performed activities in the recreational area. As the specified activities are social and the public activities the desirable degree of spaciousness are increasing as mentioned by İmamoğlu (1975) in chapter two.

5. CONCLUSION

Through the study, the basic concepts, human responses and semiotics of color, form and size and their applications in interior spaces are analyzed. The role of recreation on public complexes is examined with its significance in human life. A field research is conducted in the dormitories of Bilkent University testing the perception and the preference of colors, forms, and sizes in recreational area.

Conforming the results, both of the hypotheses are verified and it is indicated that color; form and size preferences for different recreational activities and for different sexes are varying. It can be inferred that activities that are grouped under five main categories: eating, playing, socializing watching TV, and reading was associated with different colors, forms and sizes. Eating activity is associated with large square red, where playing activity is associated mainly with large rectangle green. Watching TV activity is associated with large rectangle blue. On the other hand, it is difficult to state color and size for the socializing activity but the form circle is the form associated with the specified activity.

It is observed in the study that, the preference of dominating colors, forms, and sizes in the space for male and female subjects is different. Medium square red is the preference of females, where medium square blue is the preference of males. Another interesting result coming out with the study is the perception of dominant color, form and size of

the subjects. Red is observed as one of the most dominant color in the space although it is used very little.

Other interesting observations of the field research is the perception of square as the dominant form, perception of red as the second dominant color and the preference of large as the dominant size in the environment, although the actual case is different. The perception of square can be discussed with space, and the furniture organization. The perception of red can be discussed with the specific features of that hue (being the first attracting color, Mahnke, 1996). The preference of large as the dominant size in the space can be related to the preference of spaciousness in the public spaces.

During the evaluation of the research it is observed that, in interior spaces color, form and size are significant factors in space perception and in the performed activity, with their psychological responses and symbolic interpretations. A rectilinear space can be perceived as square by changing the organization of furnishings, the place, size and form of the openings, the application surface, amount and the hue of the color. Thus, different colors, forms and sizes in a space create different psychological responses and symbolic meanings, which is associated with different spatial preferences and activity patterns.

As the user group of the study is university students who are in limited age group, there is not a significant difference examined in the study, between the age and the color, form and size perception and preferences. The effects of age can be another factor that can be studied with relation to the preference and perception for different recreational activities and for dominance in the space. Other significant factors in the perception and the

preference of color, form and size in a recreational area can be the difference between the perception during day (day lighting) and night (artificial lighting). Also different lighting arrangements, such as: cove lighting, up lighting and wall washing, can be another significant factor in perception and preference.

In the content of the above mentioned criteria, the study that aimed to figure out the perception and the preference of colors, forms and sizes by the occupants of the space in recreational environments. This study can be used as a design tool by the architects and interior architects, who design certain environments for certain functions by using color, form and size as the basic design elements, as it outputs the facts that the decisions about certain design features during the design process could be concluded with totally different effects, interpretations, and perceptions on the occupants of the designed spaces. It should be considered that color form and size are important features that must be investigated, being aware of their psychological significance, in the design of the recreational spaces. Those spaces in public complexes should be designed by determining the performed recreational activities, the needs, demands, likes and preferences of the users of those spaces.

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APPENDICES

APPENDIX A:

QUESTIONNAIRE

Subject Number: ....

Application Place: ....

Date:.....................

1. Age ....   Sex: F ☐   M ☐

2. How long do you live in this building?

Semester 1☐   2☐   3☐   4☐   5☐   more ....

3. With how many persons do you share your room?

Alone ☐   1 ☐   2☐   3 ☐

4. On which floor does your room locate?

Ground☐   1 ☐   2 ☐   3 ☐   4 ☐

5. Do you spend any time in the cafeteria and TV room in the dormitory?

Yes ☐   No ☐

6. Which times of the day generally you use cafeteria and TV room, and how much time do you spend in it?

		Up to 1hr.	1hr. - 2hr.	2hr. - 3hr.	3hr- more
Morning ☐	Time ☐	☐	☐	☐	☐
Noon ☐	Time ☐	☐	☐	☐	☐
Afternoon ☐	Time ☐	☐	☐	☐	☐
Evening ☐	Time ☐	☐	☐	☐	☐

7. What kind of activities do you perform in cafeteria and TV room? Identify where do you perform with which form, color and size.

Activities	Where to perform	Form	Color	Size

8. What kind of activities would you like to perform in cafeteria and TV room? Identify where you would like to perform with which form, color and size.

Activities	Where to perform	Form	Color	Size

9. Which forms, sizes, and colors you see dominating in this space?

Identify the dominance order from more dominant (1) to less dominant

(2,3,4...).

Square ☐

Circle ☐

Triangle ☐

Rectangle ☐

Small ☐

Medium ☐

Big ☐

Red ☐

Yellow ☐

Blue ☐

Green ☐

Other

10. Which forms, sizes, and colors <u>would you like</u> to see dominating in this space?

Identify the dominance order from more dominant (1) to less dominant (2,3,4…).

Square ☐

Circle ☐

Triangle ☐

Rectangle ☐

Small ☐

Medium ☐

Big ☐

Red ☐

Yellow ☐

Blue ☐

Green ☐

Other

SORU FORMU

Denek Sayısı: ....

Uygulanan Yer: ....

Tarih:......................

1. Yaş ....   Cinsiyet: K ☐   E ☐

2. Ne kadar zamandır bu binada yaşıyorsunuz?

Dönem   1☐   2☐   3☐   4☐   5☐   daha fazla........

3. Odanızı kaç kişi ile paylaşıyorsunuz?

Yalnız ☐   1☐   2☐   3☐

4. Odanız kaçıncı katta?

Zemin☐   1☐   2☐   3☐   4☐

5. Yurtta kantin ve T.V. odasında vakit geçiriyor musunuz?

Evet ☐   Hayır☐

6. Genellikle günün hangi saatlerinde kantin ve T.V. odasını kullanıyorsunuz ve burada ne kadar vakit geçiriyorsunuz?

			1 saate kadar	1-2 saat	2-3 saat	3 saatten fazla
Sabah	☐	Süre	☐	☐	☐	☐
Öğlen	☐	Süre	☐	☐	☐	☐
Öğleden sonra	☐	Süre	☐	☐	☐	☐
Akşam	☐	Süre	☐	☐	☐	☐

9. Kantin ve T.V. odasında hangi aktiviteleri gerçekleştiriyorsunuz? Bu aktiviteleri nerede, hangi formları, renkleri ve büyüklükleri kullanarak gerçekleştirdiğinizi belirtiniz.

Activiteler	Nerede	Form	Renk	Büyüklük

10. Kantin ve T.V. odasında hangi aktiviteleri gerçekleştirmek isterdiniz? Bu aktiviteleri nerede, hangi formları, renkleri ve büyüklükleri kullanarak gerçekleştirmek istediğinizi belirtiniz.

Activiteler	Nerede	Form	Renk	Büyüklük

9. Bu mekanda hakim olan formlar, büyüklükler ve renkler nelerdir?

En etkin olandan hareket ederek sıralayınız (1,2,3,4.....).

Kare ☐

Daire ☐

Üçgen ☐

Dikdörtgen ☐

Küçük ☐

Orta ☐

Büyük ☐

Kırmızı ☐

Sarı ☐

Mavi ☐

Yeşil ☐

Diğer

10. Bu mekanda <u>hakim olmasını istediğiniz</u> formlar, büyüklükler ve renkler nelerdir?

En etkin olandan hareket ederek sıralayınız (1,2,3,4.....).

Kare ☐

Daire ☐

Üçgen ☐

Dikdörtgen ☐

Küçük ☐

Orta ☐

Büyük ☐

Kırmızı ☐

Sarı ☐

Mavi ☐

Yeşil ☐

Diğer

APPENDIX B:
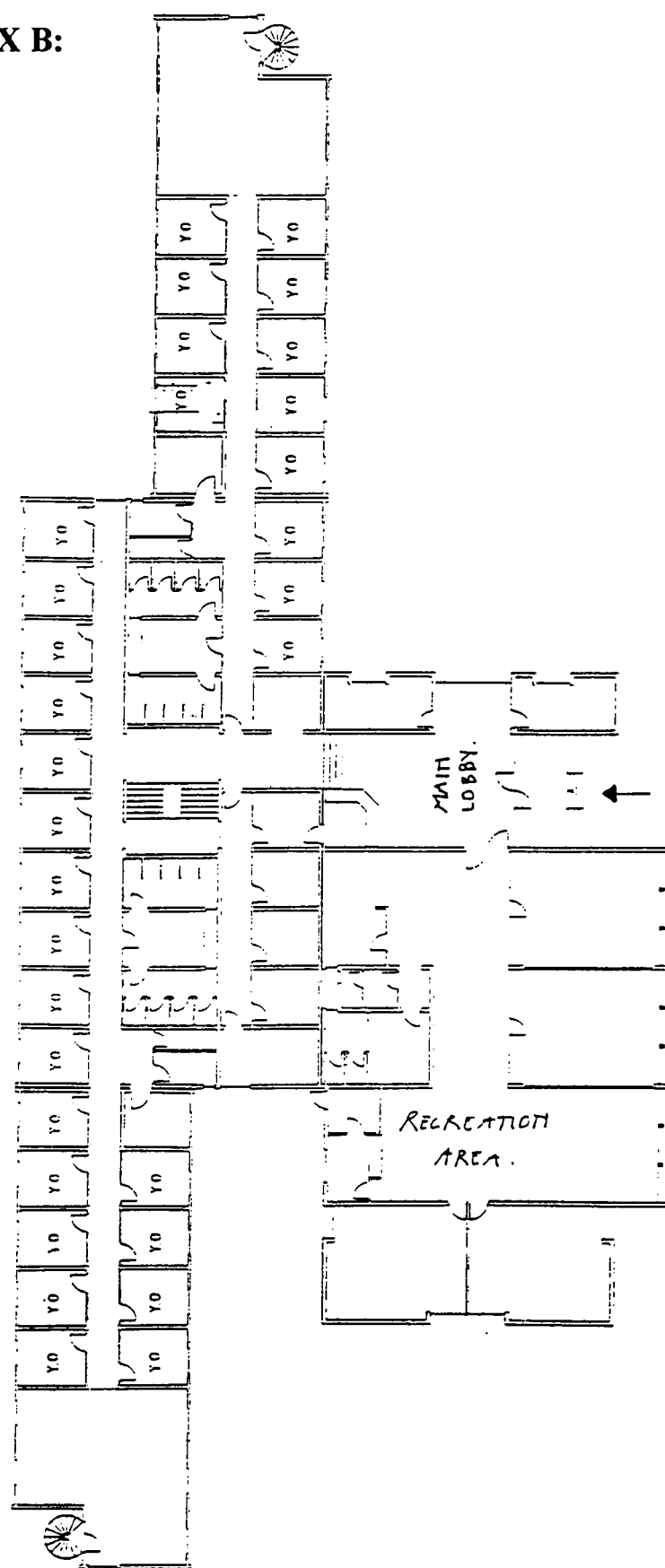
Figure B.1: Ground Floor Plan of the dormitories number 75-76
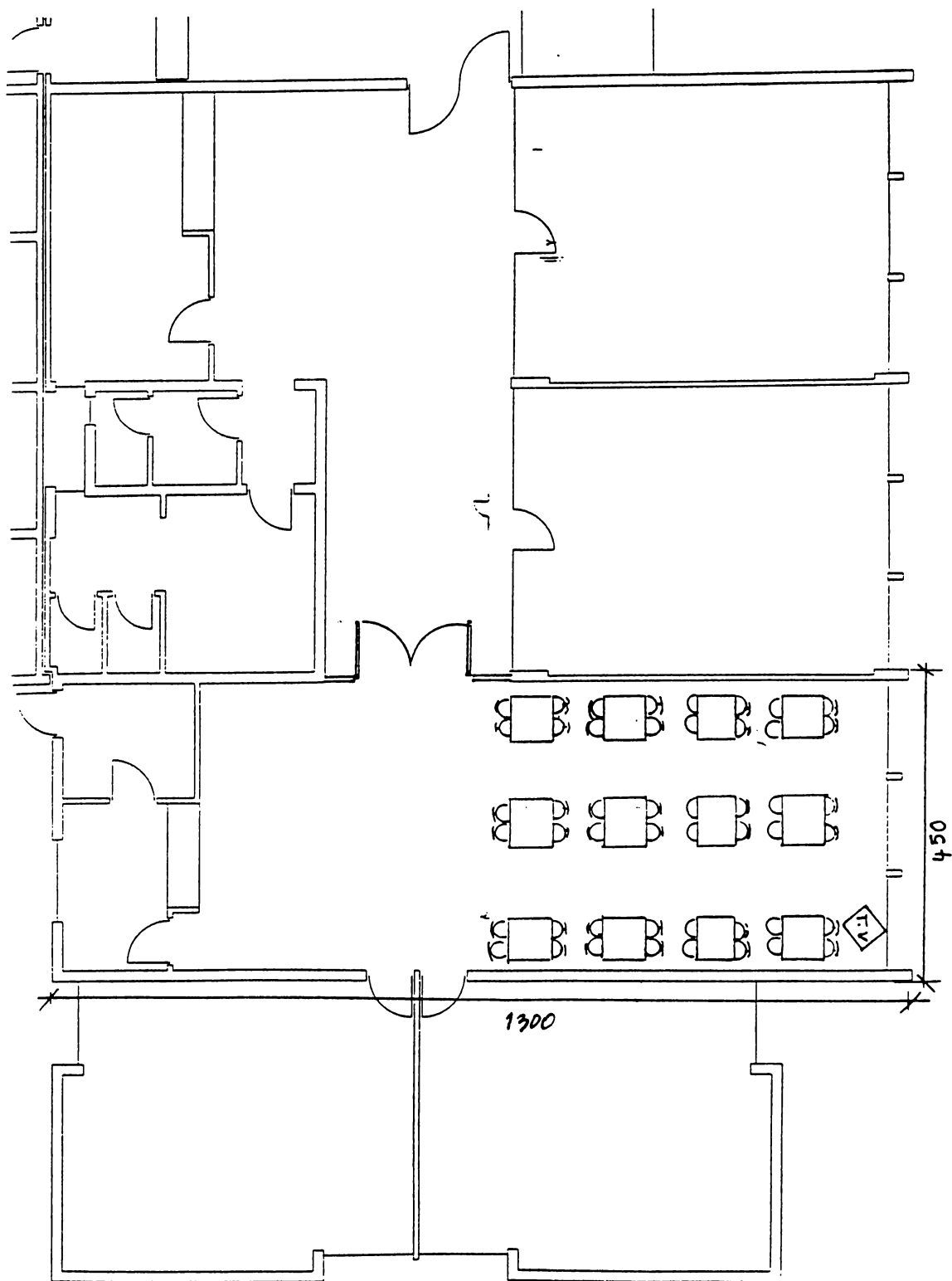
Figure B.2: Plan of the Recreation Area in Dormitory Number 76

APPENDIX C:

Table C.1: Female Questionnaire

Subject	Age	Sex	Semesters Living in the Building	Occupancy Number of the Room	The Floor Number of the Room	Time spent in the recreation area				Activities Performed in the Recreation Area			Activities that would Liked to be Performed			Color, Form, and Size Dominating in the Space								Color, Form, and SizeThat Would Like to be Dominating in the Space							
						a	b	c	d	a	b	c	a	b	c	a	b	c	d	e	f	g	h	a	b	c	d	e	f	g	h
1	24	1	6	2	1	0	0	0	4	1	4	7	1	3	1	4	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0
2	23	1	6	1	5	0	2	0	0	1	2	1	1	6	1	0	0	0	0	5	0	0	0	2	0	0	0	0	0	0	0
3	21	1	4	2	1	0	0	0	1	1	1	5	5	6	2	0	0	0	0	2	0	0	0	0	6	0	0	0	0	0	0
4	25	1	6	2	2	0	0	1	1	1	2	5	1	6	1	0	0	0	0	5	0	0	0	2	0	0	0	0	0	0	0
5	20	1	2	3	4	0	0	0	2	3	5	1	4	6	2	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0
6	20	1	4	4	2	0	0	0	2	1	1	5	1	11	7	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
7	19	1	2	2	5	0	0	0	1	1	2	5	1	2	5	0	0	0	0	2	0	0	0	0	11	0	0	0	0	0	0
8	23	1	4	2	4	0	0	0	2	3	5	1	3	11	2	0	0	0	0	5	0	0	0	0	11	0	0	0	0	0	0
9	21	1	3	3	4	0	0	0	1	1	2	1	1	12	8	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0
10	22	1	4	1	3	0	0	2	2	4	2	1	1	3	1	0	0	0	0	0	0	4	0	1	0	0	0	0	0	0	0
11	23	1	5	2	3	0	0	1	2	1	1	7	2	3	4	0	0	0	0	2	0	0	0	0	3	0	0	0	0	0	0
12	24	1	4	4	3	0	0	0	1	3	5	5	3	11	2	0	0	0	0	2	0	0	0	0	11	0	0	0	0	0	0
13	21	1	2	1	4	0	0	1	0	3	2	7	4	2	2	5	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
14	18	1	2	2	4	0	0	1	0	1	2	5	3	1	2	0	0	0	0	2	0	0	0	11	0	0	0	0	0	0	0
15	21	1	2	1	5	0	0	1	0	3	5	7	3	12	2	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0
16	21	1	4	2	4	0	0	1	0	1	11	7	1	3	1	0	0	0	0	0	0	1	0	6	0	0	0	0	0	0	0
17	21	1	6	2	4	0	0	0	1	4	5	5	1	12	1	0	0	0	0	0	0	4	0	9	0	0	0	0	0	0	0
18	20	1	1	4	3	0	1	0	3	1	2	5	2	5	4	0	5	0	0	0	0	0	0	0	12	0	0	0	0	0	0
19	23	1	3	2	3	0	1	0	2	1	5	3	1	3	1	0	0	0	0	0	5	0	0	0	0	0	6	0	0	0	0
20	20	1	3	2	3	0	0	1	0	4	5	3	4	6	2	0	0	4	0	0	0	0	0	2	0	0	0	0	0	0	0
21	19	1	2	3	5	0	0	1	0	1	5	5	1	5	2	0	0	0	0	2	0	0	0	0	11	0	0	0	0	0	0
22	22	1	3	4	2	0	0	0	1	1	3	5	2	6	4	3	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0
23	19	1	1	1	3	0	0	1	1	1	2	5	2	6	4	4	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
24	19	1	2	4	5	0	0	0	1	3	2	1	2	3	4	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
25	18	1	2	4	2	0	0	3	3	1	2	1	4	6	2	0	0	0	0	2	0	0	0	6	0	0	0	0	0	0	0
26	18	1	4	3	2	0	0	2	0	1	2	5	1	3	5	2	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0
27	21	1	3	4	2	0	0	0	1	3	2	5	1	6	1	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0
28	18	1	2	3	4	0	0	2	0	4	4	3	1	3	4	0	0	4	0	0	0	0	0	0	0	6	0	0	0	0	0
29	18	1	1	1	3	0	0	0	2	1	2	5	2	6	4	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0
30	21	1	3	2	5	0	1	1	0	1	2	1	2	6	4	2	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
31	18	1	2	2	4	1	0	0	1	1	2	1	4	2	2	0	0	0	0	2	0	0	0	0	11	0	0	0	0	0	0
32	20	1	3	2	3	0	2	0	2	1	5	1	2	2	1	0	0	0	0	1	0	0	0	5	0	0	0	0	0	0	0
33	21	1	3	2	2	0	0	0	1	3	4	5	1	3	1	0	0	4	0	0	0	0	0	10	0	0	0	0	0	0	0
34	21	1	6	2	3	0	0	1	0	1	5	1	3	11	2	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
35	21	1	4	3	3	0	0	2	0	1	2	1	3	5	3	0	0	2	0	0	0	0	0	0	0	3	0	0	0	0	0
36	19	1	2	2	5	0	0	1	0	4	2	7	4	2	5	0	0	0	0	0	0	5	0	0	0	0	0	12	0	0	0
37	18	1	1	3	2	0	0	0	1	1	2	5	1	3	1	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0
38	19	1	2	3	3	0	0	0	1	4	2	5	4	2	2	0	0	0	0	0	0	2	0	0	0	3	0	0	0	0	0
39	24	1	5	4	5	0	0	0	2	3	1	5	2	6	4	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
40	18	1	2	3	3	0	0	0	1	4	2	2	4	2	2	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0
41	24	1	2	3	1	0	0	0	4	1	2	7	1	3	2	2	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0
42	18	1	1	4	5	0	0	2	0	3	4	5	1	3	1	5	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0
43	22	1	3	2	4	0	0	0	2	1	5	5	1	3	1	0	0	0	0	4	0	0	0	0	0	0	12	0	0	0	0
44	23	1	6	1	4	1	0	0	3	1	2	1	3	12	1	0	0	0	0	2	0	0	0	0	0	3	0	0	0	0	0
45	22	1	6	2	2	0	0	0	2	1	2	5	2	2	4	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	9
46	23	1	6	3	3	1	0	2	0	4	2	5	3	12	1	3	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0
47	21	1	6	3	2	0	0	2	3	3	2	5	2	2	4	2	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0
48	20	1	2	4	2	1	0	0	1	3	2	1	3	12	1	0	0	0	0	4	0	0	0	0	0	0	0	0	12	0	0
49	18	1	1	2	4	1	0	0	2	1	2	1	1	2	1	2	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0
50	20	1	6	4	2	0	0	4	0	3	2	5	1	3	1	0	0	0	0	2	0	0	0	9	0	0	0	0	0	0	0

*Interpretation of the numbers that take place in Table C.1 is available in pages 122-123.

Table C.2: Male Questionnaire

Subject	Age	Sex	Semesters Living in the Building	Occupancy Number of the Room	The Floor Number of the Room	Time spent in the recreation area				Activities Performed in the Recreation Area			Activities that would Liked to be Performed			Color, Form, and Size Dominating in the Space								Color, Form, and Size That Would Like to be Dominating in the Space							
						a	b	c	d	a	b	c	a	b	c	a	b	c	d	e	f	g	h	a	b	c	d	e	f	g	h
1	21	2	2	4	4	0	0	0	1	1	2	5	1	3	1	0	0	0	0	2	0	0	0	0	5	0	0	0	0	0	0
2	18	2	1	4	5	0	0	0	1	1	2	5	2	6	2	0	0	0	0	1	0	0	0	0	6	0	0	0	0	0	0
3	18	2	2	4	2	0	0	1	0	3	5	5	2	3	4	0	0	0	0	5	0	0	0	0	12	0	0	0	0	0	0
4	22	2	4	3	1	0	0	2	0	4	5	3	1	5	2	0	6	0	0	0	0	0	0	0	0	6	0	0	0	0	0
5	25	2	5	2	1	0	0	0	1	4	5	2	1	2	1	0	0	5	0	0	0	0	0	0	0	0	0	12	0	0	0
6	22	2	4	3	1	0	1	0	2	3	2	3	4	12	2	0	0	2	0	0	0	0	0	0	0	12	0	0	0	0	0
7	20	2	2	4	1	0	0	0	1	3	2	5	2	3	4	0	0	0	0	1	0	0	0	3	0	0	0	0	0	0	0
8	24	2	5	3	1	0	0	1	1	1	1	1	1	3	2	0	0	4	0	0	0	0	0	0	5	0	0	0	0	0	0
9	21	2	4	2	2	0	0	0	2	1	2	1	1	3	2	2	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0
10	23	2	4	2	3	0	0	1	1	1	2	1	2	12	4	0	0	0	0	1	0	0	0	0	0	0	4	0	0	0	0
11	22	2	4	2	5	0	0	1	1	1	2	5	2	12	4	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0
12	20	2	2	3	5	0	0	0	1	1	2	1	4	11	2	2	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0
13	21	2	4	2	5	0	0	0	1	1	2	1	1	12	1	1	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0
14	21	2	4	3	2	0	0	1	0	3	5	5	4	6	2	2	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0
15	22	2	2	4	1	1	0	0	0	3	3	3	2	6	4	0	0	0	0	3	0	0	0	0	11	0	0	0	0	0	0
16	19	2	1	4	3	0	0	0	1	1	2	5	2	6	4	0	0	0	0	2	0	0	0	3	0	0	0	0	0	0	0
17	23	2	6	2	2	0	0	0	2	1	2	5	2	2	4	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	9
18	22	2	6	4	2	0	0	0	4	3	2	5	1	3	1	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0
19	21	2	6	2	5	0	0	4	0	3	2	1	1	6	1	0	0	0	0	2	0	0	0	0	0	0	0	11	0	0	0
20	23	2	6	2	1	0	0	2	0	3	2	1	3	2	2	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0
21	22	2	6	2	4	0	2	0	2	3	2	1	2	12	4	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
22	20	2	1	2	4	0	0	0	2	3	2	1	2	6	4	0	0	0	0	2	0	0	0	0	5	0	0	0	0	0	0
23	22	2	4	2	3	0	0	1	0	3	2	7	3	6	2	0	0	6	0	0	0	0	0	0	0	0	0	0	0	2	0
24	24	2	4	4	5	0	0	2	2	1	5	5	4	6	2	2	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0
25	23	2	4	4	2	0	0	0	2	1	2	3	1	3	1	0	0	2	0	0	0	0	0	0	10	0	0	0	0	0	0
26	20	2	1	2	4	0	0	0	2	3	2	1	2	2	4	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0
27	21	2	6	4	2	0	0	0	4	3	5	5	2	6	4	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0
28	21	2	2	2	3	2	0	0	4	4	5	7	1	5	1	2	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0
29	22	2	2	1	5	1	1	1	1	3	2	5	1	2	1	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0
30	23	2	4	3	3	0	0	1	0	3	2	7	5	2	2	0	0	0	0	0	0	2	0	0	0	9	0	0	0	0	0
31	27	2	6	4	5	0	0	0	4	1	2	5	3	6	3	0	0	0	0	0	0	4	0	0	2	0	0	0	0	0	0
32	21	2	2	3	5	0	0	0	1	3	2	1	2	6	2	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0
33	19	2	1	4	3	0	0	1	1	3	4	5	4	6	2	4	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
34	20	2	2	4	2	0	1	0	3	1	2	5	2	6	4	0	5	0	0	0	0	0	0	12	0	0	0	0	0	0	0
35	22	2	3	4	2	0	0	0	1	4	2	5	2	3	4	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0
36	22	2	1	3	1	0	0	0	4	4	2	5	1	6	3	1	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0
37	18	2	2	2	4	0	1	0	1	3	5	5	2	3	2	0	0	0	0	2	0	0	0	0	11	0	0	0	0	0	0
38	24	2	6	3	3	2	0	0	3	1	2	1	3	3	2	0	0	0	0	2	0	0	0	0	0	8	0	0	0	0	0
39	19	2	2	4	4	1	0	0	1	3	5	5	2	5	2	2	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0
40	18	2	1	2	2	0	0	2	0	3	5	5	1	3	4	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0
41	24	2	6	3	3	0	0	2	0	3	1	1	3	12	1	1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
42	25	2	4	3	3	1	0	0	2	1	2	5	1	6	2	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0
43	20	2	2	4	1	0	1	0	0	3	5	5	4	6	2	0	0	0	0	2	0	0	0	0	0	11	0	0	0	0	0
44	22	2	6	4	1	0	0	0	2	1	5	5	2	5	2	0	0	0	0	0	2	0	0	0	3	0	0	0	0	0	0
45	21	2	1	2	2	1	0	0	1	4	2	5	2	2	1	0	0	0	0	3	0	0	0	0	0	11	0	0	0	0	0
46	19	2	1	1	4	0	0	3	0	4	5	7	2	3	4	0	0	2	0	0	0	0	0	0	12	0	0	0	0	0	0
47	19	2	2	3	5	0	0	1	0	3	5	1	1	12	1	11	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0
48	24	2	6	3	4	0	0	0	4	1	4	5	1	3	1	5	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0
49	21	2	4	3	3	0	0	0	1	3	5	7	1	3	1	0	0	4	0	0	0	0	0	0	6	0	0	0	0	0	0
50	19	2	2	2	5	0	0	0	1	1	2	1	2	2	4	0	0	0	0	11	0	0	0	0	0	9	0	0	0	0	0

*Interpretation of the numbers that take place in the Tables C.1 and C.2 in

Appendix C.

Subject: Subject numbers of the study

Age: Age of the subjects

Sex: (1) F (2) M

Semesters living in the building:
(1) one (2) two (3) three (4) four (5) five (6) more

Occupancy number of the room:
(1) alone (2) with one person (3) with two person (4) with three person

The floor number of the room:
(1) one (2) two (3) three (4) four (5) five (6) more

Occupancy number of the room: (1) ground floor (2) first floor (3) second floor
(4) third floor (5) forth floor

Time Spend in the recreation area:
(a) morning (b) noon (c) afternoon (d) evening
(1) up to 1hr. (2) 1hr-2hr (3) 2hr-3hr (4) 3hr-more

Activities performed in the recreation area:
(a) activities / (1) eating (2) playing (3) socializing (4) watching TV (5) reading

(b) form-size / (1) small square (2) medium square (3) large square (4) small
rectangle (5) medium rectangle (6) large rectangle (7) small triangle
(8) medium triangle (9) large triangle (10) small circle (11) medium
circle (12) large circle

(c) color/ (1) red (2) blue (3) yellow (4) green (5) white (6) purple (7) cream
(8) brown

Activities that would liked to be performed in the recreation area:
(a) activities / (1) eating (2) playing (3) socializing (4) watching TV (5) reading

(b) form-size / (1) small square (2) medium square (3) large square (4) small
rectangle (5) medium rectangle (6) large rectangle (7) small triangle
(8) medium triangle (9) large triangle (10) small circle (11) medium
circle (12) large circle

(c) color/ (1) red (2) blue (3) yellow (4) green (5) white (6) purple (7) cream
(8) brown

Color, form, and size dominating in the space:
(a) red (b) blue (c) yellow (d) green (e) white (f) purple (g) cream (h) brown

form-size / (1) small square (2) medium square (3) large square (4) small rectangle (5) medium rectangle (6) large rectangle (7) small triangle (8) medium triangle (9) large triangle (10) small circle (11) medium circle (12) large circle

Color, form, and size that would liked to be dominating in the space:
(a) red (b) blue (c) yellow (d) green (e) white (f) purple (g) cream (h) brown

form-size / (1) small square (2) medium square (3) large square (4) small rectangle (5) medium rectangle (6) large rectangle (7) small triangle (8) medium triangle (9) large triangle (10) small circle (11) medium circle (12) large circle

APPENDIX D:

Female Eating	Red	Blue	Yellow	Green	White	Purple	Cream	Brown	Total
Small Square	0	0	0	0	0	0	0	0	0
Medium Square	1	0	0	0	1	0	0	0	2
Large Square	10	1	0	1	1	0	0	0	13
Small Rectangle	0	0	0	0	0	0	0	0	0
Medium Rectangle	0	1	0	0	0	0	0	0	1
Large Rectangle	7	0	0	0	0	0	0	0	7
Small Triangle	0	0	0	0	0	0	0	0	0
Medium Triangle	0	0	0	0	0	0	0	0	0
Large Triangle	0	0	0	0	0	0	0	0	0
Small Circle	0	0	0	0	0	0	0	0	0
Medium Circle	0	1	0	0	0	0	1	0	2
Large Circle	1	0	0	0	0	0	0	1	2
Total	19	3	0	1	2	0	1	1	27

Table D.1: Color, Form and Size Preferences for Eating Activity for Female
Subjects

Male Eating	Red	Blue	Yellow	Green	White	Purple	Cream	Brown	Total
Small Square	0	0	0	0	0	0	0	0	0
Medium Square	2	0	0	0	0	0	0	0	2
Large Square	12	4	0	0	0	0	0	0	16
Small Rectangle	0	0	0	0	0	0	0	0	0
Medium Rectangle	1	1	0	0	0	0	0	0	2
Large Rectangle	7	0	1	0	0	0	0	0	8
Small Triangle	0	0	0	0	0	0	0	0	0
Medium Triangle	0	0	0	0	0	0	0	0	0
Large Triangle	0	0	0	0	0	0	0	0	0
Small Circle	0	0	0	0	0	0	0	0	0
Medium Circle	0	0	0	0	0	0	0	0	0
Large Circle	6	0	0	0	0	0	0	0	6
Total	28	5	1	0	0	0	0	0	34

Table D.2: Color, Form and Size Preferences for Eating Activity of Male Subjects

Female Playing	Red	Blue	Yellow	Green	White	Purple	Cream	Brown	Total
Small Square	0	0	0	0	0	0	0	0	0
Medium Square	1	0	0	1	0	0	0	0	2
Large Square	0	0	2	7	0	0	0	0	9
Small Rectangle	0	0	0	1	0	0	0	0	0
Medium Rectangle	0	0	0	0	0	0	0	0	0
Large Rectangle	0	0	0	9	0	0	0	0	9
Small Triangle	0	0	0	0	0	0	0	0	0
Medium Triangle	0	0	0	1	0	0	0	0	0
Large Triangle	0	0	0	0	0	0	0	0	0
Small Circle	0	0	0	0	0	0	0	0	0
Medium Circle	0	0	0	1	0	0	0	0	1
Large Circle	0	0	0	0	0	0	0	0	0
Total	1	0	2	20	0	0	0	0	23

Table D.3: Color, Form, and Size Preferences for Playing Activity of Female Subjects

Male Playing	Red	Blue	Yellow	Green	White	Purple	Cream	Brown	Total
Small Square	0	0	0	0	0	0	0	0	0
Medium Square	0	0	0	3	0	0	0	0	3
Large Square	1	1	0	6	0	0	0	0	8
Small Rectangle	0	0	0	0	0	0	0	0	0
Medium Rectangle	0	2	0	0	0	0	0	0	2
Large Rectangle	0	4	0	5	0	0	0	0	9
Small Triangle	0	0	0	0	0	0	0	0	0
Medium Triangle	0	0	0	0	0	0	0	0	0
Large Triangle	0	0	0	0	0	0	0	0	0
Small Circle	0	0	0	0	0	0	0	0	0
Medium Circle	0	0	0	0	0	0	0	0	0
Large Circle	1	0	0	3	0	0	0	0	4
Total	2	7	0	17	0	0	0	0	26

Table D.4: Color, Form, and Size Preferences for Playing Activity of Male
Subjects

Female Watching TV	Red	Blue	Yellow	Green	White	Purple	Cream	Brown	Total
Small Square	0	0	0	0	0	0	0	0	0
Medium Square	0	4	0	0	1	0	0	0	5
Large Square	0	4	0	0	0	0	0	0	4
Small Rectangle	0	0	0	0	0	0	0	0	0
Medium Rectangle	0	0	0	0	0	0	0	0	0
Large Rectangle	1	7	0	0	0	0	0	0	8
Small Triangle	0	0	0	0	0	0	0	0	0
Medium Triangle	0	0	0	0	0	0	0	0	0
Large Triangle	0	0	0	0	0	0	0	0	0
Small Circle	0	1	0	0	0	0	0	0	0
Medium Circle	0	1	0	0	0	0	0	0	1
Large Circle	1	0	0	0	0	0	0	0	1
Total	2	17	0	0	1	0	0	0	20

Table D.5: Color, Form and Size Preferences for Watching TV Activity of Female

Male Watching TV	Red	Blue	Yellow	Green	White	Purple	Cream	Brown	Total
Small Square	0	0	0	0	0	0	0	0	0
Medium Square	0	0	0	0	0	0	0	0	0
Large Square	1	4	0	0	0	0	0	0	5
Small Rectangle	0	0	0	0	0	0	0	0	0
Medium Rectangle	0	0	0	0	0	0	0	0	0
Large Rectangle	1	9	0	0	0	0	0	0	10
Small Triangle	0	0	0	0	0	0	0	0	0
Medium Triangle	0	0	0	0	0	0	0	0	0
Large Triangle	0	0	0	0	0	0	0	0	0
Small Circle	0	0	0	0	0	0	0	0	0
Medium Circle	0	1	0	0	0	0	0	0	1
Large Circle	0	2	0	0	0	0	0	0	2
Total	2	16	0	0	0	0	0	0	18

Table D.6: Color, Form and Size Preferences for Watching TV Activity of Male

Female Socializing	Red	Blue	Yellow	Green	White	Purple	Cream	Brown	Total
Small Square	0	1	0	0	0	0	0	0	1
Medium Square	0	0	0	0	0	0	0	0	0
Large Square	3	0	0	0	0	0	0	0	3
Small Rectangle	0	0	0	0	0	0	0	0	0
Medium Rectangle	0	0	1	1	0	0	0	0	2
Large Rectangle	0	3	0	0	0	0	0	0	3
Small Triangle	0	0	0	0	0	0	0	0	0
Medium Triangle	0	0	0	0	0	0	0	0	0
Large Triangle	0	0	0	0	0	0	0	0	0
Small Circle	0	0	0	0	0	0	0	0	0
Medium Circle	0	3	0	0	0	0	0	0	3
Large Circle	8	0	0	0	0	0	0	0	8
Total	11	7	1	1	0	0	0	0	20

Table D.7: Color, Form and Size Preferences for Socializing Activity of Female Subjects

Male Socializing	Red	Blue	Yellow	Green	White	Purple	Cream	Brown	Total
Small Square	0	0	0	0	0	0	0	0	0
Medium Square	1	0	2	0	0	0	0	0	3
Large Square	2	3	0	0	0	0	0	0	5
Small Rectangle	0	0	0	0	0	0	0	0	0
Medium Rectangle	0	3	0	0	0	0	0	0	3
Large Rectangle	0	0	1	0	0	0	0	0	1
Small Triangle	0	0	0	0	0	0	0	0	0
Medium Triangle	0	0	0	0	0	0	0	0	0
Large Triangle	0	0	0	0	0	0	0	0	0
Small Circle	0	0	0	0	0	0	0	0	0
Medium Circle	0	2	0	0	0	0	0	0	2
Large Circle	4	0	0	0	0	0	0	0	4
Total	7	8	3	0	0	0	0	0	18

Table D.8: Color, Form and Size Preferences for Socializing Activity of Male Subjects

Female Reading	Red	Blue	Yellow	Green	White	Purple	Cream	Brown	Total
Small Square	0	0	0	0	0	0	0	0	0
Medium Square	0	0	0	0	0	0	0	0	0
Large Square	0	0	0	1	0	0	0	0	1
Small Rectangle	0	0	0	0	0	0	0	0	0
Medium Rectangle	0	0	0	0	0	0	0	0	0
Large Rectangle	0	1	1	0	0	0	1	1	4
Small Triangle	0	0	0	0	0	0	0	0	0
Medium Triangle	0	0	0	0	0	0	0	0	0
Large Triangle	0	0	0	0	0	0	0	0	0
Small Circle	0	0	0	0	0	0	0	0	0
Medium Circle	0	0	0	0	0	0	0	0	0
Large Circle	0	1	0	0	0	0	0	0	1
Total	0	2	1	1	0	0	1	1	6

Table D.9: Color, Form and Size Preferences for Reading Activity of Female Subjects

Male Reading	Red	Blue	Yellow	Green	White	Purple	Cream	Brown	Total
Small Square	0	0	0	0	0	0	0	0	0
Medium Square	0	1	0	0	0	0	0	0	1
Large Square	0	0	1	0	0	0	0	0	1
Small Rectangle	0	0	0	0	0	0	0	0	0
Medium Rectangle	0	0	0	0	0	0	0	0	0
Large Rectangle	0	1	0	0	0	0	0	0	1
Small Triangle	0	0	0	0	0	0	0	0	0
Medium Triangle	0	0	0	0	0	0	0	0	0
Large Triangle	0	0	0	0	0	0	0	0	0
Small Circle	0	0	0	0	0	0	0	0	0
Medium Circle	0	0	0	0	0	0	0	0	0
Large Circle	1	0	0	0	0	0	0	0	1
Total	1	2	1	0	0	0	0	0	4

Table D.10: Color, Form and Size Preferences for Reading Activity of Male Subjects

Female	Red	Blue	Yellow	Green	White	Purple	Cream	Brown	Total
Small Square	2	0	0	0	0	0	0	0	2
Medium Square	10	2	1	0	0	0	0	0	13
Large Square	1	1	5	0	0	0	0	0	7
Small Rectangle	0	0	1	0	0	0	0	0	1
Medium Rectangle	2	0	0	0	0	0	0	0	2
Large Rectangle	2	2	2	0	0	0	0	0	6
Small Triangle	1	0	0	0	0	0	0	0	1
Medium Triangle	0	0	0	0	0	0	0	0	0
Large Triangle	3	0	0	0	0	0	0	1	4
Small Circle	1	0	0	0	0	0	0	0	1
Medium Circle	2	5	0	0	0	0	0	0	7
Large Circle	0	3	0	0	2	1	0	0	6
Total	24	13	9	0	2	1	0	1	50

Table D.11: Dominant Color, Form, and Size Preferences of Female Subjects

Male	Red	Blue	Yellow	Green	White	Purple	Cream	Brown	Total
Small Square	0	0	0	0	0	0	0	0	0
Medium Square	2	11	0	0	0	0	1	0	14
Large Square	3	1	0	0	0	0	0	0	4
Small Rectangle	0	0	0	1	0	0	0	0	1
Medium Rectangle	0	3	0	0	1	0	0	0	4
Large Rectangle	0	3	1	0	0	0	0	0	4
Small Triangle	0	0	0	0	0	0	0	0	0
Medium Triangle	1	1	0	0	0	0	0	0	2
Large Triangle	0	1	3	2	0	0	0	1	7
Small Circle	0	1	1	1	0	0	0	0	3
Medium Circle	0	4	1	1	0	0	0	0	6
Large Circle	0	3	1	1	0	0	0	0	5
Total	6	28	7	6	1	0	1	1	50

Table D.12: Dominant Color, Form, and Size Preferences of Male
Subjects

APPENDIX E:

Application of the Chi- Square	Observed (fi)	Theoratical (Fi)	(fi-Fi)	(fi-Fi)²/Fi
Medium Square Red Eating	3	1,75	1,25	0,892857143
Medium Square Red Playing	1	1,7	-0,7	0,288235294
Medium Square Red Socializing	1	0,75	0,25	0,083333333
Medium Square Red Watch TV	0	0,7	-0,7	0,7
Medium Square Red Reading	0	0,1	-0,1	0,1
Medium Square Blue Eating	0	1,75	-1,75	1,75
Medium Square Blue Playing	0	1,7	-1,7	1,7
Medium Square Blue Socializing	0	0,75	-0,75	0,75
Medium Square Blue Watch TV	4	0,7	3,3	15,55714286
Medium Square Blue Reading	1	0,1	0,9	8,1
Medium Square Green Eating	0	2,1	-2,1	2,1
Medium Square Green Playing	5	2,04	2,96	4,294901961
Medium Square Green Socializing	0	0,9	-0,9	0,9
Medium Square Green Watch TV	1	0,84	0,16	0,03047619
Medium Square Green Reading	0	0,12	-0,12	0,12
Large Square Red Eating	13	4,9	8,1	13,38979592
Large Square Red Playing	0	4,76	-4,76	4,76
Large Square Red Socializing	1	2,1	-1,1	0,576190476
Large Square Red Watch TV	0	1,96	-1,96	1,96
Large Square Red Reading	0	0,28	-0,28	0,28
Large Square Blue Eating	3	2,1	0,9	0,385714286
Large Square Blue Playing	1	2,04	-1,04	0,530196078
Large Square Blue Socializing	2	0,9	1,1	1,344444444
Large Square Blue Watch TV	0	0,84	-0,84	0,84
Large Square Blue Reading	0	0,12	-0,12	0,12
Large Square Green Eating	1	2,8	-1,8	1,157142857
Large Square Green Playing	7	2,72	4,28	6,734705882
Large Square Green Socializing	0	1,2	-1,2	1,2

	Observed (fi)	Theoratical (Fi)	(fi-Fi)	(fi-Fi)²/Fi
Large Square Green Watch TV	0	1,12	-1,12	1,12
Large Square Green Reading	0	0,16	-0,16	0,16
Large Rectangle Blue Eating	0	3,85	-3,85	3,85
Large Rectangle Blue Playing	3	3,74	-0,74	0,146417112
Large Rectangle Blue Socializing	0	1,65	-1,65	1,65
Large Rectangle Blue Watch. TV.	7	1.54	5,46	19,35818182
Large Rectangle Blue Reading	1	0,22	0,78	2,765454545
Large Rectangle Green Eating	0	3,5	-3,5	3,5
Large Rectangle Green Playing	10	3,4	6,6	12,81176471
Large Rectangle Green Socializing	0·	1,5	-1,5	1,5
Large Rectangle Green Watch. TV.	0	1,4	-1,4	1,4
Large Rectangle Green Reading	0	0,2	-0,2	0,2
Medium Circle Blue Eating	0	1,75	-1,75	1,75
Medium Circle Blue Playing	0	1,7	-1,7	1,7
Medium Circle Blue Socializing	4	0,75	3,25	14,08333333
Medium Circle Blue Watch TV	1	0,7	0,3	0,128571429
Medium Circle Blue Reading	0	0,1	-0,1	0,1
Large Circle Red Eating	3	2,45	0,55	0,123469388
Large Circle Red Playing	0	2,38	-2,38	2,38
Large Circle Red Socializing	4	1,05	2,95	8.288095238
Large Circle Red Watch TV	0	0,98	-0,98	0,98
Large Circle Red Reading	0	0,14	-0,14	0,14
Medium-Large Square White-Yellow Eating	2	1,05	0,95	0,85952381
Medium-Large Square White-Yellow Playing	0	1,02	-1,02	1,02
Medium-Large Square White-Yellow Socializing	1	0,45	0,55	0,672222222
Medium-Large Square White-Yellow Watch TV	0	0,42	-0,42	0,42
Medium-Large Square White-Yellow Reading	0	0,06	-0,06	0,06

	Observed (fi)	Theoratical (Fi)	(fi-Fi)	$(fi-Fi)^2/Fi$
Medium-Large Rectangle Red, Blue Yellow, Green Eating	8	4,55	3,45	2,615934066
Medium-Large Rectangle Red, Blue Yellow, Green Playing	4	4,42	-0,42	0,039909502
Medium-Large Rectangle Red, Blue Yellow, Green Socializing	1	1,95	-0,95	0,462820513
Medium-Large Rectangle Red, Blue Yellow, Green Watch. TV.	0	1,82	-1,82	1,82
Medium-Large Rectangle Red, Blue Yellow, Green Reading	0	0,26	-0,26	0,26
Medium-Large Circle Cream, Blue, Green, Brown Eating	2	2,45	-0,45	0,082653061
Medium-Large Circle Cream, Blue, Green, Brown Playing	3	2,38	0,62	0,161512605
Medium-Large Circle Cream, Blue, Green, Brown Socializing	1	1,05	-0,05	0,002380952
Medium-Large Circle Cream, Blue, Green, Brown Watch TV	1	0,98	0,02	0,000408163
Medium-Large Circle Cream, Blue, Green, Brown Reading	0	0,14	-0,14	0,14
				157.3977892

Table E.1: Application of the Chi-square for
the First Hypothesis

	Observed (fi)	Theoratical (Fi)	(fi-Fi)	(fi-Fi)²/Fi
Medium Square Red Male	2	6	-4	2,666667
Medium Square Red Female	10	6	4	2,666667
Medium Square Blue Male	11	6,5	4,5	3,115385
Medium Square Blue Female	2	6,5	-4,5	3,115385
Large Square Yellow Male	0	2,5	-2,5	2.5
Large Square Yellow Female	5	2,5	2,5	2,5
Large Rectangle Blue Male	3	2,5	0,5	0,1
Large Rectangle Blue Female	2	2,5	-0,5	0,1
Medium Circle Blue Male	4	4,5	-0,5	0,055556
Medium Circle Blue Female	5	4,5	0,5	0,055556
Large Circle Blue Male	3	3	0	0
Large Circle Blue Female	3	3	0	0
Small-Medium-Large Square Red, Blue, Yellow, Cream Male	5	5	0	0
Small-Medium-Large Square Red, Blue, Yellow, Cream Female	5	5	0	0
Small-Medium-Large Rectangle Red, Blue, White, Yellow, Green Male	6	6,5	-0,5	0,038462
Small-Medium-Large Rectangle Red, Blue, White, Yellow, Green Female	7	6,5	0,5	0,038462
Small-Medium-Large Triangle Red, Blue, Yellow, Green, Brown Male	9	7	2	0,571429
Small-Medium-Large Triangle Red, Blue, Yellow, Green, Brown Female	5	7	-2	0,571429
Small-Medium-Large Circle Red, Blue, Yellow, Green, White, Purple Male	7	6,5	0,5	0,038462
Small-Medium-Large Circle Red, Blue, Yellow, Green, White, Purple Female	6	6,5	-0,5	0,038462
				18,17192

Table E.2: Application of the Chi-square of the Second Hypothesis

APPENDIX F:

The interpretation of three colors that are used during the discussions of the field

research in 4.3.2. in *"Lüsher Color Test"* (Scott, ed. 1972).

*"**BLUE**: Blue represents complete calm. The body adjusts itself to relaxation and*

recuperation, so that in sickness and exhaustion the need for this color increases.

Psychologically, the tendency to be sensitive and easily hearth also increases. Blue

represents the basic biological need- physiologically, tranquillity; psychologically,

contentment, contentment being peace plus gratification. Any one in a situation as

balanced, harmonious and tension-free, as this feels settled, united and secure. Thus,

blue represents the bonds one draws around oneself, unification and the sense of

belonging. "blue is loyalty", as they say, but where one's allies are concerned one is

especially vulnerable, so blue corresponds to depth of felling. Blue, as a relaxed

sensitivity, is a prerequisite for empathy, for aesthetic experience and for meditative

awareness.

Blue corresponds symbolically to calm water, to the quite temperament, to

femininity, to the illumination in the manuscript. Its sensory perception is sweetness;

its emotional content is tenderness" (Scott, ed. 1972, 59)

*"**GREEN**: Green represents the psychological condition of elastic tension. It*

expresses it self psychologically as the will in operation, as perseverance and

tenacity. Green is therefore an expression of firmness, of constancy, and above all, of

resistance to change. It indicates constancy of view point as well as constant self-

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awareness and places a high value on the "I" in all forms of possession and self-

affirmation, since possession is regarded as increasing both security and self esteem.

From this, we can see that the person who chooses green wants to increase his

certainty in his own value, either by self-assertiveness, by holding fast to some

idealized picture he has of him self, or by the acknowledgement he expects from

others in deference to his possessions- whether because of his greater wealth or in

terms of his superiority in physical, educational or cultural attainments.

Green as tension therefore acts as a dam behind which the excitation of external

stimuli builds up without being released, increasing the sense of pride, or self-

controlled superiority to others, of power, of being in control of event, or at least of

being able to manage and direct them. This damming-up and suppression of external

stimuli lead to many forms and degrees of "control" not only in the sense of directed

drives, but also as detailed accuracy in checking and verifying facts, as precise and

accurate memory, as clarity of presentation, critical analyzes and logical

consistency- all the way up to abstract formalism" (Scott, ed. 1972, 63).

*"**RED:** Red represents energy expending psychological condition. It speeds up the*

pulse, raises blood pressure and increases the respiration rate. Red is the expression

of vital force, of nervous and glandular activity, and solve it has the meaning of

desire and of all forms of appetite and craving. Red is the urged to achieve results, to

win success; it is hungrily to desire all those things, which offer intensity of living

and fullness of experience. Red is impulse, the will-to-win, and all forms of vitality

and power from sexual potensive to revolutionary transformation. It is the impulse

towards active doing towards sport, struggle, competition, eroticism, and

enterprising productivity. Red is "impact of the will" or "force of will" as distinct

from the green elasticity of the will.

Red corresponds symbolically to the blood of conquest, to the Pentecostal flame

igniting the human spirit, to the sanguine temperament and to masculinity. It's

sensory perception is appetite, its emotional content is desire" (Scott, ed. 1972, 65).