THE EFFECTS OF TRADITIONAL PLAYGROUND EQUIPMENT DESIGN IN CHILDREN'S DEVELOPMENTAL NEEDS

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ABSTRACT

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In this research, concept of play and types of outdoor playgrounds were explored in the light of the relevant literature. A field study was conducted in order to determine the attributes of traditional type playground equipment in children's developmental needs. Kurtuluş Park of Ankara was determined as the research area whereas, 70 children, aged between 6 to 12, were randomly selected and observed. Data on age, sex, favourite type of playground equipment and play behaviour of the child were collected by means of an observation sheet. A short interview with the child was also conducted after the observation session. Collected data were encoded, analyzed and interpretted by using Pearson's Chi-square Test and Fisher's Exact Chi-square Test with 95% ($\alpha = 0.05$) confidence intervals.

The results of the field study revealed that today's playgrounds have little value in terms of play. Limitations of fixed playground equipment directly affect children's developmental needs. The findings of the research study indicates that traditional type play structures support physical and social development of the child to a certain extent. However, this kind of equipment do not foster cognitive and emotional development of children.

Key words: traditional playgrounds, outdoor play, child development

ÖZ

GELENEKSEL ÇOCUK PARKI OYUN ELEMAN TASARIMLARININ ÇOCUK GELİŞİMİ ÜZERİNE ETKİSİ

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Bu araştırmada oyun kavramı ve çocuk parkları türleri ilgili literatürün ışığı altında incelenmiştir. Geleneksel çocuk parkı oyun elemanlarının çocuk gelişimi üzerine etkisini belirlemek için bir alan çalışması yürütülmüştür. Ankara, Kurtuluş Park'ı araştırma bölgesi olarak belirlenmiş, 6-12 yaş aralığındaki 70 çocuk rasgele seçilip gözlenmiştir. Yaş, cinsiyet, en çok tercih edilen oyun elemanı ve çocuğun oyun davranışları ile ilgili veriler bir gözlem kağıdı yardımı ile toplanmıştır. Gözlem süresinden sonra çocuklar ile kısa birer görüşme düzenlenmiştir. Toplanan veriler matematiksel olarak kodlanıp, Pearson'ın Ki-kare testi ve Fisher'in Kesin Ki-kare Testi kullanılarak %95 ($\alpha = 0.05$) güven aralığında analizi yapılıp yorumlanmıştır.

Alan çalışmasının sonuçları günümüz çocuk parklarının, oyun kavramı göz önünde bulundurulursa oldukça az değeri olduğunu ortaya çıkarmıştır. Sabit oyun elemanlarının limitli kullanımı direkt olarak çocuğun gelişim ihtiyaçlarını etkilemiştir. Araştırma çalışmasının sonuçları geleneksel çocuk parkı oyun elemanlarının çocuğun fiziksel ve sosyal gelişimini bir dereceye kadar karşıladığını göstermiştir. Bununla birlikte, bu tipteki oyun elemanlarının çocuğun bilişsel ve duygusal gelişimine katkıda bulunmadığı ortaya çıkmıştır.

Anahtar kelimeler: geleneksel çocuk parkı, açık hava oyunları, çocuk gelişimi

To my little son; ARDA

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INTRODUCTION

1.1 Aim and Objective

Playgrounds have an important role in the modern child's world. The ideal outdoor playground should be a replica of natural outdoor environment for today's urban child. They should encourage physical, social, emotional, mental and creative play as well (Sheridan, 1999).

Playgrounds also need to allow children to experiment and control the environment that will provide an active learning atmosphere for facilitating their construction of knowledge. Through the use of the playground equipment the child is assisted to develop spatial and visual perception.

Today's playgrounds have a little value in terms of play. Traditional type of playground equipment do not provide creative opportunities for children to play unimagined ways and do not represent enough challenge. This type of playground structures are enjoyable to use but they do not allow children to practice their creative abilities because of their repetitive actions. Children are quickly get bored of inflexible and fixed playground structures. Traditional type

playground equipment are primaly designed for development of motor skills of children. As it was stated before, the design of playground equipment should promote the child intellectually, socially, emotionally and physically. In this research study, Piaget's perspective will form the main structure in analyzing developmental factors of play.

The aim of this study will be to explore the effects of play structures in children's development and to bring a new way of look on playground equipment design concept. On the other hand, inadequate aspects of outdoor play structures will be underlined. Through this research, the viability of traditional playground equipment in 21st century will also be discussed. In this study, it is not the only aim of knowing what children do on playgrounds but also understand the effects of playground equipment design on their learning ability and development.

In the second chapter of the thesis, definition of play and play types are examined from different points of view. Play theories and the role of play in child development are also taken into consideration. In the third chapter, importance of outdoor play environment for children and types of playgrounds are mentioned. Traditional play structures and design criteria for playgrounds are examined in the light of the relevant literature. In the fourth chapter, a field study is conducted to determine the impact of playground equipment design in children's development. Analyzing, discussion and conclusion part constitute the fifth and the sixth chapter of the thesis.

1.2 Methodology

In child study, most of the events must be observable and measurable that will allow scientific analysis. In scientific method, theory or hypothesis should be testable. Difficulty of gathering exact data from the child necessitates observational methods in the study of child development (Vasta,1979). Conducting an observational study involves forethought and provides a wealth of information when done correctly.

In this study, observational methods will be used to analyse the relationship between the playground equipment design and children's developmental factors. Observation methods can be conducted in two different ways; naturalistic observation and observation with intervention. In this study, naturalistic observation will be preferred in order to observe behaviours in the natural setting. The advantages of this type of observation is that investigator does nothing to interfere with the subject's behaviour while the subjects do not realize they are being observed (Gillham,2000).

An observation sheet will be prepared and a pilot playground will be determined for performing a field study. Playground type, age, gender of the child, socioeconomic status, previous visits to the park, amount of pretend play, time spent on each equipment, way of playing with the equipment and number of children playing together will be the independent variables of the study. After

observing the focused child at least 20 minutes a short interview will be conducted.

In the second stage of the field study, collected data will be encoded, analyzed and interpreted using suitable statistical techniques for categorical variables. In this study, not only the physical development but also the mental development of the child will be searched thoroughly in terms of playground equipment design. Interaction between outdoor playing settings and the child, will form the main part of the study.

CHAPTER 2

PLAY

2.1 Play and Children

Play is the child's way of learning. Through play, children receive information from the surrounding environment in order to use it in their physical and mental development. By means of play, children learn and develop as individuals, and as members of the community.

Developmental benefits of play include creativity and imagination, learning to solve problems, discovery and reasoning, symbolic thought and ability to cooperate. Play can be defined as freely choosen, personally directed, intrinsically motivated behaviour that actively engages the child (Kenneth et. al., 1983; cited in Mussen, 1983).

For a child, being outdoors is the only chance for exploring the world surrounds him or her. It is the outdoors where children can freely experience their motor skills like running, jumping, climbing etc. It is also the most approppriate area for performing manipulative skills such as swinging, lifting, and balancing. Most of the cases; outdoors have something more than physical benefits. As

children play outdoors, they are more likely to invent games and learn about the world in their own way.

2.1.1 Theories of Play

The value of play is considered by researchers from a range of diciplines including psychology, education, philosophy, and anthropology. As it is stated in Table 1. childhood theorists see "play" as fundemental to human development and emphasize its critical value for all children.

Early play theorists determined only the physical benefits of play. According to Herbert Spencer's (1873) "surplus energy theory", play is necessary to allow children to discharge excess energy. Opposite of Spencer's view, G.T.W. Patrick (1916) explained the purpose of play as renewal of the energy (Hughes, 1995) and a need for relaxation (Mussen, 1983). He saw play as a tool that keeps children occupied while they restore their natural energy supply.

Contemporary theorists Erikson, Freud, Ellis and Piaget emphasized the importance of play in the social, cognitive and emotional development of children. They considered play as a necessary and integral part of childhood (Hart,1993). As a psychoanalitic theorist, Sigmund Freud suggested the major function of play as the reduction of anxiety. According to him, the source of the child's feelings, such as anger, unreasonable fear, and sexual curiosity, were created by adult society. With play, child explore disapproved feelings without confronting adult obstruction (Hughes, 1995).

Table 1. Theories of Play

THEORIES	REASONS FOR PLAY	GREATEST BENEFITS
Surplus Energy H. Spencer	To discharge the natural energy of the body	Physical
Renewal of Energy G.T.W. Patrick	To avoid boredom while the natural motor functions of the body are restored	Physical
Recapitulation G.S. Hall	To relive periods in the evolutionary history of the human species	Physical
Practice for Adulthood K. Groos	To develop skills and knowledge necessary for functioning as an adult	Physical, intellectual
Psychoanalytic S. Freud, A. Freud , E. Erikson	To reduce anxiety by giving a child a sense of control over the world and an acceptable way to express forbidden impulses	Emotional, social
Cognitive – Developmental J. Bruner, J. Piaget B. Sutton-Smith	To facilitate general cognitive development To consolidate learning that has already taken place while allowing for the possibility of new learning in a relaxed atmosphere	Intellectual, social
Arousal Modulation D.E. Berlyne, G. Fein H. Ellis	To keep the body at an optimal state of arousal To relieve boredom To reduce uncertainty	Emotional, physical
Neuropsychological O. Weininger, D. Fitzgerald	To integrate the functioning of the right and left cerebral hemispheres	Biological, intellectual

Source: HUGHES, FERGUS P. Children, Play, and Development. USA; Allyn & Bacon, 1995. p. 15

Erikson, who developed Freud's theories, identified play as an important medium in learning and development. He focused on the ego-building aspect of play. He was also interested in the link between imaginative play and the emotions. Piaget defines the word "play" as a biological model of interaction between child and environment. In his work, Piaget conceives of two functions as basic human development – assimilation and accommodation. Assimilation can be defined as the mastery of familiar or new skills by repetition and practice. Accommodation is the complementary to assimilation. It occurs when previous experience of children do not work to cope with the new situation. The balance between two is important for the development of intelligence and logical thought (Piaget, 1962).

G.S. Hall linked genetic psychology and education together. His recapitulation theory explains that each person goes through changes in both the psychic and semantic senses which follow the evalution scale of the mind and body. According to the relaxation theory of G.T.W Patrick, result of play (or sport and games etc.) is a satisfied, relaxed child or adult. He defines play as a typical natural and instinctive activity for children.

With arousal modulation theory, Berlyne stated that, there is some optimal level of central nervous system arousal that a human being tries to maintain. Similar views of play were offered by Ellis (1973) and Fein (1981), who suggested that children's play provides a variety of forms of stimulation to an

organism in need of it such as physical stimulation, perceptual stimulation, and intellectual stimulation.

An interesting approach was offered by Weininger and Fitzgerald (1988) who argued that symbolic play is related to the integration of the two hemispheres of the brain. Each hemisphere is responsible for different intellectual functions. The left hemisphere processes perceptual, physical, and structural; the right hemisphere processes abstract, conceptual and functional modes of information. In that sense, play reflects the maturation of the human brain.

2.1.2 The Role of Play in Child Development

Development can be briefly defined as the change and continuity over time. In his book "Child Development" Santrock explains development as follows:

> Development is the pattern of movement or change that begins at conception and continues through the life cycle. Most development involves growth, altough it includes decay (as in death and dying). The pattern of movement is complex because it is the product of several processes – biological, cognitive, and social. (Santrock, 1994)

Considering the information, which has been given in Table 2., the focus age group of this study will be the middle childhood children as they are the most approppriate age group to conduct a research study.

Table 2. Major Developments in Childhood and Adolescence

AGE PERIOD	MAJOR DEVELOPMENTS
PRENATAL STAGE (CONCEPTION TO BIRTH)	Basic body structure and organs form. Physical growth is most and rapid in life span Vulnerability to environmental influences is great.
INFANCY AND TODDLERHOOD (BIRTH TO AGE 3)	Newborn is dependent but competent. All senses operate at birth. Physical growth and development of motor skills are rapid Ability to learn and remember is present, even in early weeks of life. Attachments to parents and others form toward end of first year. Self –awareness develops in second year. Comprehension and speech develop rapidly. Interest in other children increases.
EARLY CHILDHOOD (3 TO 6 YEARS)	Family is still focus of life, although other children become more important. Fine and gross motor skills and strength improve. Independence, self-control, and self care increase. Play, creativity, and imagination become more elaborate. Cognitive immaturity leads to many "illogical" ideas about the world. Behaviour is largely egocentric, but understanding of other people's perspective grows.
MIDDLE CHILDHOOD (6 TO 12 YEARS)	Peers assume central importance. Children begin to think logically, although largely concretely. Egocentrism diminishes. Memory and language skills increase.

Table 2 (cont.)

	Cognitive gains improve ability to benefit from formal schooling. Self-concept develops, affecting self-esteem. Physical growth slows. Strength and athletic skills improve.
ADOLESCENCE **(12 TO ABOUT 20 YEARS)**	Physical changes are rapid and profound. Reproductive maturity arrives. Search for identity becomes central. Peer groups help to develop and test self-concept. Ability to think abstractly and use scientific reasoning develops. Adolescence egocentrism persists in some behaviours. Relationships with parents and generally good.

Source: PAPALIA & OLDS, A Child's World. United States of America; Mc Graw-Hill, 1993. p. 13

From Piaget's theoretical base, developmental factors of play can be analyzed in five particular forms (Heseltine & Holborn ,1987).

1. Environmental Development

Children are active by their nature. They tend to have an inherent drive to explore and to experiment. Compared to indoors, outdoor play provides more kinds of activities for children to interact with the environment. The pleasure of being outdoors, away from adults, is a great experience for children.

Heseltine and Holborn (1987) pointed out the range of choices and experiences that an outdoor environment provide for children. Stimulating and challenging features of a playground structure increase the play value. Similarly, Wardle emphasizes the importance of playgrounds that encourage a variety of play alternatives. Outdoor play environments are needed for improving important skills and developing critical cognitive concepts. These can be best supported and enhanced in the public playgrounds (Wardle,2000).

2. Physiological Development

Physical development of children can be analyzed in two parts; sensory and motor. Sensory stimulation describes the feelings which are perceived through the senses such as touching, seeing and hearing. Motor stimulation is equally important as sensory stimulation. It supports eye-hand-foot coordination and is benefical to children's development of balance and locomotor skills (Frost, 1992).

Children reinforce and practice their motor skills while manipulating the materials. They learn to control their bodies and give their bodies directions to achieve the tasks as they explore. Since children master new motor abilities, simple activities are coordinated to create more complex ones.

The term 'movement' is vital for every person from the moment of birth. Through providing outdoor play activities that involve movement, children explore their own physical skills. To allow children the best opportunities to

exercise and to extend their own physical skills, will help to maintain their interest throughout their stages of physical development.

3. Cognitive Development

Cognitive development can be defined as the change in mental abilities like learning, language memory, reasoning, and thinking (Papalia & Olds, 1993).

In cognitive play, children improve their role playing, problem solving, constructing, and fantasing abilities. From Eriksen's point of view providing opportunities for cognitive development will help children to develop the characteristics below:

- develop creative thinking; to use intuition and imagination as well as logic;
- develop and employ problem solving skills and strategies with respect to intellectual and social problems;
- deal with symbols and various modes of expression, realize their meanings, and use them appropriately;
- grow in ability to do, to make, and to create;
- express inner creative impulses through dance, song, painting, handcrafts, acting, and the like. (Eriksen, 1985)

When children begin to play with a purpose, they develop the ability to create symbols, to pretend, and to imitate.

4. Emotional Development

Children need opportunity to express themselves and become confident in sharing their ideas with others. Free play on the playground fosters children's

emotional development in three dimensions: building self-confidence and self-esteem through increased performance abilities, and experimenting with various emotions through pretend play.

Another important factor in emotional growth is to develop a sense of compassion, empathy and caring for others. According to Fogel and Melson, children of early childhood begin to see themselves and others in terms of age categories, gender differences and other characteristics.

While using playground equipment, children develop a greater sense of mastery, accomplishment, and independence. Promoting fantasy and dramatic play on playgrounds also incites the opportunity for emotional release, experimentation, and socialization.

On the other hand, by age three, children experience all basic emotions; enjoyment, interest, excitement, fear, sadness, shame and anger. During middle childhood thought about "the self" become more psychological, complex and stable (Fogel & Melson, 1988).

5. Social Development

A playground serves many important social developments during childhood. Hart suggests that, an outdoor play environment provides many social skills, such as sharing, cooperating, turn taking, and understanding the rules of

play (Hart, 1993). Hudson and Thompson (cited in Malivet and Philippe ,1991) clarify the socialization on playgrounds as follows:

> The playground is a place of encounters and communication, a place to develop and practice social skills, to experience acceptance and rejection, to develop friendships, and to learn about cooperation. (Hudson & Thompson, 2001)

Positive interpersonal interaction and socialization between children must be supported by playground equipment. Children especially need opportunities for emotional development and social skills development on playgrounds. Through social play, children usually involve verbal and physical interactions that will increase their ability to identify and empathize with other's feelings. Being a part of a group or team, gaining group goals, learning to trust and respect for peers also constitutes an important aspect of social development (Eriksen, 1985).

The significance of social stimulation in child development requires to relate and to interact with others. In terms of social growth, providing interaction areas for mixing children of different ages on a playground is an important criteria. However, in section 3.5.1, it is stated that age appropriate separation is an important safety factor on a playground.

2.2 Types of Play

Contemporary studies recognizes both the cognitive and social aspects of play (Santrock, 1994). Structural classifications of most widely studied children's play forms are given below:

1. Functional play (Sensorimotor play)

In functional play, the child deals with simple repetitive movements with or without objects such as rolling a ball or pulling a toy (Kenneth et. al., 1983; Papalia & Olds, 1993). Sheridan identified functional play in terms of physical development as it involves gaining strength, agility, and co-ordination. Functional play is seen in babies as soon as they begin to control their head and limbs (Sheridan, 1999).

As soon as children master new motor abilities, they are reconciled to create more complicated play sequences. When children explore and examine the functions and properties of objects by pushing and pulling, banging and dropping, they are learning how things feel, taste, smell, and sound. They apply the same limited activity to all objects since they comprehend how they react.

The goal of this kind of play is to expose curiosity and motivate children to learn more. They will achieve this if they have an interesting and challenging environment filled with materials and objects that attract them and inspire their explorations.

2. Social play

Play has a social dimension, and is seen as an important element in the development of children's social skills. This type of play involves social interaction in a group with a sense of group identitiy and organized activity.

Social play provides unique child development opportunities to develop cooperation and leadership skills. During social play children develop a variety of skills, attitudes, and social relationships. Their bodies, minds, and emotions become integrated through play. They are able to explore their potential without the risk of failure or ridicule sometimes present in real-life situations. They can imagine that they are someone else, try something new, fall down and get up without fear of the consequences (Papalia & Olds; 1993).

Through social play children get together, communicate, and learn social and cultural rules.

3. Constructive play

Constructive play can be defined as the manipulation of objects to construct or "create" something (Papalia & Olds, 1993 ; Wardle,2000). Wardle emphasizes the importance of constructive play in child development. While children engaged with different materials, they also have a chance to develop specific skills that enable them to create a sense of control and to develop positive self-esteem. Wardle expressed the reasons of children's preference for constructive play as follows:

> In constructive play, children can also continually change the way while they use materials: making them more complex, challenging and different. By continually rearranging their materials, they create an environment to match their level of learning (...)

> This continual manipulation of the environment means that children who have plenty of constructive materials and know how to engage in constructive play rarely get bored.
> (Wardle, 2000)

Explorative and manipulative play is essential for sensory development, fine movements and hand-eye coordination of children. This type of play help children to explore their environment through senses such as sight, sound, smell, touch, and taste (Sheridan, 1999).

In general, this type of play with symbolic themes is popular in middle childhood. In this play, group of children also perform physical activities together like running, jumping and struggling.

4. Pretend Play

Pretend play happens when the child starts to transform the physical environment into a symbol.

> Toddler's pretend play is the earliest evidence of symbolic thinking. Pretending to be a bird or pretending that a postcard is a car or that a piece of cloth is a pillow are examples of the simplest kind of fantasy (symbolic) play.
> (Steward & Friedman, 1987)

This kind of imaginative play is a significant step in the development of children when they are about three to four years old. Understanding the feelings of others, learning new words, communicating new thoughts and separating real from unreal can be described as the benefits of imaginative play.

> One of the most important forms of play is playing with ideas. Abstract thinking is play. When a child fantasizes, he is playing. By taking images, ideas, and concepts from inside their own minds and reorganising, sorting, and reconnecting in new ways, children create. They create play worlds, hopes, desires and wishes. (Perry, 2001)

Pretend play encourages creativity and divergent thinking. In their review of literature, Susa and Benedict suggested that "divergent thinking is a cognitive ability that involves being able to produce a large number of relatively unique or unusual ideas in response to a given task constraint." (Susa & Benedict, 1994)

Pretend play with peers is not only significant in children's cognitive development but it is also important for their social and emotional maturation. Through this type of play, children comprehend more about different social roles and relationships. They create an imaginary situation in which rules of behaviour are formulated.

4. Games With Rules

During middle childhood, games with rules are the most prominent form of play. Children become more socialized and logical which enable them to play games together (Piaget,1962).

In comparison to sociodramatic play, game play is more organized and meet the social and intellectual needs of children.

> Game rules dictate what the players can or cannot do within their defined roles. Rules also determine, a priori, how the game is to be played. Consequently, game behaviour is far more restricted and formalized than is play behaviour. (Mussen, 1983)

Santrock defined games with rules as a multidimensional, complex concept. This type of play usually involves two or more sides, competition, and criteria for determining the winner (Santrock, 1994).

In this kind of play, rules are definite that directly guide children's group behaviour. Children learn to share activities and goals while determining to inquire strategies and skills. Children enjoy compete as they like the possibility of winning.

> According to Piaget the final stage in the development of play is the emergence of "games with rules" during the early school years. Here, play is governed by formal, relatively, inflexible rules, involves some competition, and may produce some anxiety. (Hughes, 1995)

Games with rules help children concentrate, understand limits, and control their behavior to conform to the rules**.**

CHAPTER 3

PLAYGROUNDS

Play is the business of child. With play, children learn, discover and create within an enviroment that is open to manipulation. Children need outdoor physical environments that will support and promote their play process.

As it was stated in Chapter 2, outdoor play constitutes an important role in the development of children and related to that factor, playgrounds are the places that will provide opportunities to enhance these developmental factors.

Playgrounds also help children to display their genius. According to Senda, play structures are spontaneously enticing children into playing and they are the starting point for children to generate their play activities (Senda, 1992). A well designed playground equipment directly reflects an understanding of children's behaviour. Play value is also important in terms of playground settings. Moore and his colleagues described play value as a measurement of the developmental significance (Moore et. al.,1992).

On the other hand, any setting designed for children requires both theoretical and experimental knowledge and it should provide as much stimulation

as possible. The consequences of insufficient play possibilities in a playground results as , poor imagination, nervousness, deficiency of physical development and craving for entertainment. By offering various kinds of activity settings, a playground can stimulate child's interest and allow exploration simultaneously (Groves & Mason, 1993).

Today, children have more structured and supervised lives, with few opportunities for free play. Children experience the natural environment differently than adults. Children experience nature as a stimulator and experiential component of their activities. They judge the natural setting not by its aesthetics, but rather by how they can interact with the environment.

Children have a unique, direct and experiential way of knowing the natural world as a place of mystery and wonder. Children's special concern for the natural environment is connected to the child's development and his or her way of knowing.

3.1 A Brief History of Playground Design in 20th Century

Playgrounds can be defined as specialized open spaces especially designed for children in towns and cities. In nineteenth century, rapid growth of urbanization introduced the development of playground concept. Until that time, children were not thought of as individuals in the community. The reasons for the late development of playgrounds in the history can be explained by the social, educational, and economical conditions of the time.

First playgrounds in United States were developed in the end of the nineteenth century. They were equipped with sand piles, small wagons, wheelbarrows, shovels and also with swings, seesaws and other equipment. From that time until now, its basic form has remained essentially constant. American playgrounds typically consist of large open spaces for team games and smaller areas of play equipment intended for younger children. Eriksen (1985) clarified the features of the early playgrounds as:

> These playgrounds had several common characteristics. They were for the use of young children; they were located in the densely populated sections of cities; they received funding from philanthropic sources; they were maintained only during the summer vacation period; and they contained equipment that was suitable only for outdoor use. These playgrounds combined ball-playing areas of fixed equipment as did the traditional playground, which was hard-surfaced, bleak, and furnished with commercially manufactured equipment for physical exercise. (Eriksen, 1985)

In the past several decades, technological innovations have changed the structure and appearance of some equipment (for instance, high-impact plastics and powder-coated paints are common today), and playground structures have combined many play elements into one continuous piece of equipment, but the essential form of the playground remains the same.

In Europe, development of first playgrounds were revealed at about the same time as in United States. The characteristics of the equipment showed similarity with its hard gravel surfaces and standardized playground structures

such as swings and seesaws. Rather than considering play as a serious activity, amusement was the main purpose in the design of the play equipment.

In the middle of the 20th century, Denmark has been considered as the leader in the development of playgrounds. Denmark was the first country that introduced the first adventure playground concept (see section 3.2.1). In order to control the development of playgrounds, Denmark began legislation. As Eriksen (1985) stated:

> More recent building laws for all of Denmark, also adapted and passed by other European countries, have made the 1939 law stronger and expanded the concept. A 1967 law lessened the suggested walking distance between playgrounds, from ten to fifteen minutes in 1939 to only five minutes in 1967. the basic effect of this law was to require more playgrounds than ever before. (Eriksen, 1985)

3.2 Types of Playgrounds

Playgrounds can be varied according to their types; adventure, contemporary and traditional. Campbell & Frost (1985), and Hayward and his colleagues (1974) ; (cited in Barbour, 1999) summarized playground types as below:

> Traditional playgrounds are characterized by large, metal equipment, such as climbers, slides, and swings, on which children can exercise. Contemporary playgrounds usually include multi-purpose and linked structures that provide various means of entry and exit, and areas or fixtures that promote dramatic play. Adventure playgrounds incorporate various types of movable materials and tools for children to use in constructing

their own play structures. Each type of playground elicits different kinds or frequencies of behaviours. (Barbour, 1999)

3.2.1 Adventure Playgrounds

The concept of adventure (junk) playground first appear in Denmark in 1943, where children are free to shape their environment in their own way (Heseltine & Holborn, 1987). From Eriksen's point of view, adventure playgrounds represent a real change from traditional playground concept in the last sixty years. In this type of playgrounds, children are involved in planning, creating and building the area with different type of materials such as tires, telephone cable spools, railroad ties, sand, wood and rope.

Figure 1. An Example of an Adventure Playground , Source: www.mindspring/ discoverygardens.com

Another important factor is, play leader is an absolute essential for adventure playgrounds. A play leader shows children how to use the materials and help them to conduct the activities (Eriksen, 1985).

Most young people, at one time or another have a deep urge to the experiment with earth, fire, water, and timber, to work with real tools without fear of criticism or censure. From this point of view, adventure type playgrounds enable creativity in terms of play with its 'loose materials'. Weinstein and Thomas (1987) emphasized the importance of loose parts that supports fantasy play.

> Playgrounds around the world are littered with abandoned, rusting, rocking ducks and lonely, chipped concrete turtles. A lesson can be learned from children's constructions. They seldom worry if an *ad hoc* collection of cardboard boxes and blankets resembles something specific. In fact, what is so nice about a box is that one time it can be a jail, the next time a palace and later a rocket ship or inside of a whale. The design team should design nonobjective spaces – round, square, irregular, regular, bright, dark, big, little. (Weinstein & Thomas, 1987)

Wardle (2000) listed some of these loose parts that encourage constructive play on this type of outdoor playgrounds as below:

> "Large building blocks; plastic and wooden
> Old tires (make sure they are bias ply and clean)
> Milk crates or similar cubic units
> Wagons to transfer dirt and stones
> Lots of sand and sand toys
> Water containers to carry water in
> Large, smooth boards for building with blocks and crates
> Fine motor materials:
> - Clay, play dough
> -Paints and easels
> -Woodwork bench, tools and a variety of wood
> -A collection of small building blocks
> Small play animals, vehicles, trees
> Natural materials; sticks, poles, branches, old logs, stores, leaves
> An active garden; flowers and vegetables (Wardle , 2000)"

In this type playground a storage shed is also needed to store loose parts, tools and materials. Hooks for hanging tires, buckets for sand toys, areas for art materials and woodworking tools, and places to stack wagons are also necessary elements on an adventure playground.

Wardle states that, adventure playgrounds help to develop a variety of cognitive skills and enable children to continually be stimulated and challenged. The critical point about this type of playground is, the child engages in specific skills which differs from purely motor play.

3.2.2 Contemporary Playgrounds

Contemporary playgrounds are generally planned by architects or landscape architects. In general, they are not commonly used and they are expensive places because of their large moldings of concrete. Contemporary playgrounds must be recognized by its sculptural quality of landforms and equipment. The play structures are generally created according to the aesthetic criteria of the designer. Hard construction materials such as concrete and stone are used in order to provide durability and easy maintenance. On the other hand, the purpose of using this type of materials is to prevent vandalism. In these playgrounds, joining or connecting different pieces which will form a continuous piece known as the superstructure or multi functional structure.

Nevertheless, play structures without moving parts do not support children's learning and developmental needs. Although they are aesthetically

pleasing, they do not let children to recreate their environment. Static feature of this type playground quickly cause boredom. Disadvantage of this type is, children's most favourite large muscle activity is missing in the design of the equipment. Usually these places are used for social play like; retreat, quiet play and talking.

Figure 2. A Modular Play Sculpture in Kodomo No Kuni Park , Tokyo
Source: http://www.noguchi.org/countoured.htm

In this type of playgrounds, equipment are sometimes decorated with bright colors and comic heads. Some pieces are designed by artists which are called “play sculptures”. Eriksen expressed the features of this type of play structures as below:

> One issue of debate regarding play sculptures was over the virtues of concrete versus abstract designs. If the sculpture was representative or suggestive of an animal or object, such as a horse or boat, people questioned whether the design limited variety of play activities that could be performed with it. On the other hand, purely abstract forms may be attractive but may not suggest any uses to the children or be comfortable or easy to climb or sit on. (Eriksen, 1985)

To enhance the interest in contemporary playgrounds, special features can be added like water jets, climbing hills, and tunnels. Vegetation can also be pleasant for children.

Contemporary playgrounds liked more by kids than traditional type, encourages educationally worthwhile forms of play.

3.2.3 Traditional Playgrounds

When most people imagine “playgrounds” the image come to their mind is one of an area filled with traditional metal equipment designed primaly for large muscle activity.

The design of traditional type play structures developed early in the 20th century and they are still used on playgrounds today. Swings, slides, see-saws, climbers and merry-go-rounds can be stated as the most popular items which are generally used on this type of playgrounds. Eriksen noted the popularity of traditional playground as below:

> Such standardized equipment quickly become popular because it allowed more children to play in a smaller place and because it could be easily ordered from a catalog by a local school board that did not want to pay for a designer or that did not wish to explore more creative forms of play. The desire was often for inexpensive, easily maintained apparatus that could be used by the children without much supervision. (Eriksen, 1985)

Changing way of life styles change children's expectations from a piece of equipment on a playground. Although, traditional type playgrounds are common in public places, children's choice of playground type is exactly different from adult intended. Cohen and his friends (cited in Hayward, Rothenberg, and Beasley, 1974) clarified the preferences of children as follows:

> Traditional play areas are not as popular with children as contemporary and adventure play areas. Of children questioned at each play area:
> At traditional: 15,4 % prefer traditional
> At contemporary: 55,2 % prefer contemporary
> At adventure: 75 % prefer adventure (Cohen et. al, 1994)

According to Heseltine and Holborn (1987), traditional type of play structures are especially useful for physical development. While children are looking for challenge in complex manipulable environments, traditional

playground structures such as swings and slides have been linked with only solitary and parallel play.

Figure 3. An example of a Traditional Type Playground

La Farge (1988) discussed the inadequate form of traditional playgrounds from two points of view: safety concept and deficiency of play value. He stated that, today's playgrounds are still reflecting the same goals with the first playgrounds in the late nineteenth century.

> They wanted to build healthier, better exercised children, and they especially had in mind poor children who were growing up in crowded city conditions. The same goals are still important today, and the same equipment is still fun, but 50 years of research concerning the significance of play for the child's cognitive and social development has revealed the limitations of traditional playground equipment. (La Farge, 1988)

3.3 Traditional Type Playground Equipment

3.3.1 Slides

Slides are popular play structures as they attract many children at varying ages. According to Heseltine and Holborn, slides are the most common and useful play equipment on a playground. Nevertheless, their selection and location on a playground is important in order to prevent playground injuries (Heseltine & Holborn, 1987). Moore and his colleagues also defined safety features of slides in detail. Previous studies on playground safety have shown that majority of severe playground accidents are caused by falling off the equipment onto hard surfaces. This can be reduced by installing shock absorbing surfacing materials and by reducing height of slides (Moore et.al. 1992).

Stainless steel and plastics are the most prefered materials for slide surfaces. Although stainless steel is durable, it becomes extremely hot in direct sunlight and can cause second degree burns. On the other hand, this kind of material constitutes important risk factors with its razor sharp edges. According to Moore and his colleagues plastic slides solve the problems of heat and sharp edges.

> When first introduced, plastic slides were made of fiberglass. While these slides accomplished the goal of adding color and reducing burns, they proved to be flammable and subject to impact fracture.
> Currently, high density polyethylene slides solve the durability problem and add an element of permanent color.
> (Moore et.al. 1992)

Figure 4. An Example for the Slide, Source:www.labucketbrigade.org /photos/la/Playground.jpg

Today, in addition to standard narrow slides, a variety of challenging slide designs are produced. Different types of slides, such as, wave, spiral, wide, tunnel, banister, and slides with rollers present more interesting and challenging playgrounds to children. With these various choices children can easily select the appropriate type according to their own skill level (Moore et. al.,1992).

3.3.2 Swings

Swings are the most popular play equipment and potentially the most dangerous one on a playground. In their study, Moore and his colleagues clarified the factors which will minimize swing injuries on playgrounds. From their point of view, swings should be isolated from other play equipment and should not be added to composite structures. Because of their rigid frameworks, swing seats

which are made of wood and metal should be removed to avoid the risk of impact injury.

Running into the equipment is another aspect of playground accidents and can be reduced by reorganizing the traffic pattern of the playground. CPSC guidelines indicates that, a separated area specially for swings could reduce the risk of injuries (CPSC,1997). The traditional single-axis, double-hung swing is mostly used type of play equipment on playgrounds (Moore et.al., 1992). However, Heseltine and Holborn classified the types of swings below:

> Standard Swings: Standard swings come in two types, single and multi-bay. In multi-bay swings, a maximum of two is recommended; spaced single swings are less likely to cause collision accidents. An impact-absorbent surface must be incorporated, making due allowance for the swing area. Higher barriers cause difficulties since they become play objects in their own right. More than one openning can create a traffic route through the swing arc.
> Group Swings: These are helpful in encouraging socialization, and usually comprise a large tractor tyre suspended horizontally. They are best in their own enclosure, and require impact-absorbent surface to the recommended minimum use zone.
> Cantilever Swings: Extremely popular with older children, cantilever swings can be helpful in enticing them from toddler areas. They should always be sited in their own enclosure with impact-absorbent surface to the recommended minimum use zone. A governor should be fitted to the shackle unit to stop the tyre swinging to the horizontal. (Heseltine & Holborn, 1987)

Figure 5. An Example for the Swing , Source: http://www.ltcps.com/ independentplay.php?category=14

3.3.3 Climbers

Climbers are useful play structures in order to practice motor skills for children. In every playground, a variety of climbers can be examined, such as, tunnel, net, arch and cube climbers. On the other hand, they provide opportunities for children's socialization and cooperation skills.

Although, climbers are popular equipment on a playground, accidents are the main problem while majority of injuries occur from falls. Climber heights, climber rung size, and climber fall zones are important factors in terms of safety concept. Moore and his colleagues stated the need for height limitation of the equipment to reduce injuries from falls. They also noted four important factors about deciding critical height of a climber as:

– Type and quality of the shock absorbant surface.
– Location.
– User group
– Ability to maintain the equipment and the surfacing.
(Moore et. al.,1992)

Figure 6. An Example for the Arch Climber, Source: www.playworldsystems.com /product/freestand/climb.html

Climbers are usually attached to multi-play structures that will provide traffic flow patterns. They also develop spatial awareness with their different type of designs. Fall zone of a climber is another important factor.

> In addition to the standard fall zone requirements, climbers should not have climbing bars or other structural components in the interior of the structure onto which a child could fall from a height of greater than 18 inches. Therefore, arch climbers are preferred over cube climbers because they do not have interior bars. (Moore et. al.,1992)

Climbers with different types on a playground are benefical in terms of children's physical development. They help to exercise the use of large arm, leg and back muscles and present graduated challenge for children.

3.3.4 Balance Equipment

Balance equipment give children a physical challenge and a chance to interact socially with other kids on the playground. According to child development specialists, this kind of equipment are valuable especially in poise and balance activities.

Balance equipment can be examined in two types; static and dynamic. As to the static one, dynamic balance has more developmental value with its various kind of opportunities. Cable, clatter, chain/log bridges, rolling barrels, and spring platforms are the examples of dynamic balance equipment. Static balance equipment, such as balance beams are generally used to link play structures because of their low height.

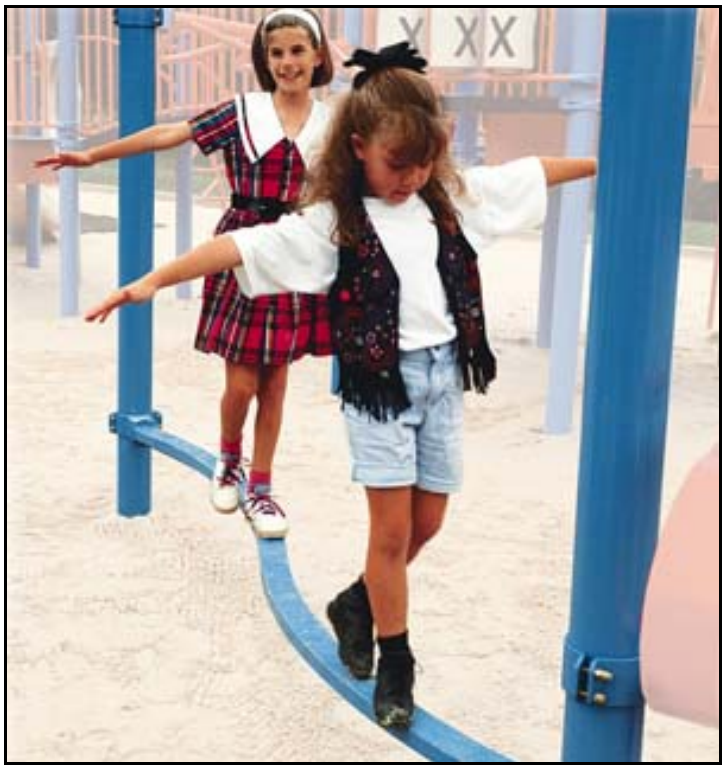

Figure 7. An example for the Balance Equipment, Source: www.playworld-systems.com/prodset.html

3.3.5 See-Saws

See-saws are especially appealing to middle childhood children. Although, see-saws do not have much play value, they support cooperative play and they are still popular by younger children on playgrounds. See-saws are generally preferred on playgrounds with their easy installation and less required space than any other equipment.

This kind of equipment are not suitable for children under five years old, since they can not manipulate the speed and the height of the equipment on their

own. Nevertheless, it is important to provide safety factors and prevent the equipment being used by more than intended number of users.

Today, there has been little change in the design of see-saws. There are not much different type of see-saws but spring loaded ones can be stated as the newest versions of them.

Figure 8. An example for the See-saw, Source: http://www.playworld-systems.com/product/freestand/seesaws.html

3.3.6 Spring-Mounted Equipment

Spring-mounted equipment supports bouncing and rocking activities of children on a playground. Heseltine and Holborn defined spring-mounted equipment as below:

> The ranges of animals and vehicles mounted on largesprings are excellent for under-fives and some of the larger multiple spring pieces are suitable for all play areas. These small, relatively static and inexpensive items are good in incidental playspaces such as shopping areas or in a conjunction with multiplay structures. (Heseltine & Holborn, 1987)

Moore and his colleagues underlined the design criteria of this kind of equipment as:

> They must be soft enough for small children to move yet strong enough to avoid damage when used inappropriately by large children. In addition, they must be designed to minimize the possibility of children pinching either their hands or their feet between the coils or between the spring and a part of the rocker. (Moore et.al., 1992)

Figure 9. An example for the Spring Equipment, Source: http://www.ltcps.com/independentplay.php?category=14

3.3.7 Merry-go-rounds

Merry-go-rounds are still children's favourite play structure with its circular movement. Although it is one of the most attractive equipment on a playground, a great number of injuries occur (especially falls against or under the

moving equipment) when small children try to dismount while older children continue spinning. To prevent these kind of accidents size and speed of the equipment should be limited. Moore and his colleagues also identified the surfacing factor for a spinning equipment:

> Be certain that rotating equipment is installed in such a manner that children do not have access underneath it such that they can become entrapped. (Moore et. al.,1992)

Merry-go rounds frequently cause finger loss because of the gaps between the central support post.

Figure 10. An example for the Merry-go-round, Source: http://www.american-playground.com/page64.htm

3.3.8 Multi-Play Structures

Multi-play structures are benefical for physical and social play. They are combining of different types of play units in one piece of equipment. Despite their high cost, they are generally preferred for special areas or on major sites.

Although, they enable large numbers of children play together, they are not convenient for individual use. Multi-play structures are incapable of supporting fantasy or creative play because of their crowded construction. They restrict developmental possibilities of children with their inflexible and fixed structure.

Surfacing of this type of equipment is also important for preventing playground injuries. According to Heseltine and Holborn, multi-play structures should be sited on a loose-fill or synthetic impact-absorbing surface. To avoid the risk of impact with moving equipment, revolving items and swings should not be attached on this type play equipment.

Today, many of the playgrounds are based on multi-play structures. Adventages of placing these play systems on a playground is their composite structure with many play elements into one continuous piece of equipment. Additionally, considering the play value of multi-play structures, they should not be seen as the sole part of a playground design.

Figure 11. An example for the Multi-play Structure, Source:www.cityofhavelock.com/ Recreation/recreat.htm

3.4 Activities on Playground Equipment

Table 3. determines Eriksen's (1985) activity analysis about various settings each activity would require.

Table 3. Eriksen's Activity Matrix Chart from Children's Design Session

ACTIVITIES	Active/ Passive	Noisy/ Quiet	Approx. Group Size	Environ-mental Needs	Location &Orientation	Equip-ment	Time Span	A=grade 1-3 B=grade 4-6	Special Concerns
Climbing	active	noisy	small	grass		jungle gym	15min	A&B	soft place to land
Sliding	active	noisy	small	grass		tunnel slide	15min	A	safety
Playing & Building in Sand box	passive	quiet	large	sand		sandbox	15min	A	
Jumping	active	noisy	one at a time small group	grass		spring-board	15min	B	
Pretending (Fantasy Play)	active and/or passive	noisy and/or quiet	small to large	grass		wooden fort	15-30 min	A&B	
Sitting	passive	quiet	small or large	grass		Benches, trees	5 min	A&B	
Playing with Toy cars	active to passive	quiet	small	blacktop		toy cars	15min	A	

Table 3 (cont.)

Jumping Rope	active	noisy	1-3	blacktop		rope	15min	A	
Tag	active	quiet	small	move in&out of soft surface	north side		15-30 min	A&B	safety
Reading	passive	quiet	small	benches, stumps, enclosures	near bldg		15min	A&B	
Swinging	active	quiet	small	soft surface	near bldg	swings	15-30 min	A&B	
Ice Skating	active	noisy	varies	hard Surface	rink	watering equipment for ice	15-30 min	B	safety
Sliding or Sledding	active	quiet	varies	snow, hills or slopes		sleds	15-20 min	A&B	safety
Running/ Jogging	active	quiet	small	soft surface	completel y around school		varies	A&B	how big an area to be covered
Punching Bags	active	quiet	1	covered area, firm ground	close to building	punching bags	5 min	B	
Snow Ball Target Throwing	active	noisy/ quiet	varies	snow		target	varies	A&B	
Bouncing	active	noisy	1-2	soft surface	anywhere	trampolin e/ resilient soft surface	5-30 min	Grades K-6	
Climbing	active	quiet or noisy	varies	hill with varied surface		hill	varies	A&B	
Climbing (objects)	active	quiet	small or large	varied soft materials, soft surface	anywhere	rubber tires, etc.	varies	A&B	
Roller Skating	active	quiet	small	hard		skates, safety pads. skate rest bar	20-30 min	B	
Climbing & Sliding	active	quiet and/or noisy	varies	soft surface below	sunny area	ropes,poles, platform	varies	A&B	

Source: ERIKSEN,A. Playground Design:Outdoor Environments for Learning and Development. NewYork: Van Nostrand Reinhold Company, 1985. pp.68-71

3.5 Design Criteria for Playground Equipment

3.5.1 Safety Factor

Playgrounds have a vital role in any child's physical, social, intellectual, and emotional development. Wadell defines the term playground as; "an improved area designed, equipped, located and set aside for children's play. It includes play equipment, protective surfacing, fencing, signs, internal routes, internal landforms, vegetation and related structures." (Wadell, 2001) Nevertheless, this challenging environment usually expose children to unintended hazards.

The concern for promoting safety on playgrounds let several countries to introduce their own standards to prevent serious injuries and remove unintended hazards. (Standards Association of Australia, 1981; Standards Association of New Zealand, 1986; British Standards Institution, 1986; Canadian Standards Association,1990; American Society for Testing and Materials [ASTM],1993) (Robitaille et al., 2000). In Turkey, presently, there are no national safety standards for playground safety. Playground equipment and surfacing are evaluated according to the standards of British Standards Institution (TS EN 1177: 1997), in fact, there is no legislation mandating compliance to any of these standards.

In United States, the federal government has issued national guidelines in order to reduce the number of injures on playgrounds. ASTM has been concerned with safety standards on many different types of materials and products,

accordingly has published national voluntary standards for public use playground equipment.

However, based on the findings from previous researches, each year it is estimated that more than 200.000 preschool and elementary aged children in United States are injured by playground equipment related accidents (Hudson et.al., 2000). According to Wallach, the most important criteria in playground design is to provide as much fun as possible with as much safety as necessary.

There are three main problems with creating safe environments; the role of children, changing nature of play and quality of play. There should be a balance between needs for safety and needs for independent play. For many adults, safe play is provided directly through rule setting and regulation, indirectly through legislation and guidelines.

Height of equipment, surfacing materials, use zones and age appropriate separation are important safety factors that contribute to playground design problems. Height limitations of playground equipment varies according to the safety standards and guidelines of different countries. While ASTM standard F1292 have a height limitation of 12 feet, CPSC chart states that the critical height may differ according to type of the surfacing material. When an acceptable material is selected, its shock absorbant properties must be analyzed by categorizing the relationships between the height of the playground equipment and the depth of the material.

Surfacing also affect the rate of injuries on a playground. According to CPSC (1997) guidelines;

> Hard surfacing materials, such as asphalt and concrete are unsuitable for use under and around equipment of any height unless they are required as a base for a shock absorbing unitary material such as rubber mat. Earth surfaces such as soil and hard packed dirt are not recommended because they have poor shock absorbing properties. Similarly, grass and turf are not recommended because environmental conditions can reduce their effectiveness in absorbing shock during a fall. (CPSC, 1997)

Age appropriate separation of playground is also necessary for playground safety.

> The playground must be designed to permit children to develop gradually and exercise their skills by providing a series of graduated challenges. The challenges must be appropriate for each age related ability and must be ones that the child can perceive and choose to undertake. Preschool (2-5) and school age (5-12) children differ dramatically in their physical size, physical ability, cognitive, and social skills. Thus the owner has a duty to establish separate and distinct age appropriate playground areas. (Wadell, 2001)

Use zone is defined by CPSC as the surface under and around a piece of equipment onto which a child falling from or exiting from the equipment. Use zone is especially important in swings and slides. As different types of play equipment require different sizes of use zones, the most critical factor is the area should be kept clear of obstructions and be properly surfaced to prevent serious injury to children who may fall from the equipment.

The playground equipment should meet the anthropometrics and cognitive needs of the curious and developing child. With the help of safety standards and

guidelines, it is partially conceivable to control the design and manufacture of the equipment layout, installation and maintenance to promote safety. Nevertheless, the problem is , it is not easy to predict how creatively children will play on it. While Wallach pointed out the importance of safety guidelines on playgrounds, he underlines the importance of fun and enjoyment. He denoted that safer play does not always mean desirable play. Similarly as Wilkinson mentioned, the most important element in playground equipment design is to provide both safe and entertaining outdoor opportunities (Wilkinson, 2001).

3.5.2 Materials

Wood, metal, plastic, rope and chain are mainly used materials in the manufacture of play equipment. According to Moore and his colleagues wood has been used longer than any other material in the manufacture of play equipment and keep its popularity over the years. Today, wood is used with a variety of materials such as metal alloys and molded high density plastics in composite play systems (Moore et. al., 1992).

Attractiveness and natural compatibility of wood meets the needs of a playground equipment. However wooden play structures may cause trouble while it does not maintain well in the extreme heat or dryness (Wade, 1999).

Steel prevails as the basic playground equipment material owing to its high strength and ease of fabrication. On the other hand, rust is the main problem which can minimize its robustness over time and eventually result in structural

failure. In general, most steel is galvanized and painted to prevent rust. Moore and his colleguages clarified the solutions for metal playground equipment.

> To overcome the rust problems associated with steel, some manufacturers now use aluminum frames. While the cost for aluminum is slightly higher and its strength is less than that of steel, its superior resistance to rust makes it an attractive choice. (Moore et. al., 1992)

Determining the best metal choice for a playground necessities to consider the life expectancy of the play area. If the location of the playground do not have significant problems with moisture steel would be the best choice for metal equipment.

Another type of material mostly used for playground equipment is plastic. It is available with hundreds of different types and commonly used in order to provide fascinating environments by offering a great range of color and form. Plastics are important in providing playground safety. They are used to round corners and also used as a coating on metals to prevent contact burns due to the direct sun light.

> Among the plastics used on play equipment, the most common is high density polyethylene. It is used for rotational molded slides, panels, and spring mounted animals. It can also be used in injection molds as a “structural foam” and has been employed for spiral slides and deck planks. Polyvinyl chloride (PVC) is also popular as a soft coating on chains and decks. Fiberglass should be avoided in unsupervised play settings because it has low impact resistance. (Moore et. al., 1992)

Rope and chain are flexible elements especially used to appeal children, but their low durability requies frequent inspection and replacement. On the other hand, harsh structure of chain may introduce pinch points. According to Moore and his colleagues, chain should only be used if it is covered in a vinyl coating.

Most playground use the combination of this type of materials. In table 4, advantages and disadvantages of using various playground materials in detail.

Table 4. Advantages and Disadvantages of Using Various Playground Materials

MATERIALS	ADVANTAGES	DISADVANTAGES
Wood (CCA Pine/Redwood)	• Easy to use. Well suited to Volunteers constructing playground. • Looks natural. • Easy to repair. • Easy to attach elements to it. (e.g. slides, handles, climbers) • Inexpensive. • Can be creative and design what you need.	• Splinters, cracks, and splits.. • Can burn. • Lots of maintenance. • Does not last as long as other materials. • Does not look as upscale or classy. • Some feel the CCA process is hazardous for children.
Laminated Plywood (painted commercially)	• Very colorful. • Allows for designs with lots of flat surfaces. • Easier to use for infant / toddler pieces. • Can be repaired. • A natural material that lasts.	• Can chip and deteriorate quicker than plastic and metal. • Restricted to flat designs. • Expensive. • Not appropriate if you don't want bright colors.
Polyethylene	• Does not get hot. • Has no splinters. • Initially bright and attractive. • Shapes that are safe. (e.g., a curved slide) • Not structurally strong but usually used with metal. • Smooth and friendly to hold.	• Colors fade over time. • Overuse makes the playground look like a new car salesroom. • Expensive. • Limited number of uses and possibilities.

Table 4 (cont.)

Steel or Aluminum (coated, painted, or untreated)	• Strong. • Lasts a long time. • A large choice of paint colors. • Unitized to provide a variety of options. • Resists vandalism. • Good for structural strength.	• Slides can be very hot and should not be used; posts / railings also get hot. • Hurts to fall against. • Almost impossible to repair. • Cannot add to as you wish. • Expensive.
Fabrics	• Light weight for roofs and canopies. • Easy to replace. • Shade is becoming a more critical issue on playgrounds.	• Soon fades and gets dirty. • Tears easily. • Flies in the wind. • Tends to look shabby. • No structural strength.
“ **Recycled” Plastics**	• Looks like wood. • Has some similar properties to wood. • Can be cut and drilled. No splinters. • Doesn’t rot, rust, or split. • Is made from recycled materials.	• Has no structural integrity. • Cannot be recycled into other plastics. • Doesn’t hold nails, screws, and lug bolts as well as wood does.

Source: WARDLE, F. Outdoor Play: Designing, Building, and Remodeling Playgrounds for Young Children; Children Today; Mar/Apr 87, Vol.15, Issue 2

3.5.3 Accessibility

On a playground, accessibility promote integrated social, emotional, physical, and intellectual opportunities for children of all abilities. It should be one of the most important factor that will influence the design of the equipment and play environments. Children with disabilities have the right to be provided with challenging and interesting opportunities for play in order to develop their strength and skills.

Accessible routes which are connecting play components along with certain spaces are crucial to create a play area usable for children with disabilities. They enable a continuous unobstructed path attaching all accessible elements and spaces of a facility. Inside the boundary of the play area, accessible routes may include platforms, ramps, elevators, and lifts.

Other requirements for play components are provided to promote general usability, with application to a variety of play components. Additional features will assist in making play components more accessible to more children. Components with back support, increased space for maneuvering adjacent to the play component that promote independent use are substantial features for disabled children on a playground.

Moore and his colleagues (1992) determined the requirements of an accessible playground as providing grade level or ramped walkways, using firm, continuous, and non-slippery walking surfaces. Reach ranges are also important for the person seated in a wheelchair who will reasonably extend his arm or hand to touch, manipulate, move, or interact with an object or play component. Considering design features like open sides, back supports, and hand supports help to facilitate easy transfer and access on an accessible playground.

3.6 Today's Children and Their Playing Needs

Children at present are fundamentally different from children of a decade ago. Since the modern city environment surrounds the child by a metal, concrete and glass world, the need for constructing outdoor environments for children emerged. Although, today's play patterns are directly affected by changing family life styles and technological development, its benefits to children are still what they were a hundred years ago. Nevertheless, 21st century public playgrounds represents a limited aspect of children's play needs.

> Today's kids grow up faster and stay young longer. The play structures that used to attract kids in the 70's from five to preteens are now used only a little by the 8 year olds. A 10 year old plays there only when there is no other option.
> (Beckwith, 2000)

Children are demanding their play to be sufficiently challenging and interesting. Children often prefer playing computer games instead of spending their time outdoors. They are completely attracted by audio-visual stimulation and frequently changing challenge levels.

> Surveys of teenagers show that multi-tasking is a regular part of the life style of this demographic group. Kids want to do everything: they listen to music as they talk, answer the phone and chat on internet. They like shopping at the mall, hanging out and interacting with video games and technology. They are social but technology means social activities are done differently than in years past. (Brown et. al., 2001)

Another aspect of changing life styles which affect the quality of play is clarified by Brown and his colleagues, "children are more obese than ever, and

already studies have shown that these children are less likely to engage with play equipment."

According to Perry, the primary inhibitor of play for children is television. It is the passive and uncreative way of spending time. It directly prevents children from social interactions, abstract thinking, creativity and play. Similarly Hughes underlined the effect of television on children's play. He stated that, children who spend most of their time in front of television play less imaginatively than others. These children are rarely participating in a variety of activities that are more intellectually stimulating. Hughes determined the five essential characteristics of play as, intrinsically motivated, freely chosen, pleasurable, nonliterate, and actively engaged in by the participants (Hughes, 1995).

CHAPTER 4

FIELD STUDY

4.1 Methodology

Scientific study of children consists of 3 principles: careful observation and recording of data, development and testing of various hypotheses and public dissemination of findings (Papalia & Olds; 1993). Similarly, Vasta (1972) underlined two important criteria for studying children: observability and measurability.

Although there are various types of research approaches, non-experimental methods and experimental methods can be defined as the major techniques for the study of child development. In Table 5. characteristics of these research methods are listed according to their types.

Observational methodology is a non-experimental method which plays an important role in the scientific study of children. It allows the researcher to examine what normally occurs in the child's world without interfering the usual course of events (Vasta, 1972).

Table 5. Characteristics of Major Research Methods

TYPE	MAIN CHARACTERISTICS	ADVANTAGES	DISADVANTAGES
NONEXPERIMENAL METHODS			
CASE STUDY	Study of single individual in depth	Provides detailed picture of one person's behaviour and development	May not generalize to others; may reflect observer bias
NATURALISTIC OBSERVATION	Observation of people in their normal setting with no attempt to manipulate behaviour	Does not subject persons to unnatural settings that may distort behaviour.	Lack of control; inability to explain cause-and-effect relationships. Observer bias possible.
LABORATORY OBSERVATION	Observation of people in the laboratory with no attempt to manipulate behaviour	Provides good descriptions.Great control than naturalistic observation.	Inability to explain cause-and-effect relationships. Observer bias. Controlled situation can be artificial.
INTERVIEW	Participants asked about some aspect of their lives ; ranges from highly structured to more flexible questioning	Goes beyond observation in getting information about a person's life, attitudes	Interviewee may not remember information accurately or may distort responses in a socially desirable way. How questions is asked may affect answer
CORRELATIONAL STUDIES	Measure direction and magnitude of a relationship between variables	Allow predictions from one variable about another variable	Do not determine cause-and-effect relationships
EXPERIMENTAL METHODS			
EXPERIMENT	Controlled procedure in which an experimenter manipulates the independent variable to determine its effect on the dependent variable; may be conducted in the laboratory or field or make use of naturally occuring events	Establishes cause-and-effect relationships; highly controlled procedure that can be repeated bother investigator.Degree of control is strongest in the laboratory experiment and least in natural experiment.	Findings especially when derived from laboratory experiments, may not generalize to situations outside the laboratory.

Source: PAPALIA & OLDS, A Child's World. United States of America; Mc Graw-Hill, 1993. p.13

In this research, nonexperimental methods will be conducted. Naturalistic observation and interviews will form the main parts of the procedure.

Time sampling is one type of the naturalistic observation. According to Papalia and Olds, time sampling technique is the most advanced method of the current observational approaches. This technique is important while it enables an accurate assessment of the reliability of the observations. Rowen (1973) underlined the effective way of time samples for the observational approach. He stated that, using time samples allow the researcher to record any kind of behaviour of the child in a selected period of time, such as; facial expression, use of hands, whole body movements and making sounds.

In time sampling method it is important to concentrate only on the watching child, comments can be added after the process. In this research, this technique will be used in the first stage of the field study.

Interview is another important research method in which people are asked to state their attitudes and opinions by the researcher. Rowen noted the generalizations that can be made about conducting a successful interview as:

> Interviews should be informal, relaxed, and casual. There should be no list of prepared questions to be answered. Ideas should flow as the discussion ensues. The interviewer picks up suggestions for proceeding from statements made by the person being interviewed. (Rowen, 1973)

Raymund underlined the the difficulty of interviewing children as below:

> Discovering the deeper meanings and effects of childhood on a person's overall life experiences directly from interviewing and observing children is difficult. Not only do children have difficulty articulating and communicating their feelings, but also are unaware of future effects until much later in life. (Raymund, 1995)

In this thesis, interviews will be held after the observation course. Considering the features of research methods above, objectivity and validity will form the main characteristics of this study.

4.1.1 Research Area

In May 2003, in order to examine the effectsof playground equipment on children's developmental needs, observational techniques were carried out on Kurtuluş Park of Ankara.

Kurtuluş Park was selected as the research area because it was a typical type of traditional playground. It was suitable with its location since it allowed to observe a large number of children from different socioeconomic status. Playground equipment installed on the park was ideal to conduct a research study with its varied type. Play structures found on the park can be listed as below:

-Classic slide

-Tube slide

-Spiral slide

-Swings

-Merry-go-round

-Climbers

-Balance beam

-See-saw

-Composite Structures

Figure 12. An overall view from Kurtuluş Park

Play equipment on the park were made of metal and the surfacing was coarse gravel. Around the play area a small walk path was surrounded by plants and trees.

On the other hand, wooden benches were located separated from play area for adult supervision. This facilitated the observation procedure and children on the park did not aware of the researcher.

4.1.2 Design of Observation Sheet

In this part of the study, in order to identify the occurrence of children's behaviour on playgrounds, observational methods were conducted. Primary data were gathered through naturalistic non-participant observation.

In the first stage, an observation sheet was designed and a pilot playground was selected. (see Appendix 1) Observations conducted maximum 20 minutes for each child. Using time sampling method, observation intervals were divided into 4 parts. During that short periods of time, all behaviours of each subject were documented by using the observation code sheet.

In Section A, children's play type observed in the light of the relevant literature. In the observation sheet, play types were categorized as; sensorimotor play, social play, constructive play, pretend / fantasy play, and games with rules. People that accompanied to children throughout their play session were also taken into account.

In an observational study, coding of behaviours is another critical issue. In this study, behaviour patterns of children were coded as:

G: Gross motor – Walking around, running, jumping, skipping, climbing.

D: Disturbing – Destroying objects or another child around., throwing objects.

T: Talking – Conversing with another child or singing.,

O: Orienting – While seated, turning toward to another child, showing objects to them or looking to others.

P: Pretending – Acting as something or someone else, making believe.

N: Noise – Throwing objects, tapping feet, clapping, kicking objects.

A: Aggression – Hitting, pushing, pinching, using an object to strike another child.

V: Vocalization – Crying, screaming, coughing, sneezing, whistling.

OT: Other Tasks – The child is doing things which are not described in the above categories.

These codes helped researcher to deal only with specific types of behaviour which will be analyzed. During the observation period, each equipment that the child use through his or her play session were recorded separetely between the 5 minutes intervals. The play equipment on Kurtuluş Park were coded as:

A: Slides

B: Swings

C: Climbers

D: Balance Beams

E: See-Saw

F: Horizontal Ladders

G: Merry-go-rounds

H: Spring-Mounted Equipment

I: Multi-Play Structures

The way that the child use the equipment was also noted for determining the social interaction between children or physical interaction with the equipment.

In Section B, secondary data were collected by interviewing each child. Interviews were semi-structured and questions were asked to the child in a friendly atmosphere in order to collect the exact data without distressing the child.

4.1.3 Subjects

In this study, research population were middle childhood children. Throughout the field study, subjects were 70 children (33 girls and 37 boys) randomly selected on Kurtuluş Park. The most important feature of random sampling is, each member of the population has an equal chance of being selected.

As it was stated before, middle childhood children are the most appropppriate age group to conduct a research study. Children aged from six to twelve tend to form a society of their own. They enjoy and value the fellowship of their peers. Their physical growth continues to progress and skill development follows its natural course.

During this period, children express themselves voluntarily in language. Interviews with children can produce some meaningful insights. Role playing and dramatization are effective means of discovering more about the middle childhood children (Raymund,1995).

4.1.4 Variables

Age and gender of the child, his or her play type, the way of using the equipment and the time spent for each type of play structure were formed the independent variables of the study.

Details of the observation were also noted and a set of questions were asked to the child after this procedure. The qualitative data gathered on the playground was in the form of words, descriptions of events and written documents about the child. These information transformed into quantitative data by coding procedures in order to evaluate them with statistical techniques.

For analyzing the recorded data Pearson's Chi-square test methods and Fisher's exact chi-square test were used.

4.2 Results of Observation

A total of 33 girls and 37 boys, aged 6-12 years old (mean age= 8.31) , were successfully observed. All activities and behaviours of children were recorded separately by using the observation code sheet.

Age and gender differences of children can be seen in Figure 13. and in Figure 14. 61.4% of children were between 6-8 years old and more boys (52.9%) than girls (47.1%) were observed.

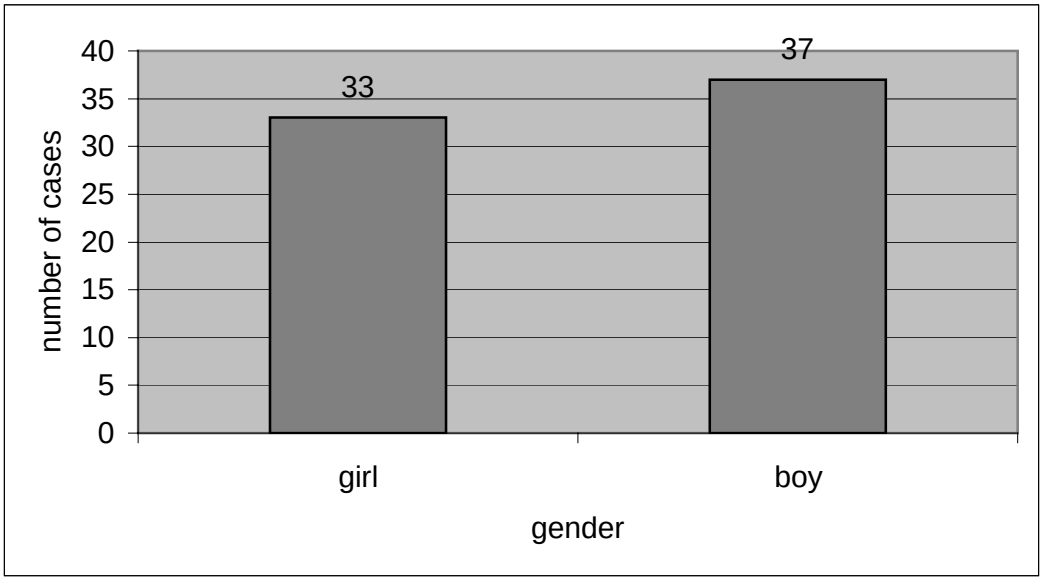

Figure 13. Rate of girls and boys

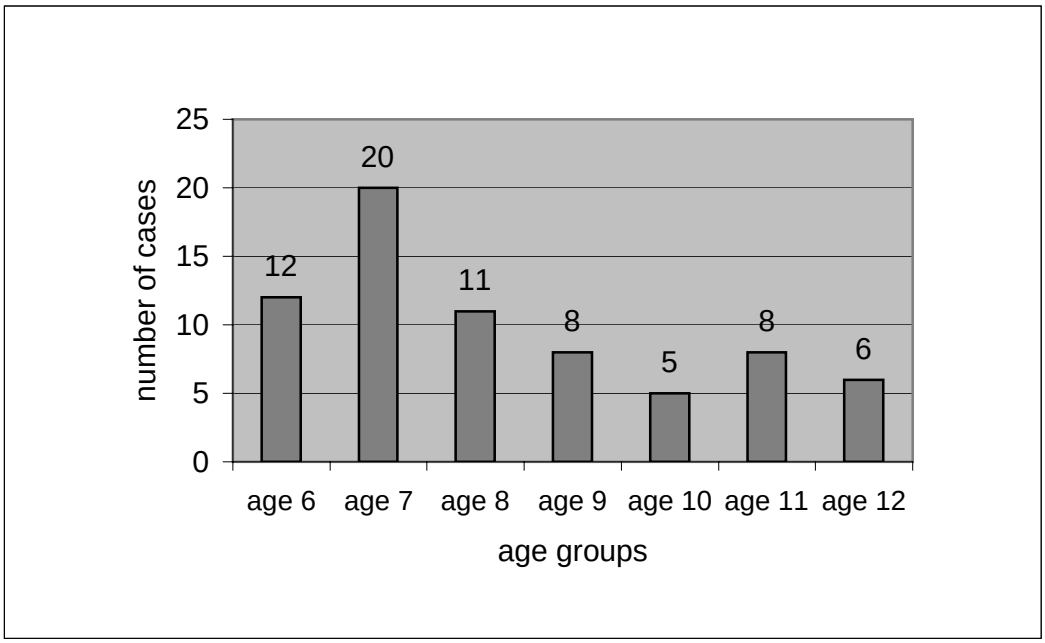

Figure 14. Distribution of children according to their age groups

As can be seen in Figure 15., play mates of children were noted in order to determine their socialization level. Majority of the children (%51.4) were involved in play activities with their peers.

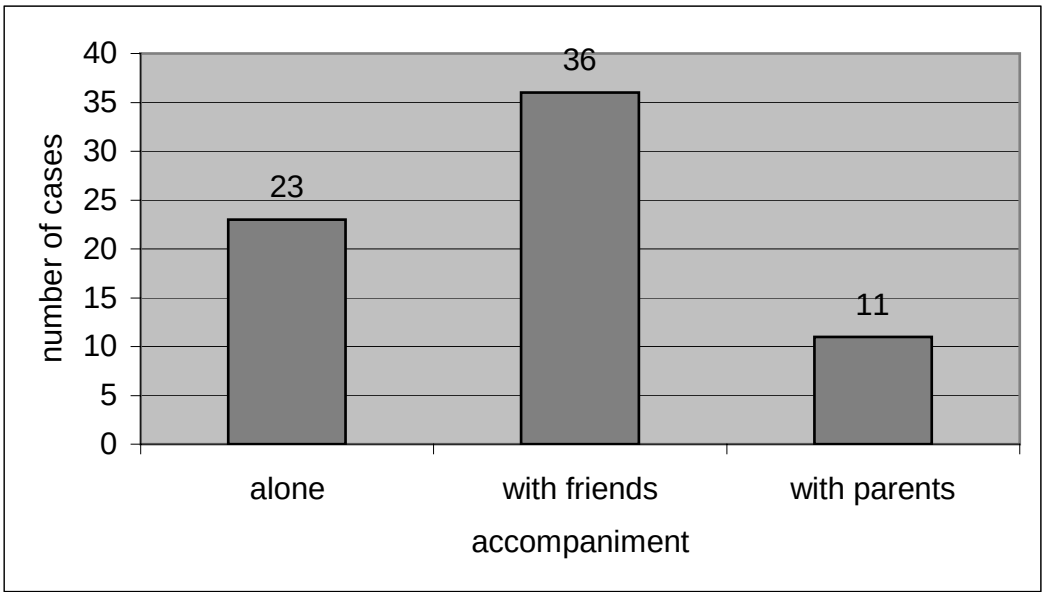

Figure 15. Accompaniment on the playground

Children's play activity were recorded to identify the play types occured on the playground. The observed play types included sensorimotor play, social play, constructive play, pretend play, and games with rules. Majority of children (38.6%) presented only sensorimotor play on the playground. Furthermore, 28.6% of the cases were both sensorimotor play and social play occured at the same time interval. Similarly, 8.6% of the children presented more than one type of play whereas sensorimotor play, social play and games with rules were observed consecutively on the playground. Figure 16, illustrates children's choice of play types on the playground in detail. During their play session, considering that children on the playground presented more than one type of play, variables in Figure 16. were coded as:

a. sensorimotor play

b. social play

c. constructive play

d. pretend play

e. games with rules

f. sensorimotor play + social play

g. sensorimotor play + social play + pretend play

h. sensorimotor play + social play + games with rules

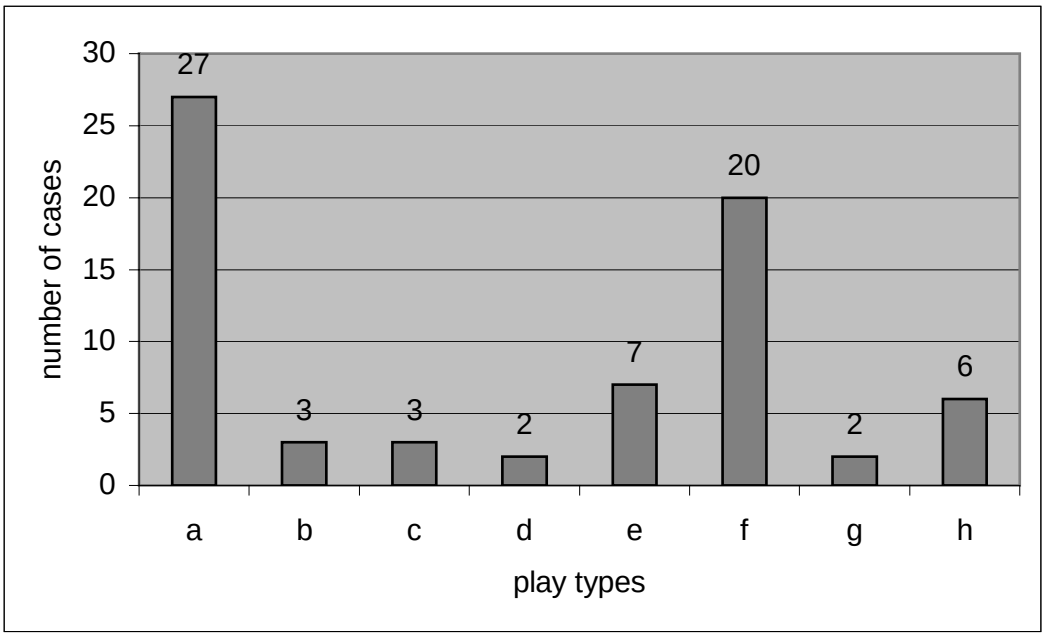

Figure 16. Children's choice of play types on the playground

As it was stated in section 4.1.2 , the variety of play behaviours were recorded through an observation code sheet. Besides, playground equipment that the child interact during the play session were also noted. With the help of the recorded data, the most favorite activities and play structures were evaluated together. As it can be examined in Table 6, the most observed modes of behaviour

on the playground were gross motor skills, talking and vocalization. In addition, "other tasks" was recorded mostly while it included gobbling, drinking, resting, and etc.

Table 6. Recorded codes of children's behaviour occured on the playground

TIME / GENDER	0-5 minutes	5-10 minutes	10-15 minutes	15-20 minutes
Girl	G - V	G - V	G - N	G - N
Girl	G – T	G – T - OT	G - V	G – OT
Girl	G - P	G – T - P	G - P	G
Girl	G	G - V	G - T	G – T
Girl	G - T	G – T - OT	G - T	G – T – OT
Girl	G - V	G - V	G - V	G - V
Girl	G - N	G – O - V	G – T - O	G - OT
Girl	G - O	G	OT	OT
Girl	G	G	G	G – T – OT
Girl	G - N	G - T	G - OT	G
Girl	G - O	G - O	G – T - OT	G – OT
Girl	V	V	O	O
Girl	G	G - O	G - O	G – T - V
Girl	G – T - N	G	G	OT
Girl	G	G – N - OT	G - OT	G
Girl	G	G	G	G – O - N
Girl	G – T - V	G - A	G - T	G
Girl	G - V	G - V	G - V	G – O
Girl	G	OT	G - T	G – O
Girl	G - O	G – T - V	G - V	G - OT
Girl	G - P	T - P	G - P	T - P
Girl	G - T	OT	G - V	G
Girl	G - T	G - T	G - O	G - T
Girl	G	G - OT	G	G
Girl	G – P	T - P	G - P	T - P
Girl	T - N	G – T - O	G - T	G – T - O
Girl	G	G	G	G
Girl	G - D	G - V	G – T – OT	G – T - OT
Girl	G - OT	G	G - T	G - O
Girl	G	G - OT	G - T	G – T
Girl	G - T	G - T	G - T	G – T
Girl	G	G	G - O	G – T

Table 6 (cont.)

Girl	G - V	G - V	G - V	G – V
Boy	G	A - V	G – D - O	G – T - O
Boy	G - N	OT	G - A	G – N
Boy	G	G - O	G – O - OT	G – OT
Boy	G - V	G - V	G - A	G – A
Boy	G	G - O	G - O	G
Boy	G	G	G	G
Boy	G – T - N	G - V	G - A	G – A
Boy	G - OT	G - O	G - O	G – V
Boy	G	G	G	G
Boy	G - V	G - V	OT	G - OT
Boy	P	P	P	P
Boy	G	G	G	G
Boy	G – T - V	G - T	G - V	G – V
Boy	G - V	G	G	G
Boy	G	G - V	G - OT	G
Boy	G	G	G	G – O
Boy	G	G - O	G	G
Boy	G - T	G - T	T	T
Boy	G	G	G	G
Boy	G	G	G - V	G – T
Boy	G - T	T	A - V	G
Boy	G - T	G	G - N	G – T - A
Boy	G - N	G - OT	G - OT	G
Boy	G - N	G – N - A	G - N	G - N
Boy	G	G	G	G
Boy	G - T	G - T	G – T - OT	G – T - OT
Boy	G – T - OT	G - V	G – T - OT	G – T - OT
Boy	G - T	G – T - OT	G – T - OT	G - T
Boy	G - OT	G - OT	G	G
Boy	G - P	G - T	G – T - N	G - N
Boy	G - T	G - T	G - T	G - T
Boy	G – O - V	D - V	G - OT	G - OT
Boy	G	G	G	G
Boy	G – A - OT	G - OT	G - OT	G – A - OT
Boy	G - A	G - T	G - T	G - A
Boy	G - A	G - T	G - T	G – A
Boy	G – A- OT	G – A - OT	G – A - OT	G - OT

Data for play behaviour of children occured on the playground and data for equipment used by children during their play session can be seen in Table 7.

and Table 8. The most preferred equipment observed on the playground were swings, slides, merry-go-rounds and multi-play structures. Relationships between the variables of play behaviour and interaction with the playground equipment will be analyzed in Chapter 5.

Table 7. Data for Children's Play Behaviour Occurred on Kurtuluş Park

	0 – 5 min. Cases N (%)	**5 – 10 min. Cases N (%)**	**10 – 15 min. Cases N (%)**	**15 – 20 min. Cases N (%)**
G: gross motor	67 (54.9)	60 (47.24)	64 (49.2)	63 (50)
D: disturbing	1 (0.81)	1 (0.78)	1 (0.76)	0 (0)
T: talking	17 (13.93)	19 (14.96)	19 (14.6)	20 (15.87)
O: orienting	4 (3.27)	8 (6.29)	9 (6.92)	8 (6.34)
P: pretending	5 (4.09)	4 (3.14)	4 (3.07)	3 (2.38)
N: noise	8 (6.55)	2 (1.57)	4 (3.07)	5 (3.96)
A: aggression	4 (3.27)	4 (3.14)	5 (3.84)	6 (4.76)
V: vocalization	10 (8.19)	16 (12.5)	9 (6.92)	5 (3.96)
OT: other task	6 (4.91)	13 (10.23)	15 (11.53)	16 (12.6)

Table 8. Data for Playground Equipment Used by Children

	0 – 5 min. Cases N (%)	**5 – 10 min. Cases N (%)**	**10 – 15 min. Cases N (%)**	**15 – 20 min. Cases N (%)**
A: slides	11 (11.8)	24 (25.8)	17 (20)	17 (20)
B: swings	27 (29.03)	18 (19.3)	15 (17.6)	14 (16.4)
C: climbers	10 (10.7)	11 (11.8)	12 (14.1)	9 (10.5)
D: balance	3 (3.2)	9 (9.6)	4 (4.7)	6 (7.05)
E: see-saw	4 (4.3)	3 (3.2)	1 (1.17)	4 (4.7)
F: h.ladder	4 (4.3)	3 (3.2)	7 (8.2)	7 (8.2)
G: m-g-r	13 (13.9)	10 (10.7)	12 (14.1)	9 (10.5)
H: s-m-e	2 (2.15)	1 (1.07)	3 (3.5)	4 (4.7)
I : m-p-s	19 (20.4)	14 (15.05)	14 (16.4)	15 (17.6)

The way that the child use the equipment was observed by the researcher. As can be seen in Figure 17., 34.3% of children used the playground equipment differently than adults intended and played with the equipment in their own ways. Swinging on foot, climbing upwards of a slide, jumping off a moving merry-go-round and jumping from the climbers were the most observed inappropriate use of the equipment.

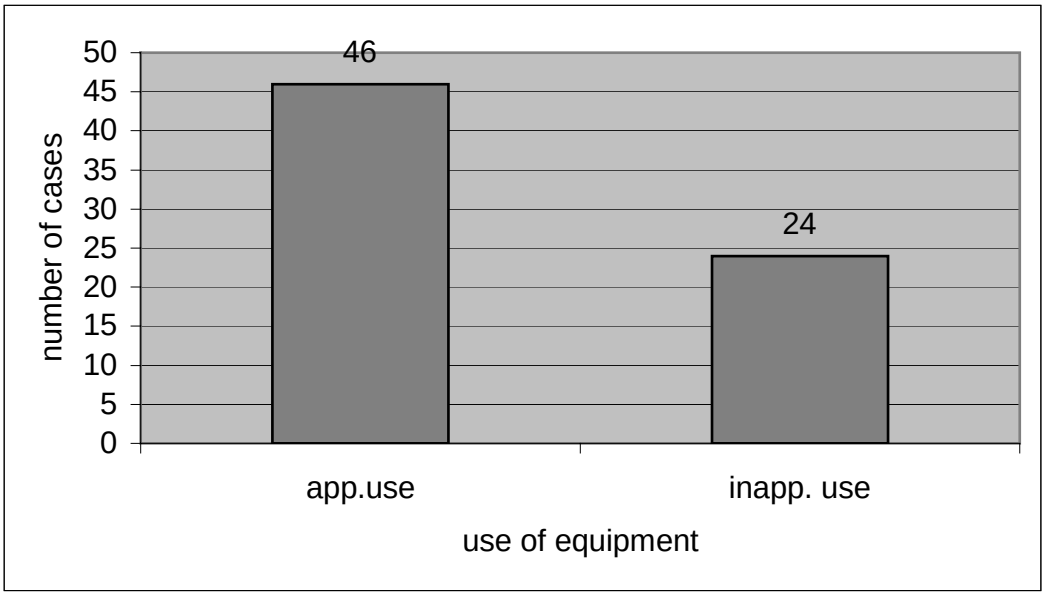

Figure 17. The way that children use the equipment

In order to evaluate the socialization factor of playground equipment, child's interaction with others during their play session were noted on the observation form.

As can be seen on Figure 18., while 55.7% of children communicated with their peers during their play period, 45.3% of children preferred to play alone or to play with their parents on the playground.

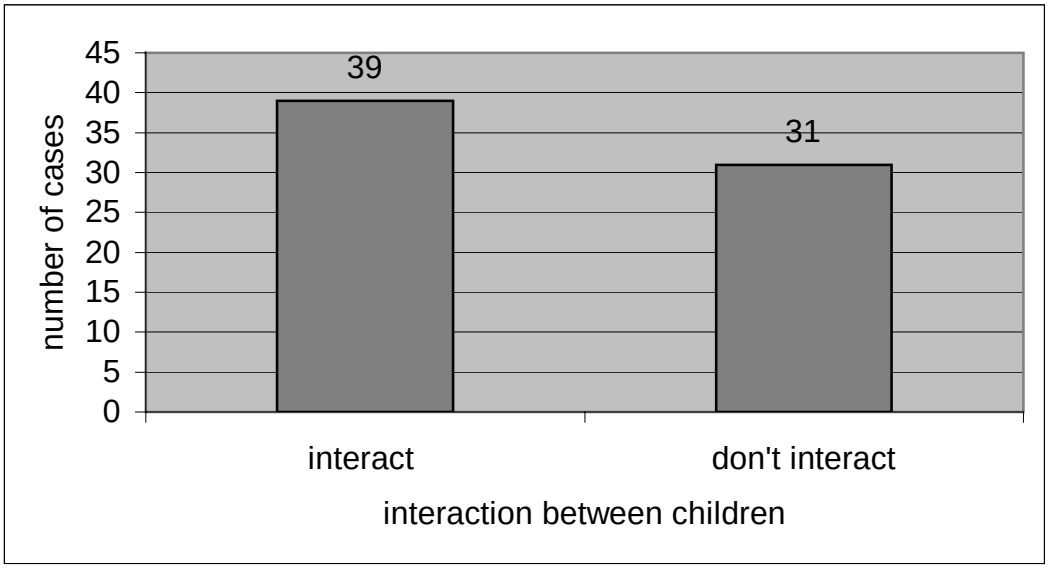

Figure 18. Children's interaction with others on the playground

4.3 Results of Interview

In the second part of the field study, a short interview with each children were conducted in Kurtuluş Park. As it was stated before, critical points of interviewing techniques were taken into account. After the observation period, questions below were directed to children through a manner of conversation. Before starting the interview, the researcher got permission from the child's parent and briefly explained the aim of the study. Children, whose parent's refused to conduct an interview, eliminated from the research population.

Conversations began with talking about irrevelant subjects so that the child was encouraged to talk freely. In order to acquire more information, the researcher listened the child respectfully and tried to make him feel comfortable to express his feelings spontaneously. Individual responses of children determined the format

of each interview. The structure of the conversation were formed by the questions below:

1. How many times have you been to this playground?
2. What is your favorite thing to do on this playground?
3. If you could build your own playground what kinds of things would you put on?
4. Do you like to invent games using playground equipment?
5. What kinds of games do you invent?

Questions were designed to collect specific data which cannot be taken through observation, such as, frequency of visiting the playground, favorite activities, and invention of original games. Considering the difficulty of attracting children's attention for a long time, conversations generally took 5 minutes for each respondent.

As can be seen in Figure 19., majority of children (35.7%) stated that they are taken to the playground everyday. 60% of these children are between the age of 6 and 7. Table 9 displays the variation of age groups according to the frequency of visiting the playground.

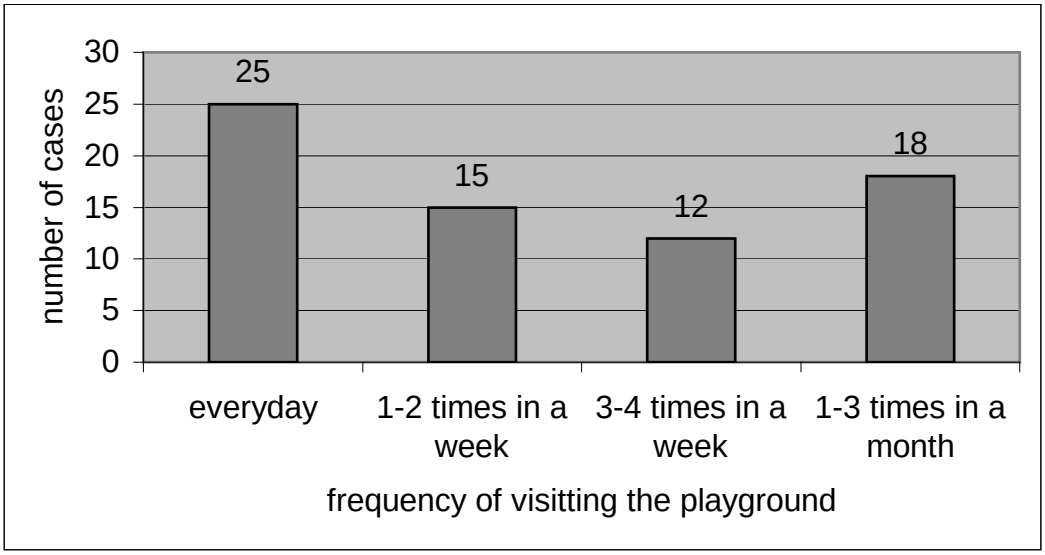

Figure 19. Children's frequency of visiting the playground

Table 9. Relationship between age groups and frequency of visiting the playground

Frequency \ Age Groups	**6 - 7**	**8 - 9**	**10 - 12**
Everyday	15 (21.4%)	7 (10%)	3 (4.3%)
1-2 times in a week	6 (8.5%)	4 (5.7%)	5 (7.1%)
3-4 times in a week	8 (11.4%)	1 (1.4%)	3 (4.3%)
1-3 times in a month	3 (4.3%)	7 (10%)	8 (11.4%)

When children were asked to state their favorite activity on the playground, swinging and sliding were the most leading answers. Related with that question, their favourite play equipment on the playground was also noted. Movable play structures such as, swings, merry-go-rounds, and spring mounted equipment were most preferred playground structures by children. Figure 20. illustrates the children's preference of play structures in detail.

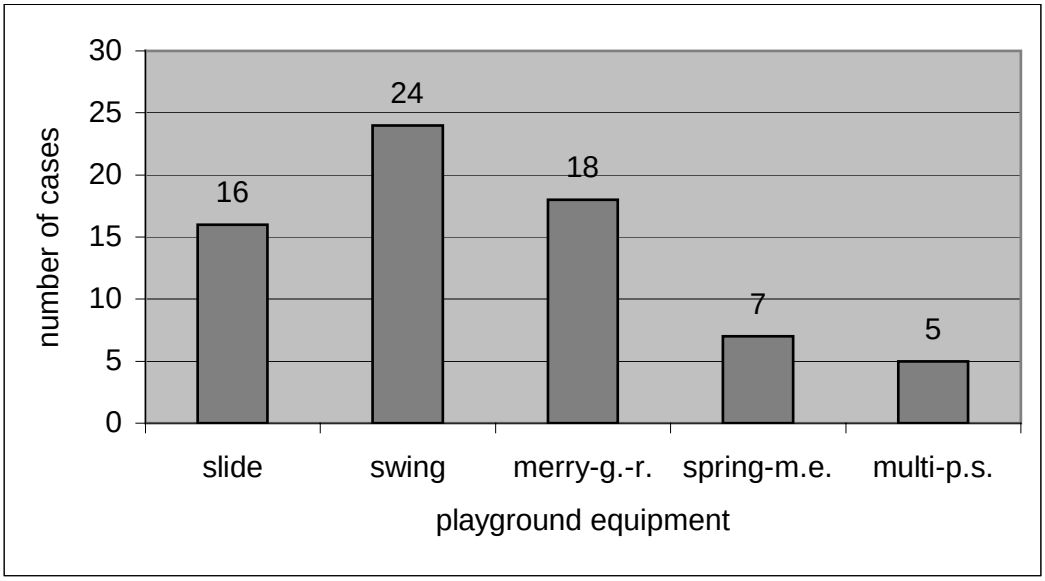

Figure 20. Children's preference of playground equipment

In order to determine children's particular thoughts about adequacy of playground structures in terms of design, the researcher wanted them to create a playground equipment by their own imagination. 34.2% of children showed no interest in that question. Rest of the children (65.8%), especially girls (60.8%), were more likely to express their ideas.

Jumping from high platforms onto soft surfaces, playing with water and mud, bouncing and climbing to trees were children's most favorite activities which they would like to perform on the playground. Most of the children stated that they would like to have water canals around the playground with lot's of bridges on it. They also mentioned that they like to play with mud and need special areas to mess around. 39.1% of children desired to have natural materials, such as, water, sand, mud and junk materials on the playground. Children usually

complained about their parent's concern of cleanliness which keeps them from this kind of activities.

Although, traditional type playgrounds provide physical skills adequately, children stated that they would like to explore extraordinary exercises. They designed flexible climbers and balance equipment with springs which will let them to move freely. They also created giant cushions underneath the multi-play structures to jump out without interference.

Children also designed settings that support hard surface game areas where the rules and goals are determined with colored lines and diagrams. They explained that these areas should be separated from other play activities to use effectively. Children also planned enclosed spaces like play houses, tents, cubes and concealed areas under platforms. They also used different materials like; textured fabrics, ropes, soft mats and unbreakable mirrors to increase the visual interest and to support imaginative play. They also designed movable parts with complex features that will provide a variety of play opportunities in one piece of equipment.

In the light of the observation results in Kurtuluş Park, children tend to invent different games using playground equipment. They enjoy competitions and show off their physical performances. When children were asked to talk about activities they invent on the playground, they generally stated typical child games such as, hide and seek, catch and run. 32.8% of children stated that they like to

play ball games on the playground where horizontal metal bars utilized as goal posts. Similarly, the results of observation suggested that majority of boys between 9 to 12 years old prefer ball games, where, these children (29.7%) showed more aggressive behaviour than the others. They also stated that playing on the streets is more enjoyable than playing on the playground.

Children mentioned that they like to bring toys and any kind of play material to the playground. 65.7% of them determined that dolls, puppets, and cars are the most popular items on the playground. Observation sessions showed that this kind of play materials promote dramatic and pretend play between children. On the other hand, from the recorded notes of the observation session, children tend to collect discarded materials such as, bottle taps and cans which will encourage constructive play and cooperative interactions.

Natural environment have a positive influence on children's development. Children enjoy to deal with landscape characteristics which they can discover, explore and experiment. Vegetation is one of the most favorite element that arouse their interest. Children stated that they like climbing to trees (55.71%), jumping over the bushes (17.1%), and collecting seeds or insects (11.4%).

4.4 Limitations of the study

In this research study naturalistic observation and interview techniques have been conducted in the light of the relevant literature. Sample size was limited with 70 children from middle childhood population. Due to the limitted sample size, statistical tests, rarely, did not give significant results. In this respect, evaluation of the data were based on subjective interpretations of the researcher.

Observational research techniques requires considerable practice. It necessitates a lot of energy, both in time and effort. Although, the researcher has benefited from the knowledge and recommendations of a child psychologist, the field study period took longer than expected. Weather conditions, obtaining permission from parents, subjects that untimely left the playground were obstacle factors of the research study. In addition, conducting the study on a single playground limited the generalizability of the results. However, considering public playgrounds in Ankara are similar with their quality and condition whereas repetition of the data and statistically significant results indicate that the findings obtained were reliable.

On the other hand, interviewing sessions were extremely arduous. Children aged between 6 to 8 usually behaved shy and their parents mostly interfered in the conversation. On the contrary, collecting data from children aged between 9 to 12 were effortless as they were more likely to express themselves freely. Considering children's attraction towards electronic devices, the researcher

didn’t use video camera or tape recorder. This provided an informal and relaxed atmosphere for conducting a legitimate interview.

CHAPTER 5

ANALYSIS AND DISCUSSION

Outdoor play experiences have a great role in stimulating children's development. Considering the findings of the field study, this research focused on specific features of playground structures and their effects on children's developmental needs.

Collected data of respondent's were analyzed using Pearson's Chi-square Test and Fisher's Exact Chi-square Test with 95% ($\alpha = 0.05$) confidence intervals. Details of the statistical analysis can be examined in Appendix 2. In this chapter, interpretation of the analyzed data will be identified along with the relevant literature according to the developmental stages of children.

5.1 Impact of Playground Equipment Design on Children's Development

5.1.1 Physical Development

A large body of literature reveals that design of playground structures contribute to children's physical development. Whereas, Barbour (1999) defined the traditional type playgrounds as exercise-oriented places, they provide a level of physical challenge and promote motor skill development of children.

Brown and his colleagues listed the playground structures which support physical skills as below:

> - climbers, including poles and nets (loco motor, strength, coordination, balance)
> - overhead and upper body equipment, including overhead ladders (loco motor, strength, coordination)
> - moving balance activities (balance coordination)
> - slides (balance, coordination)
> - swings (balance, coordination)
> - games with accessories (strength, balance, coordination)
> (Brown et. al., 2001)

Likewise, Heseltine and Holborn mentioned that traditional type of play structures support physical development of children.

As can be examined in Table 6 and Figure 16., majority of children (78.57%) performed gross motor activities entire play session, while, 11.42% of them exercised maximum for 15 minutes. Not surprisingly, only 2.8% of children preferred other type of activities such as, vocalizing, orienting and pretending on the playground. Based on these findings, it can be stated that traditional type playground equipment support physical activities completely in Kurtuluş Park. Table 8. demonstrates that physical exercises mostly occur on swings, slides and multi-play structures in the form of sensorimotor play.

In order to investigate the relationship between the choice of playground equipment and play type factor, Pearson's Chi-square Test was applied to the

respondent's data. A significant relationship between the variables were found whereas p= 0.022 < 0.05 (see App. 2.6). Hence, play type of children were directly affected by design of the play structure. With sensorimotor play, children not only master physical skills but learn to manipulate the materials on the playground. As it was stated in Section 2.1.2, the importance of movement can not be disregarded in child's life, since, traditional type play structures provide opportunities for children to improve thier physical skills sufficiently.

5.1.2 Social Development

Social development can be defined as the process in which a child learns the skills, rules, and values that enable him or her to form connections among peers and members of society. In this case, it can be stated that playgrounds are the places where first interactions between children are occured at. Play structures serve as a medium to promote social and intellectual abilities and offer children a specialized atmosphere to become more skillful in social relationships and social roles.

Findings of the field study indicates that 51.4% of children on Kurtuluş Park preferred to play with their peers. As Figure 15. illustrates the accompaniment on the playground, these data denotes the effect of playground equipment on children's socialization level. Pearson's Chi-square Test also supports the relation between two variables; accompaniment and type of play equipment whereas $p < \alpha$; $p = 0.027$ (see App. 2.5).

Design of play structure affects children's way of using the equipment. Children who cannot manipulate the equipment by themselves need the help of their parents or friends on the playground. Based on the observational notes, merry-go-rounds, slides and multi-play structures are the leading playground equipment which support social play among children. Especially merry-go-round requires full cooperation in order to work efficiently. Children learn turn taking and respect to others during play period.

As the findings of this research indicated that the playground is a rich and relatively unrestricted environment directly contribute to the quality of children's social interaction with peers. Traditional type play equipment also play an important role in children's socialization without exception.

5.1.3 Emotional Development

On playgrounds there are opportunities for emotional development as children examine their limits and challenge. As it has been stated in Section 2.1.2, their success leads to feelings of accomplishment and positive self esteem. Healty developing children learn to broaden his skills through active play of all sorts. They not only master to cooperate with others but learn to lead as well as to follow. Children comprehend the more formal skills of life.

The relevant literature mention that playground equipment contribute to emotional development of children. They require highest challenges and let children to increase their physical performance skills. On the other hand, they

inspire fantasy and dramatic play which foster peer relations and friendship among children.

On the contrary, the field study showed that traditional play structures in Kurtuluş Park do not create stimulating and interesting challenges sufficiently. Children on the playground have a little chance to structuring their own activities in view of developing self expertise, control and independence. Although, 55.7% of children interact with their peers on the playground, minimized choice of play activities and settings prevent their emotional dimensions of play. In addition to this, it can be stated that playground equipment have a direct effect on interaction factor that will promote emotional development of all children ($p < \alpha$; $p = 0.007$, see App. 2.4). However, it has been found that differentiation of age affect peer relationships whereas, $p = 0.017$ and $p < \alpha$ (see App. 2.3).

As gender factor on playgrounds have been the focus of several studies, Lewis and Phillipsen (1998) found significant relations between gender segreation and playground structures. Contrary to that statement, the analysis of this research study showed no significant results ($p > \alpha$; $p = 0.569$, see App. 2.2). for gender differences. But, if the observational notes taken into consideration, boy's tend to be more active and show higher frequences of constructive play and games with rules than girls while they prefer to play with same gender peers.

Several studies mentioned that design of play structures play an important role in fostering children's emotional development, however, this

research study showed that design of traditional playground equipment in Kurtuluş Park are incapable of enhancing the required activities which contribute to these developmental factors.

5.1.4 Cognitive Development

As children develop, the type of play they experience changes with their growing minds and bodies. With different types of play, they not only learn the physical requirements for using playground equipment but also develop cognitive skills that will assist them through the stages of cognitive development. According to Papalia and Olds, cognitive play includes constructive play, imaginative play and games with rules.

Based on this research study, game with rules are executed by children to a certain extend. However, play structures on Kurtuşuş Park provide limited opportunities for constructive and imaginative play. As can be seen in Figure 16., only 18.5% of children use the playground equipment in ways that encourage the imagination. Chi-square analysis showed that, there is a strong relationship between the way that the child use the equipment and the design of the play structure ($p < \alpha$; $p = 0.027$, see App. 2.1). Majority of children (65.7%) use the play structures intended ways. This signifies that, traditional play structures in Kurtuluş Park are insufficient in fostering mental development and creative thinking. These kind of play structures only detain children with repetitive actions. Especially swings and merry-go-rounds do not support any kind of creative play. Although, these play equipment are children's primary choice,

surprisingly, children are quickly get bored of playing with them after 7 or 10 minutes.

Interviews on Kurtuluş Park showed that children want to play with extraordinary play structures that will allow them to control the experience through their own imaginations and to exercise by their choice.

Nevertheless, children need opportunities that will encourage their creative play and creative thinking on playgrounds. These can be supported by unique devices that will provide perpetual possibilities in order to be used in different ways.

CHAPTER 6

CONCLUSION

In this study, characteristics of public playground equipment were examined by conducting a field study and the effects of traditional type play structures on children's developmental needs were discussed in the light of the relevant literature.

Specialists in children's play theory see outdoor play as fundamental to human development and define it as the essential part of their education. As pretend play has been referred to imaginative, pretense, dramatic, fantasy or make-believe, it demonstrates a link between playground equipment design and creativity. In order to provide a better play experience on public playgrounds, it is recommended that play structures should have open-ended activities that will encourage children to exercise, to experiment and to explore. Playground equipment should offer risk taking opportunities and graduated challenges for children to develop their decision making skills.

The results of interviews with children in Kurtuluş Park, in summary, revealed that children are in desire of varied play structures with endless possibilities. Design of traditional play equipment will be adequate if the goal is to encourage

physical and social skills on playgrounds. However, today's design approach necessitates to stimulate imaginative and constructive development, from this point of view, it is important to provide play equipment that children can move, manipulate, explore and incorporate into their play in a variety of different ways. Promoting challenge and interest on public playgrounds will help children to discover their creative potentials. Considering these factors, it can be stated that variety and interactivity are the new way of look on playground equipment concept, where the process is more important than the product.

Technological development is another important point that appear as the inhibitor of outdoor play. Watching television, playing video or computer games are all activities that are stealing time from social interactions and desire of being outdoors, while allow children to spend most of their time indoors. Changing life styles and habits constitute children's understanding of fun and enjoyment.

The results of this study indicate the importance of play to child development and children's need of opportunities to access creative play environments, where they can develop physically, socially, and mentally. In the light of this research, it can be stated that today's traditional playground equipment represent a limitted aspect of child's play. Children of the 21st century deserve inventive playgrounds that are approppriate to their needs. Design of a play equipment should foster independent decision making and offer opportunity for choice. With diversity of play experiences and combinations of options, playgrounds will gain their popularity and protect children's right of free play.

The findings of this study suggest a wide range of possibilities for future research. It highlights the contribution of play equipment for imaginative play which support creative development of children. It is also underlining the limitations of traditional playground equipment in terms of play quality. The strength of the results indicate that the findings deserve further investigation. On the other hand, exploring the technological dimensions of play seems to be a logical next step in this regard.

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APPENDIX 1

A FILLED OBSERVATION SHEET SAMPLE

Date: .....10/05/2003.....

Hour:.....14:25.....

Age of child: ....10.....

Gender:.....Erkek .....

Each observation will take 20 minutes for each child. This 20 minutes will be analyzed in 4 parts as below:

Part1- 0-5 min.

Part2- 5-10 min.

Part3- 10-15 min.

Part4- 15-20 min.

SECTION A – Analyzing Play Behaviour of the Child

The child play: a. Alone

b. With his\her friends ✎

c. With parent\.....

The child's play type is: a. Sensorimotor play

b. Social Play

c. Constructive Play

d. Pretend Play \ Fantasy Play

e. Games with rules ✎

OBSERVATION CODE SHEET

Time (minutes)	0-5	5-10	10-15	15-20
Child	*G D T O P N *A V OT	*G D *T O P N A V OT	*G D *T O P N A V OT	*G D T O P N *A V OT

G: Gross Motor
D: Disturbing
T: Talking
O: Orienting
N: Noise
A: Aggression
V: Vocalization
OT: Other Tasks
P: Pretending

Equipment that the child use during his\her play session

Time (minutes)	0-5	5-10	10-15	15-20
A	✎			
B				✎
C	✎	✎		
D				
E				
F				
G				
H				
I		✎	✎	

A: Slides

B: Swings

C: Climbers

D: Balance Beams

E: See-Saw

F: Horizontal Ladders

G: Merry-go-rounds

H: Spring-Mounted Equipment

I: Multi-Play Structures

The way that the child use the equipment,

.....***Çocuk oyun elemanlarını amacına uygun kullanıyor. Yalnızca arkadaşları ile top oyunları oynarken tırmanma aparatlarını kale olarak kullanıyor. Grup oyunlarını tercih ediyor ve nadir de olsa arkadaşlarına hırçın davranıyor***.....

The child interacts with others while playing,

Yes,..... .....

.....

No,.....

.....

ADDITIONAL

NOTES:.....

.....***Kurallı (top oyunu) oyunlar oynarken ara sıra başka oyun elemanlarına yönelip 1-2 defa onları kullanıp diğer oyununa kaldığı yerden devam ediyor. Bu durum arkadaşları ile arasında tartışmalara yol açıyor. Hiperaktif davranışlar sergiliyor. Bir oyun veya oyun aleti üzerinde fazla konsantre olamıyor***.....

.....

SECTION B – Interview with the child

In this section, questions will be asked to the child. In order to gather the correct data without disturbing the child, questions will be asked in a friendly atmosphere.

1) How many times have you been to this playground?

.....***Haftada 1-2 kere*** .....

2) What is your favorite thing to do on this playground?

.....***Arkadaşlar ile oynamak, vakit geçirmek*** .....

3) What is your favorite equipment on this playground?

.....***Kaydırak, merdivenler***.....

4) If you could build your own playground what kinds of things would you put on?

.....***Top oynamak için beton alan yapardım***. .....

5) Do you like to invent games using playground equipment?

.....***Bazen***.....

6) What kinds of games do you invent?

..... ***Genelde arkadaşlarla toplanıp oyun oynuyoruz. En çok top oynamayı seviyoruz. Bir de tırmanma aletlerinde takla atıp sallanmayı***.....

APPENDIX 2

SPSS OUTPUT FOR ANALYZED DATA

2.1 Relationship Between the Way That the Child Use the Equipment and the Design of the Play Structure

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
PLAYWAY * F.EQUIPMENT	70	100,0%	0	,0%	70	100,0%

PLAYWAY * F.EQUIPMENT Crosstabulation

			F.EQUIPMENT		Total
			,00	1,00	
PLAYWAY	,00	Count	35	11	46
		Expected Count	30,9	15,1	46,0
		% within PLAYWAY	76,1%	23,9%	100,0%
		% within F.EQUIPMENT	74,5%	47,8%	65,7%
		% of Total	50,0%	15,7%	65,7%
	1,00	Count	12	12	24
		Expected Count	16,1	7,9	24,0
		% within PLAYWAY	50,0%	50,0%	100,0%
		% within F.EQUIPMENT	25,5%	52,2%	34,3%
		% of Total	17,1%	17,1%	34,3%

Total	Count	47	23	70
	Expected Count	47,0	23,0	70,0
	% within PLAYWAY	67,1%	32,9%	100,0%
	% within F.EQUIPMENT	100,0%	100,0%	100,0%
	% of Total	67,1%	32,9%	100,0%

Chi-Square Tests

	Value	**df**	**Asymp. Sig. (2-sided)**	**Exact Sig. (2-sided)**	**Exact Sig. (1-sided)**
Pearson Chi-Square	4,865(b)	1	,027		
Continuity Correction(a)	3,754	1	,053		
Likelihood Ratio	4,765	1	,029		
Fisher's Exact Test				,035	**,027**
Linear-by-Linear Association	4,796	1	,029		
N of Valid Cases	70				

a Computed only for a 2x2 table

b 0 cells (,0%) have expected count less than 5. The minimum expected count is 7,89.

2.2 Relationship Between Gender and the Design of the Play Structure

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
GENDER * F.EQUIPMENT	70	100,0%	0	,0%	70	100,0%

GENDER * F.EQUIPMENT Crosstabulation

			F.EQUIPMENT		Total
			,00	1,00	
GENDER	,00	Count	22	11	33
		Expected Count	22,2	10,8	33,0
		% within GENDER	66,7%	33,3%	100,0%
		% within F.EQUIPMENT	46,8%	47,8%	47,1%
		% of Total	31,4%	15,7%	47,1%
	1,00	Count	25	12	37
		Expected Count	24,8	12,2	37,0
		% within GENDER	67,6%	32,4%	100,0%
		% within F.EQUIPMENT	53,2%	52,2%	52,9%
		% of Total	35,7%	17,1%	52,9%
Total		Count	47	23	70
		Expected Count	47,0	23,0	70,0
		% within GENDER	67,1%	32,9%	100,0%
		% within F.EQUIPMENT	100,0%	100,0%	100,0%
		% of Total	67,1%	32,9%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	,006(b)	1	,936		
Continuity Correction(a)	,000	1	1,000		
Likelihood Ratio	,006	1	,936		
Fisher's Exact Test				1,000	**,569**
Linear-by-Linear Association	,006	1	,937		
N of Valid Cases	70				

a Computed only for a 2x2 table

b 0 cells (,0%) have expected count less than 5. The minimum expected count is 10,84.

2.3 Relationship Between Age and Children's Interaction With Each Other

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
AGEgroup * INTERACT	70	100,0%	0	,0%	70	100,0%

AGEgroup * INTERACT Crosstabulation

			INTERACT		Total
			,00	1,00	
AGEgroup	,00	Count	13	19	32
		Expected Count	17,8	14,2	32,0
		% within AGEgroup	40,6%	59,4%	100,0%
		% within INTERACT	33,3%	61,3%	45,7%
		% of Total	18,6%	27,1%	45,7%
	1,00	Count	14	10	24
		Expected Count	13,4	10,6	24,0
		% within AGEgroup	58,3%	41,7%	100,0%
		% within INTERACT	35,9%	32,3%	34,3%
		% of Total	20,0%	14,3%	34,3%
	2,00	Count	12	2	14
		Expected Count	7,8	6,2	14,0
		% within AGEgroup	85,7%	14,3%	100,0%
		% within INTERACT	30,8%	6,5%	20,0%

		% of Total	17,1%	2,9%	20,0%
Total		**Count**	39	31	70
		Expected Count	39,0	31,0	70,0
		% within AGEgroup	55,7%	44,3%	100,0%
		% within INTERACT	100,0%	100,0%	100,0%
		% of Total	55,7%	44,3%	100,0%

Chi-Square Tests

	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	8,126(a)	2	**,017**
Likelihood Ratio	8,810	2	,012
Linear-by-Linear Association	7,872	1	,005
N of Valid Cases	70		

a 0 cells (,0%) have expected count less than 5. The minimum expected count is 6,20.

2.4 Relationship Between Children's Interaction With Each Other and the Design of the Play Structure

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
F.EQUIPMENT * INTERACT	70	100,0%	0	,0%	70	100,0%

F.EQUIPMENT * INTERACT Crosstabulation

			INTERACT		Total
			,00	1,00	
F.EQUIPMENT	,00	Count	21	26	47
		Expected Count	26,2	20,8	47,0
		% within F.EQUIPMENT	44,7%	55,3%	100,0%
		% within INTERACT	53,8%	83,9%	67,1%
		% of Total	30,0%	37,1%	67,1%
	1,00	Count	18	5	23
		Expected Count	12,8	10,2	23,0
		% within F.EQUIPMENT	78,3%	21,7%	100,0%
		% within INTERACT	46,2%	16,1%	32,9%
		% of Total	25,7%	7,1%	32,9%
Total		Count	39	31	70
		Expected Count	39,0	31,0	70,0

	% within F.EQUIPMENT	55,7%	44,3%	100,0%
	% within INTERACT	100,0%	100,0%	100,0%
		55,7%	44,3%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	7,058(b)	1	,008		
Continuity Correction(a)	5,762	1	,016		
Likelihood Ratio	7,416	1	,006		
Fisher's Exact Test				,010	**,007**
Linear-by-Linear Association	6,957	1	,008		
N of Valid Cases	70				

a Computed only for a 2x2 table

b 0 cells (,0%) have expected count less than 5. The minimum expected count is 10,19.

2.5 Relationship Between Children's Play Type and Accompaniment

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
ACCOMPAN * PLAYTYPE	70	100,0%	0	,0%	70	100,0%

ACCOMPAN * PLAYTYPE Crosstabulation

			PLAYTYPE			Total
			,00	1,00	2,00	
ACCOMPAN	,00	Count	15	3	5	23
		Expected Count	9,9	3,9	9,2	23,0
		% within ACCOMPAN	65,2%	13,0%	21,7%	100,0%
		% within PLAYTYPE	50,0%	25,0%	17,9%	32,9%
		% of Total	21,4%	4,3%	7,1%	32,9%
	1,00	Count	15	9	23	47
		Expected Count	20,1	8,1	18,8	47,0
		% within ACCOMPAN	31,9%	19,1%	48,9%	100,0%
		% within PLAYTYPE	50,0%	75,0%	82,1%	67,1%
		% of Total	21,4%	12,9%	32,9%	67,1%
Total		Count	30	12	28	70
		Expected Count	30,0	12,0	28,0	70,0

	% within ACCOMPAN	42,9%	17,1%	40,0%	100,0%
	% within PLAYTYPE	100,0%	100,0%	100,0%	100,0%
		42,9%	17,1%	40,0%	100,0%

Chi-Square Tests

	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	7,188(a)	2	**,027**
Likelihood Ratio	7,282	2	,026
Linear-by-Linear Association	6,731	1	,009
N of Valid Cases	70		

a 1 cells (16,7%) have expected count less than 5. The minimum expected count is 3,94.

2.6 Relationship Between Children's Play Type and the Design of the Play Structure

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
F.EQUIPMENT * PLAYTYPE	70	100,0%	0	,0%	70	100,0%

F.EQUIPMENT * PLAYTYPE Crosstabulation

			PLAYTYPE			Total
			,00	1,00	2,00	
F.EQUIPMENT	,00	Count	25	5	17	47
		Expected Count	20,1	8,1	18,8	47,0
		% within F.EQUIPMENT	53,2%	10,6%	36,2%	100,0%
		% within PLAYTYPE	83,3%	41,7%	60,7%	67,1%
		% of Total	35,7%	7,1%	24,3%	67,1%
	1,00	Count	5	7	11	23
		Expected Count	9,9	3,9	9,2	23,0
		% within F.EQUIPMENT	21,7%	30,4%	47,8%	100,0%
		% within PLAYTYPE	16,7%	58,3%	39,3%	32,9%
		% of Total	7,1%	10,0%	15,7%	32,9%
Total		Count	30	12	28	70

	Expected Count	30,0	12,0	28,0	70,0
	% within F.EQUIPMENT	42,9%	17,1%	40,0%	100,0%
	% within PLAYTYPE	100,0%	100,0%	100,0%	100,0%
		42,9%	17,1%	40,0%	100,0%

Chi-Square Tests

	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	7,619(a)	2	**,022**
Likelihood Ratio	7,788	2	,020
Linear-by-Linear Association	3,417	1	,065
N of Valid Cases	70		

a 1 cells (16,7%) have expected count less than 5. The minimum expected count is 3,94.