AN ENVIRONMENTAL-BEHAVIOR EVALUATION OF PEDIATRIC CLINIC WAITING ROOM ENVIRONMENTS

by

Michelle Acevedo

Thesis submitted to the Faculty of the

Virginia Polytechnic Institute and State University

in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

in

Housing, Interior Design, and Resource Management

APPROVED:

Anna Marshall-Baker
A. Marshall-Baker, Chairman

Joan McLain-Kark
J. McLain-Kark

Andrew Stremmel
A. Stremmel

February, 1995

Blacksburg, Virginia

AN ENVIRONMENTAL-BEHAVIOR EVALUATION OF PEDIATRIC CLINIC WAITING ROOM ENVIRONMENTS

by

Michelle Acevedo

Committee Chair - Anna Marshall-Baker

Department of Housing, Interior Design, and Resource Management

(Abstract)

The purpose of this study was to describe the behaviors of the children and the parents, as well as the perceptions of the parents in pediatric office waiting room environments. The pediatric clinics that were used in this study were five clinics located in Virginia: one in southwest Virginia, and four in northern Virginia. The sample for this study consisted of parents and children ages 2 to 11 who were visiting the pediatric clinic. The behaviors of the children and the parents were observed through behavioral mapping. The perceptions of the parents were analyzed using a brief survey.

The behavioral data were analyzed descriptively by percentages for each clinic. The majority of children aged 2 to 7 years engaged in some form of play activity while in the waiting area at all five clinics. The greater the

variety of play activities available in the clinic, the higher the percentage of children who engaged in play behavior. Clinic 5 provided the largest variety of play activities, and also had the highest percentage of children playing. Clinic 1 provided the least variety of play activities and the lowest percentage of children playing. Few children ages 7 to 11 years were observed.

The majority of parents in all five clinics, except clinic 2, sat down and watched their children play. Interestingly, a higher percentage of parents stood at the reception counter than sat in the waiting area when the reception counter was located near the entry door.

Semantic differential analysis of descriptive adjective pairs using a one-way ANOVA revealed seven statistically significant pairs: pleasant/unpleasant; drab/colorful; quiet/noisy; gloomy/cheerful; exciting/boring; crowded/roomy; and impressive/unimpressive. Clinics that provided a variety of visual interest in the waiting area, such as clinics 2 and 5, were perceived as being more pleasant, colorful, cheerful, exciting, and impressive. In contrast, clinics that provided little visual interest in the waiting area, such as clinics 1 and 4, were perceived as being more unpleasant, drab, boring, gloomy, and unimpressive. Design and research recommendations for further studies have been made.

ACKNOWLEDGMENTS

There are several people I would like to thank who contributed to the completion of this masters thesis. First, I would like to thank Dr. Anna Marshall-Baker for her guidance, support, and especially, patience throughout the entire process as my committee chair. I would also like to thank the other members of my committee, Dr. Joan McLain-Kark and Dr. Andrew Stremmel for their support and enthusiasm throughout this project. I would like to express my appreciation to the interior design faculty and staff for their continued moral support throughout my graduate studies. I will remember them fondly.

I would like to give special thanks to my friend and colleague Mary Bredderman for her words of encouragement during those times when I felt overwhelmed and needed a sympathetic ear.

Gratitude is also extended to the physicians and their staff for providing me with the opportunity to conduct my research.

Above all, I would like to thank my family for their unconditional love and support, and to Steve Milley, my best friend, whose belief in my abilities as well as his insightful knowledge helped me to fulfill this dream.

TABLE OF CONTENTS

ABSTRACT..... ii

ACKNOWLEDGMENTS..... iv

LIST OF FIGURES..... vii

LIST OF TABLES..... viii

CHAPTER

1. INTRODUCTION 1

    Statement of the Problem..... 2
    Purpose of the Study..... 3
    Research Objectives..... 4

2. LITERATURE REVIEW..... 5

    Relationship Between Environment and Behavior 5
    Individual and Environmental Characteristics 9
        Cognitive Development..... 9
        Spatial Behavior and Perception..... 11
        Four Psychological Needs..... 14
        Proxemics..... 16
        Territoriality..... 18
        Summary..... 20
    Considerations for design..... 22
        Considerations in Pediatric Design..... 22
        Family-centered Care in Health Facilities 23
        Summary..... 24

    CONCLUSION..... 25
    RATIONALE..... 26
    RESEARCH QUESTION..... 27
    SIGNIFICANCE OF STUDY..... 28
    HYPOTHESES..... 28

3. DESIGN OF RESEARCH..... 29
    Pilot Study..... 29
    Data Collection..... 30
    Methodology..... 31
        Setting..... 31
    Procedure..... 32
        Behavioral Mapping..... 32
        Survey..... 33

General Descriptions of the Pediatric Clinics 34
Clinic 1 34
Clinic 2 37
Clinic 3 40
Clinic 4 43
Clinic 5 46
Means of Data Analysis 49

4. RESULTS AND DISCUSSION 51

Behavioral Mapping Results 51
Clinic 1 52
Clinic 2 54
Clinic 3 56
Clinic 4 56
Clinic 5 58
Summary of the Behavioral Observation Results 61
Survey Results 62
Statistical Analysis 63
Summary of the Results of the Perception Survey 67
Summary of Contents 69
Clinic 1 69
Clinic 2 69
Clinic 3 70
Clinic 4 70
Clinic 5 71
Summary 72

5. DISCUSSION AND CONCLUSIONS 73

Discussion 73
Clinic 1 73
Clinic 2 76
Clinic 3 78
Clinic 4 80
Clinic 5 82
Limitations 83
Summary 84
Recommendations for Further Research 88

LIST OF REFERENCES 91

APPENDIX A: BEHAVIORAL MAP 95
APPENDIX B: SURVEY INSTRUMENT 97
APPENDIX C: SURVEY RAW DATA 99
VITA 104

LIST OF FIGURES

Figure	Page
1. Model of Environmental-Behavior Relationship...	6
2. Sociofugal vs. Sociopetal Furniture Arrangement	19
3. Illustration of Clinic 1.....	35
3-A. Photographs of Clinic 1.....	36
4. Illustration of Clinic 2.....	38
4-A. Photographs of Clinic 2.....	39
5. Illustration of Clinic 3.....	41
5-A. Photographs of Clinic 3.....	42
6. Illustration of Clinic 4.....	44
6-A Photographs of Clinic 4.....	45
7. Illustration of Clinic 5.....	47
7-A. Photographs of clinic 5.....	48
8. Percentage of Children's Behaviors in Clinic 1.	53
9. Percentage of Parents' Behaviors in Clinic 1...	53
10. Percentage of Children's Behaviors in Clinic 2	55
11. Percentage of Parents' Behaviors in Clinic 2..	55
12. Percentage of Children's Behaviors in Clinic 3	57
13. Percentage of Parents' Behaviors in Clinic 3...	57
14. Percentage of Children's Behaviors in Clinic 4	59
15. Percentage of Parents' Behaviors in Clinic 4...	59
16. Percentage of Children's Behaviors in Clinic 5	60
17. Percentage of Parents' Behaviors in Clinic 5...	60

LIST OF TABLES

Table Page

1. Summary of Pairwise Comparisons for Survey Descriptive Adjective Pairs..... 65

2. Summary of Means of Each Clinic for Significant Survey Descriptive Adjective Pairs..... 68

CHAPTER ONE

Introduction

A critical look at our clinics, hospitals, and medical offices reveals that they are designed for ease of maintenance rather than human comfort (Malkin, 1982). Historically, design of health care facilities has not been approached from the patient's perspective (Orr, 1993). Any thought that the physical environment could have a positive effect on health, well-being, and outcomes of care has been largely ignored in the design of many health care facilities, although studies have shown that health care environments do affect outcomes (Orr, 1993). For example, Oglivie (1990) manipulated spaces that supported children's health, and reduced the children's post-operative anxiety. Specifically, by providing elements within the hospital that allowed the parents to be with their child after surgery expedited recovery and minimized adverse physical and emotional effects. Because children are adept at perceiving parental cues, Oglivie suggested that reducing parental anxiety was an effective intervention that could be used by health care professionals. Reduced anxiety in the parents lead to less anxiety in the hospitalized child thereby minimizing the chance of adverse long-term effects while encouraging coping behaviors of both the child and the

parents (Oglivie, 1990). Research such as this that concerns children's behaviors and hospital design may be applied to pediatric clinics by focusing on the effects of the environment on the behavior and perception of the users, i.e., the children and the parents.

One particular area of the pediatric clinic is the waiting room. The waiting room plays an important role in the behavior and perception of the patients (Malkin, 1982). It is the patient's introduction into the medical office, and should establish immediate rapport and put the patient at ease.

Statement of the Problem

In the past, health care design has been associated with institutional-looking facilities, i.e., facilities with exposed medical equipment and minimal, if any, ornamentation. Recently, a trend has begun to make health care design look more like hospitality, or hotel-like, design (Ruga, 1989). One area of health care design that deserves attention is waiting facilities, particularly those in the pediatric field of medicine. The physical environment of a pediatric waiting area may affect the behaviors of the children patients and parents as well as parents' perception of the space.

Purpose of the Study

For the purpose of this study the relationship between the characteristics of the physical environment and behavior of the individuals was examined. Because the behavior/environment relationship is an interactive relationship between people and features of their environment, this study examined environmental variables such as furniture arrangement that may have had an effect on this relationship.

Research Objectives

1. To describe the behavior of the children and the parent in the pediatric office waiting area.

2. To describe the perceptions of the parents within the pediatric office waiting area.

3. To document the different furniture arrangements at the pediatric offices, and describe their influence on behavior and perception within the pediatric office waiting area.

CHAPTER TWO

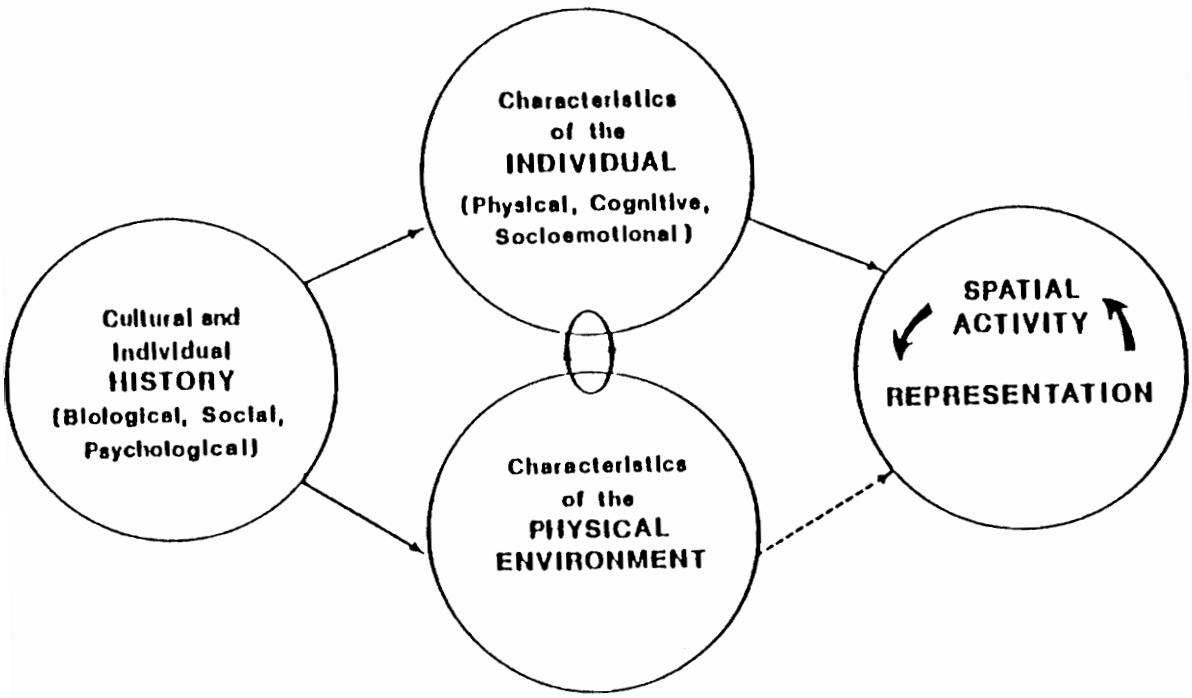
Literature Review

This chapter begins with a description of the relationship between the environment and behavior. A model defined by Liben (1981) will be used to illustrate this relationship. The importance of designing environments that encourage well-being will be discussed. There also will be a description of individual and environmental characteristics that may affect the relationship between behavior and environment. Finally, design considerations as a result of individual and environmental characteristics will be identified.

Relationship Between Environment and Behavior

Many researchers have attempted to explain the relationship between the environment and behavior. A model developed by Liben (1981) suggests that spatial representation or perception of space, and spatial activity, behavior in space, are affected by physical, individual, and cultural factors (see Figure 1). Physical factors may be variables in the physical environment, such as furniture arrangements. Individual factors may be variables such as

Figure 1. Model of Environmental-Behavior Relationship



Liben, L.S. (1981). Spatial representation and behavior: Multiple perspectives. In L.S. Liben, A.H. Patterson, & N. Newcombe (Eds.), Spatial representation and behavior across the life span. (pp. 3-32). New York: Academic Press.

age or cognitive development, that may affect physical factors. Cultural factors may include an individual's ethnic or economic background. For example, if the ethnic background of a person involves standing very close to people, then a crowded area with furniture placed close together would not be perceived as being uncomfortable (Sommer, 1969). This same situation would be perceived as very uncomfortable to persons whose ethnic background involves maintaining a fair distance between people. Importantly, all of these factors, physical, individual, and cultural, are related, and each relationship is reciprocal.

Liben's model represents a reciprocal, dynamic system that moves through and changes with time. This means that all relationships shown in the model are affected by an infinite number of factors and, thus constantly changing. Liben (1981) explains the importance of attending not only to individuals, but to their immediate social and physical environments, and to the broader biological, social, and historical contexts in which these are embedded. In other words, all aspects of an individual and the environment he/she interacts with should be considered.

For children, the environment becomes the medium which provides the message (Miles and Baron, 1990). This message communicates to children who they are, where they are, what they can do, and what their potential may be. Research in

environmental psychology suggests that a sense of well-being is encouraged by a sense of aesthetically enhancing physical surroundings because these settings aid patients regain health (Brinkley, 1993; Miles and Baron, 1990). For example, variety and change in the environment help children maintain interest in the health care facility (Hall, 1990). Mobiles, fish tanks, interactive design elements, windows with interesting views, and changing graphics can aid with variety and change.

Along with variety and change, psychological impact of a space will have an effect on the users since action follows thought(Hall, 1990). For example, the healing process in a child will be very dependent upon what the child thinks. If the child thinks he/she is going to get well, and everything around communicates the possibility of getting well, then it is likely that healing might result.

In this light, designers must be very clear about what they are thinking and about their goals for children in healthcare contexts. When children come to a health care setting because they are ill or sick, the designer's task is to create a context of such greater wholeness that it uplifts and encourages them to get back to a state of wellness once again (Hall, 1990).

Individual and Environmental Characteristics

Since individual and environmental factors affect behavior (Liben, 1981), descriptions of environments and behaviors are important. Cognitive development, spatial behavior and perception, psychological needs, proxemics, and territoriality are characteristics of the individual and/or environment that may have an effect on a person's behavior within an environment.

Cognitive development

A factor that affects behavior is the level of cognitive development. Perception of the spatial environment is affected by the age of the perceiver (Liben, 1981). An illustration of this might be that a child who sees a waiting room full of toys may perceive that space as a welcome one. To an adult, the same situation may be perceived as cluttered or disorganized.

Piaget, a cognitive therapist, believed that humans actively select and interpret information in the environment (Miller, 1983). They are able to do this because knowledge is acquired in developmental stages or periods of time in which thinking and behavior in a variety of situations reflects a particular underlying mental structure. Various

cognitive levels provide different ways of adapting to and perceiving the environment. Two particular stages of cognitive development defined by Piaget are the preoperational period and the concrete operational period.

The preoperational period is considered to be roughly from the ages of 2 to 7 (see Miller, 1983). This stage is characterized by egocentrism, rigidity of thought, semilogical reasoning, and limited social cognition. A child in the preoperational stage cannot take another person's perceptual or conceptual perspective. Children this age also tend to think about one prominent feature of an object or event while ignoring other features. Their thoughts are often linked together in a loose way rather than in a logical relationship.

The concrete operational period occurs approximately between 7 and 11 years (see Miller, 1983). At this stage the child moves from an understanding of the world based on action schemes, such as manipulating the environment, to one based on representations. The concrete operational child is a self- regulating, organized whole that strives to maintain an equilibrium within himself and with the environment. Children at this age have more of an understanding of their environment, and therefore they will try to achieve a balance within it, that is equilibrating change within the individual and the environment. An example of this might be

that concrete operational children who are taken to a health care setting may understand that they are in a place where there are doctors and strange instruments. These children may then try to find something familiar within the environment that might reduce their anxiety during their stay. This search for familiarity may then become an attempt for achieving balance between the environment and the child.

Spatial behavior and perception

Related to cognitive development, spatial behavior and perception are other factors that also affect behavior. The term *spatial behavior* is defined as "behavior in space; sensorimotor activity in the environment, such as the manipulation of objects in space, or the locomotion of self through the environment" (Liben, 1981). In other words, spatial behavior may be defined as anything from walking to touching objects within an environment.

One major function of human spatial behavior is to control the quantities of interactions in which a person will take part (Canter, 1974). That is, if a person enters a waiting area and may want to have the least amount of interaction with the other people in the waiting area, he/she might choose a seat in the room that allows minimal

contact with other people, such as a seat in the back corner. Since users are active forces seeking to optimize the balance between perceived and actual space, designers should consider carefully the people who will eventually be using the space (Canter, 1974). For example, in a pediatric waiting area, a child might at first perceive the space as big and unfamiliar. By incorporating elements of familiarity in the actual space of the waiting area, such as toys, murals, paintings, books, and play structures, the child's perception might be influenced by perceiving that same environment as familiar. This shift in perception represents the attempt of the child to find a balance between perceived and actual space.

In order to better understand perception within space, the term *space* should be defined. Many researchers have attempted to define the term "space". Some have defined space as " the infinite extension of the three-dimensional field of everyday life" (American Heritage Dictionary, 1982), i.e., wherever an individual sits or stands, the extension of the surrounding environment becomes the space surrounding the individual, whether it be a small room or an open field. Liben (1981) reports that other investigators define space as being derived directly from experience with physical space. In other words, a person's perception of a space is determined by interaction with the physical

environment. Still others believe that the development of perception of space or psychological space is thought to be determined by the inherited endowment of the organism. That is, perception of a space is innately determined by biological, social, and emotional guidelines of that individual.

Liben (1981) believes that psychological space is actively constructed by the individual, using both inherited and experiential factors. This is known as the constructivist view. In this view, both individual characteristics and environmental characteristics work together and interact to form a person's perception of space. Biological factors permit the construction of space, but the ultimate structure of space is constructed by the individual in the process of the interactions between experience and biology. In other words, both the interaction with the physical environment and the biological, social, and emotional makeup of the individual work together to form a person's perception of space.

Sommer (1983) also states that a person's behavior is affected by individual experiences with the world, as well as biological constitution, but both perception and biology are overlaid and shaped through learning. An example of this may be a child allowed to run freely around the house

without parental limits or rules who will probably react the same way in a public setting, like a waiting area.

What is desirable, then, is designing a space that will allow for a variety of behaviors in a waiting room area. Flexibility and integration between the design and the function become important so that variety can exist, and people can be involved or not as the occasion and mood demand (Hall, 1966).

Four psychological needs

Olds and Daniel (1987) have described four psychological needs that affect behavior and should guide any design process, but particularly that of a health care setting. These needs are: 1) the need for movement, 2) the need to feel comfortable, 3) the need to feel competent, and, 4) the need to feel in control.

Whether sick or well, motion is required to maintain the body's integrity (Olds & Daniel, 1987). This simply means that without movement the muscles in the body would atrophy. One way that movement can be enhanced is to ensure that the patient and family can move easily through the institution or health clinic. Providing clear circulation paths and signage allows for this ease of movement. A second way to enhance movement is to offer the patient,

e.g., a child, a range of play activities that will minimize the amount of time spent idle, sitting, or waiting.

When environmental stimulation and movement are predictable yet involve moderate degrees of change and contrast, the person experiences a sense of "being comfortable" (Olds and Daniel, 1987). For instance, wall murals and aquariums may provide a person in a waiting area with something interesting to look at, possibly distracting their attention away from the immediate environment. This may allow for the person to reduce his/her anxiety, and thus might create a relative feeling of comfort. Comfortable surroundings foster inquisitive attitudes toward activities and materials that may lower a young patient's anxiety and may make him/her a more cooperative subject for examination and treatment. Elements that may make an environment more comfortable include: 1) providing elements at a child's scale as well as an adult's scale, 2) providing visual interest through murals, art, and natural views for both the parents and the children, and 3) providing tactile and kinesthetic interests (things to touch and interact with) for the children and their parents (Olds and Daniel, 1987).

The need for competence is the freedom to explore, experiment, and learn from mistakes within an environment. This produces the competence and self-confidence which support future growth and well-being. Children in health

care settings need an opportunity to effect changes in their own lives and surroundings in order to maintain a sense of competency. In a waiting area, providing activities that children can do themselves, such as reaching a book or toy, or getting a drink of water may provide a sense of self-competence in an environment which may be intimidating to a child.

The fourth need identified by Olds and Daniel (1987) is the need to feel in control. The absence of predictability contributes to a patient's lack of ease. In order to achieve predictability, people need to feel some control over their environment. This may be achieved by the ability to control degrees of privacy or by controlling the orientation of one's body within an environment.

Proxemics

A fourth factor that affects behavior is proxemics. Proxemics has been defined as " the interrelated observations and theories of man's use of space as a specialized elaboration of culture" (Hall, 1966). This means that an individual's definition of space and use of space is largely influenced by that individual's cultural background. For example, the Middle Eastern culture views close proximity in human interactions as a norm, yet in the

majority of the American culture, close proxemics often cause discomfort among people (Sommer, 1969). One aspect of spatial organization or proxemics is the microcultural. *Microcultural* is the spatial organization of individual and group activities and consist of three types of space: fixed-feature space, semifixed-feature space, and informal space.

Fixed-feature space is one of the basic ways of organizing the activities of individuals and groups (Hall, 1966). Buildings are one expression of fixed-feature space through the placement of walls to create rooms and other areas. Semifixed-feature space is space regulated by temporary and adjustable features such as furniture. Sociopetal and sociofugal furniture arrangements may have a significant impact on behaviors in terms of proxemics within a waiting area. Informal space is the distance maintained in encounters with others (Hall, 1966).

One example of an environmental factor that affects the behavior/environment relationship within space is furniture arrangement. Two general types of furniture arrangements that affect behavior are sociofugal and sociopetal (see Figure 2) (Sommer, 1969). *Sociofugal* spaces or side-by side arrangements, tend to keep people apart. In contrast *sociopetal* spaces, or face-to-face and right angle arrangements, bring people together. For instance, corner arrangements, or furniture at right angles to each other,

have been found to produce six times as many conversations as face-to-face arrangements, and two times as many as a side-by-side arrangement (Sommer, 1969).

Territoriality

The final factor affecting individual and environmental characteristics is territoriality. Territoriality has been defined as "behavior by which an organism characteristically lays claim to an area and defends it against members of its own species" (Hall, 1966). While this is a very broad definition of territoriality, it can be applied to modern-day humans in public settings. For example, in an office setting, people will claim a specific territory, such as an office or a desk. They will place personal items on the desk or in the office as a territorial message to the other persons in the workplace. The message that this particular territory has been claimed, is clear.

Figure 2 Sociofugal vs. Sociopetal furniture arrangements.

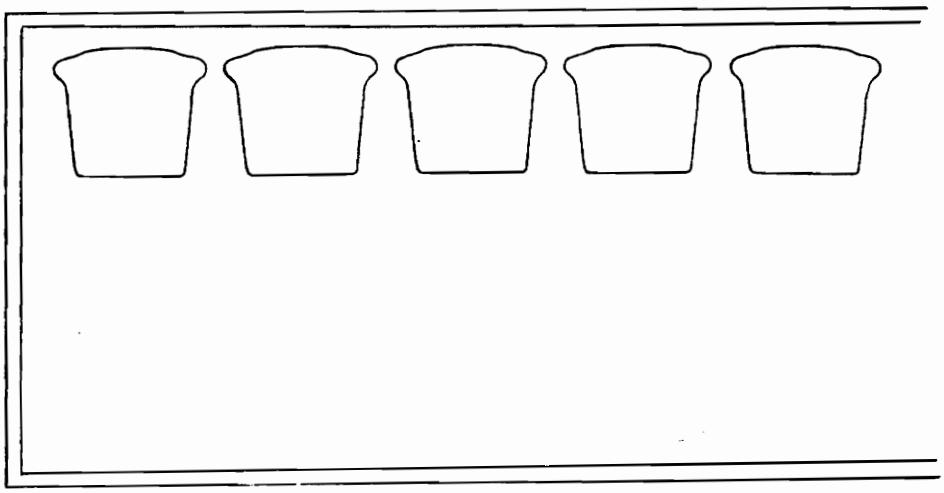


Figure 2-A Sociofugal furniture arrangement

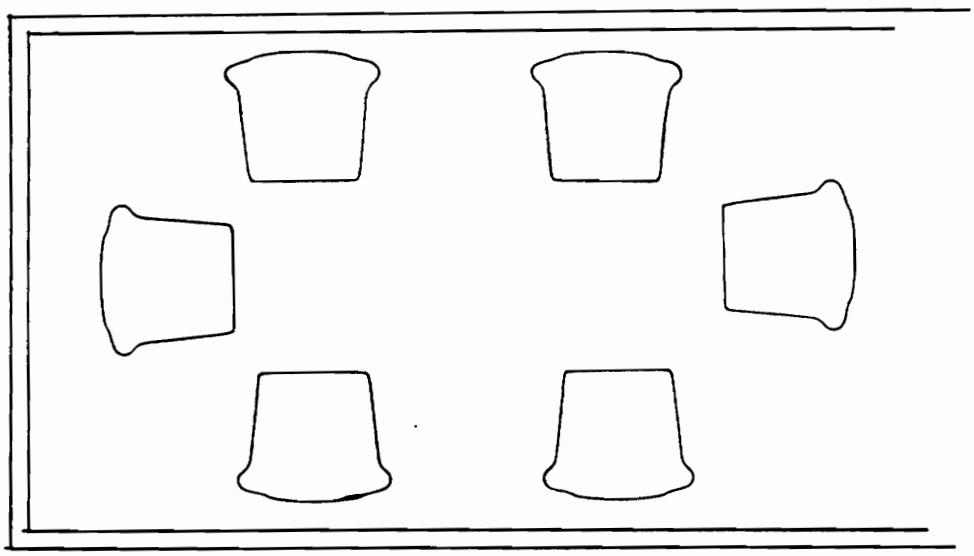


Figure 2-B Sociopetal furniture arrangement

Minimal territorial functioning has been defined as asserting some form of temporary and spatially very limited "claim" while using a space or resource in a public setting (Taylor, 1988). This is done to discourage others from sitting or standing close to one another while they are there, or using that spot should they vacate it for a brief time. An example of this behavior in a public setting, such as a waiting area, would be a person placing a purse or a jacket on a seat next to the seat he/she is sitting in. This would discourage another person from taking that seat because a territorial claim, though temporary, has already taken place. This can also result in a distancing between occupant groups within the setting (Taylor, 1988).

Summary

In summary, individual and environmental characteristics may influence behaviors within an environment. Theories in cognitive development suggest that children ages 2 - 11 may have literal interpretations of their environments, so that perception of the environment is determined by the interaction with the environment. Spatial behavior defined as activity in space, or locomotion of self through the environment relates to the psychological needs for movement and for competence, such as being able to

circulate and read signage throughout the space (Olds and Daniel, 1987). Determining the amounts of interactions within an environment by means of sociofugal and sociopetal furniture arrangements represents the need by the individual to feel in control. The individual may determine how little or how much he/she wants to interact with others.

Proxemics and territoriality relate to a person's need to feel comfortable within an environment. If the space were to be designed such that people have to sit in close proximity to each other or interrupt another person's territory, i.e., moving a purse or jacket, then the individual's comfort level may be affected depending on his/her cultural background.

Now that the individual and environmental characteristics have been identified, descriptions of spaces that accommodate the needs of the children and their parents may be developed.

Considerations for Design

Recognizing that characteristics of both the individual and the environment have an effect on the perception and behavior of an individual within a space may help to identify considerations for design. These may include considerations in pediatric design, and providing family-centered care in pediatric health facilities.

Considerations in pediatric design

A consideration for designers is attention to elements in pediatric design. Because children are particularly sensitive to their physical surroundings, the unfamiliar and often institutional qualities of health care environments are intimidating (Hall, 1990). Medical examining equipment in a doctor's office, for example, may make a child anxious about a check-up and intimidated by the surrounding environment. Children often have misconceptions about why they have been taken to the doctor or the hospital and about what will happen to them there (Hall, 1990). For example, a child might be aware that he/she is not feeling well and needs to get better, but he/she may not understand why his/her parent can't provide that care. This lack of

understanding may lead to a misconception of a doctor's visit.

Designers also need to consider distinctions between childish and childlike design (Hall, 1990). Childish design includes superficial additions or modifications to rooms designed or scaled for adults. This has often been done by simply adding popular cartoon characters or posters on the walls in an environment for children. But design for children does not simply mean the addition of bright colors and cartoon characters to an existing adult facility (Miller, Banard, & Heulat, 1991). Childlike design suggests fanciful stylized features that appeal to children, adolescents, and adults alike such as wall murals, soft sculptures, and art paintings.(Hall, 1990).

Family-centered care in health facilities

Another consideration for designers is developing family-centered care in health facilities. When describing a health care facility, the first thought that may come to mind is the facility as a primary source of care (Hall, 1990). With children, however, one important factor that is often overlooked is that parents* remain the primary

* Note: This study recognizes that all children are not raised by their biological parents and that there are other circumstances such as foster parents, adoptive parents, legal guardians, etc.

caregivers and source of comfort and support for their children (Hirschfield, 1993). From the time the child is born and throughout their developmental process into young adulthood, the parents are the ones that usually provide primary care for their children. The issue of family-centered care has gained more importance in recent years. Research on this issue has shown that coping with the medical situation by the family in health care environments enhances recovery of the children patients (Hirschfield, 1993). In other words, if the parent feels comfortable in the health care setting, it will have an influence on making the child feel comfortable as well. When one cares for a child one must care for and support the entire family.

Family involvement has become an important foundation in design considerations for health care facilities (Hirschfield, 1993). When a child is sick or hospitalized, he/she is removed from his/her home, family, and friends, and is placed in an unfamiliar environment populated by strangers (Klinzing & Klinzing, 1977).

Summary

In summary, using information on the environment/behavior relationship in terms of individual and environmental characteristics may help in defining

considerations for design in pediatric health care settings. Understanding how an environment may affect behavior can serve to guide pediatric design to support the needs of not only the children, but the parents as well. By involving parents as much as possible in the health care setting, the child's anxiety may be reduced, and healing can then begin to take place. This requires rethinking the design approach. One way is to provide space in the health care setting that will allow parents to be with their children. This ultimately will contribute to the greater healing process.

CONCLUSION

Research has shown that the relationship between the individual and his/her environment has an effect on how the individual will perceive and behave within that environment. Many factors come into play in this relationship, such as cognitive development, biological, social, and cultural variables of the individual. Aesthetic elements and physical features of the environment such as furniture arrangements, as well as proxemics and territoriality also play a role in the environment/behavior relationship.

Given the relationship between behavior and environment, a challenge for designers is to develop and

design spaces that support the needs of the users, in this case, children and parents. These needs include movement, comfort, competence, and control within a particular space.

Pediatric health care settings involve many considerations for both the child and the parent. A number of individual and environmental factors and family-related considerations must be examined in order to properly integrate and implement them into an appropriate design.

RATIONALE

The current challenge for designers is to rethink approaches to health care environments and make them more supportive of user needs, in other words, make them healing agents (Hall, 1990). In discussing design qualities that are important in a children's health care facility, the needs of the users- the children and their families- should not be overlooked (Hall, 1990). While some research has been conducted in various areas of health care settings, little research has been done on the waiting area environment of pediatric service facilities. People's needs are addressed by the perception of a space, therefore more attention should be given to how the aesthetics of an environment may affect the users (Olds, 1991). When the elements in a room are perceived as artistic, interactive

surfaces, particularly in the case of children, this will encourage well-being. This experience may be important in keeping a balance of mind, and a sense that the patient is an individual not a statistic of illness (Miles & Baron, 1990). Since healing ultimately occurs from within, a health care environment can be maximally effective when it affirms the capacity of children to heal themselves (Olds, 1991). The facility from the outside to the lobby and throughout the interior, should convey that it is a special place for children, and facilitate the important role of the family (Hall, 1990).

RESEARCH QUESTION

The study that was conducted was a descriptive study. Three research questions were examined:

1. What are the furniture arrangements used within the pediatric waiting room?
2. What are the behaviors of children and the parents within a pediatric waiting room?
3. What are the perceptions of the parents within a pediatric waiting room?

SIGNIFICANCE OF STUDY

The findings from this study describe spatial arrangements, the behaviors of children and parents, and the perceptions of parents in a pediatric health care setting. The descriptions may provide insight for the design of health care facilities, such as other medical offices and hospitals that will better serve their users. The findings of this study may encourage future studies in pediatric waiting environments that investigate effective solutions for pediatric health care.

Hypotheses

This study describes the relationship between the physical environment and behavior in a pediatric office waiting room. The following research hypotheses have been generated in order to address this question:

H1: The behavior of the children and their parents is influenced by the pediatric office environment.

H2: The perceptions of the parents are influenced by the pediatric office environment.

H3: Furniture arrangements have an effect on the perception and behavior of the users in the pediatric office.

CHAPTER THREE

Design of Research

This chapter begins with a brief description of a pilot study conducted at a pediatric clinic in Northern Virginia. Then the design of this research project, data collection, and the procedure is described. Finally, a description of each clinic is provided.

Pilot Study

A pilot study was conducted in a private pediatric clinic in Northern Virginia in order to determine length of the observation times for behavioral mapping. Observations were conducted throughout a 3 hour period on one occassion. Behavioral mapping was used to record the behavior of the parents and children who entered the waiting area. Length of behaviors were recorded to determine the waiting period for families. The mean waiting period per family was calculated at 15 minutes, with waiting times ranging from seven minutes to 35 minutes. A brief survey was distributed to the parents; however, no parents returned the surveys to the researcher.

Data collection

A typical method of collecting data is through observation or systematically watching people in their environments (Zeisel, 1981). Observers also note how a physical environment supports or interferes with behaviors taking place in it. This type of data collection can be conducted through descriptive note-taking while conducting the observations. One instrument used in observational research is behavioral mapping. Behavioral mapping is useful when the researcher wants to analyze several people in one general area at the same time. Mapping can give a better sense of how a space is used.

Another typical method used to collect data is a standardized questionnaire. Questionnaires are used to discover regularities among groups of people by comparing answers to the same set of questions asked of a number of people (Zeisel, 1981). A questionnaire using a Likert attitude scale uses groups of statements that are presented to respondents for them to indicate the intensity of their agreement or disagreement. The list must be short enough to maintain interest and must alternate positive and negative statements to avoid respondents' going down a long list checking only one column and not thinking seriously about their responses.

Methodology

Setting

The environments that were studied for this research were the waiting areas of five pediatric clinics in Virginia: one in southwest Virginia, four in northern Virginia. The clinics were observed in their existing conditions, meaning that they were not modified or manipulated in any way by the researcher.

The data were collected over a period of several weeks in December. Each clinic included some form of holiday decorations, which will be mentioned in the general descriptions of each clinic. A total of six hours was spent at each clinic, three hours, from 9:00 a.m. to 12:00 p.m., each day for two days. During the observation period, the researcher not only used behavioral mapping, but also documented user activities (see Appendix A). A survey asking the parent's perceptions of the waiting areas of each clinic was distributed to each parent (see Appendix B).

The sample consisted of a random sample of parents and children ages two to eleven years who were visiting the pediatric clinic. Data was collected in the well-waiting areas only in clinics which offered two separate waiting

areas, i.e., one for sick children and one for well children.

All parents and children were observed at the five clinics; however, children under the age of two and over the age of eleven and their parents were excluded from the data set. Only children ages two to eleven were considered in the study.

Procedure

Behavioral Mapping

Copies of the existing floor plan of each pediatric clinic waiting area were used by the researcher to document the movement patterns of the children and the parents in the waiting area. The observations were documented in 15 minute intervals. That is, movement patterns of the children and the parents were recorded every 15 minutes. The movement patterns were represented by different colored pencils for each child and parent (see Appendix A). The different activities performed in the waiting area were documented in descriptive notes.

The researcher was seated within the waiting areas of the five clinics in a manner that the behaviors of the subjects were not influenced by the investigator's presence.

Survey

A second instrument that was used was a survey. The parents were given a brief survey by the staff upon checking in consisting of 12 pairs of descriptive polar adjectives that were used to evaluate perceptions of the waiting room environment (see Appendix B). The parents indicated their feelings towards the waiting area by marking one of six spaces provided for each of these adjective pairs: Pleasant/Unpleasant, Drab/Colorful, Finished/Unfinished, Quiet/Noisy, Gloomy/Cheerful, Exciting/Boring, Convenient/Inconvenient, Private/Public, Unfriendly/Friendly, Crowded/Roomy, Impressive/Unimpressive, and Airy/Stuffy (Hillenbrand-Nowicki, 1993). Two open-ended questions at the end of the survey asked what the parents liked and disliked about the waiting area.

General Descriptions of the Pediatric Clinics

Clinic 1

Clinic 1 is a small, private clinic in northern Virginia run by one physician and one staff member. The waiting area is rectangular in shape and is approximately 274 square feet (see Figure 3). The waiting area consists of three armchairs and a 3-person couch. A magazine rack by the entry door displays magazines and children's books. Included in the waiting area are a plant, coat rack, small Christmas tree, and toy box. The toy box contained toy cars and a variety of large plastic interconnecting blocks.

The finishes in the waiting area include a dark grey carpet, dark grey vinyl on the chairs and couch, off-white wall-covering with a small pattern in grey, and two watercolor paintings on the wall (see Figure 3-A). The reception desk was decorated with greeting cards from the holiday season.

Since the waiting area is small the furniture arrangement is sociopetal, i.e.,placed at right angles to one another.

Figure 3 Illustration of clinic 1

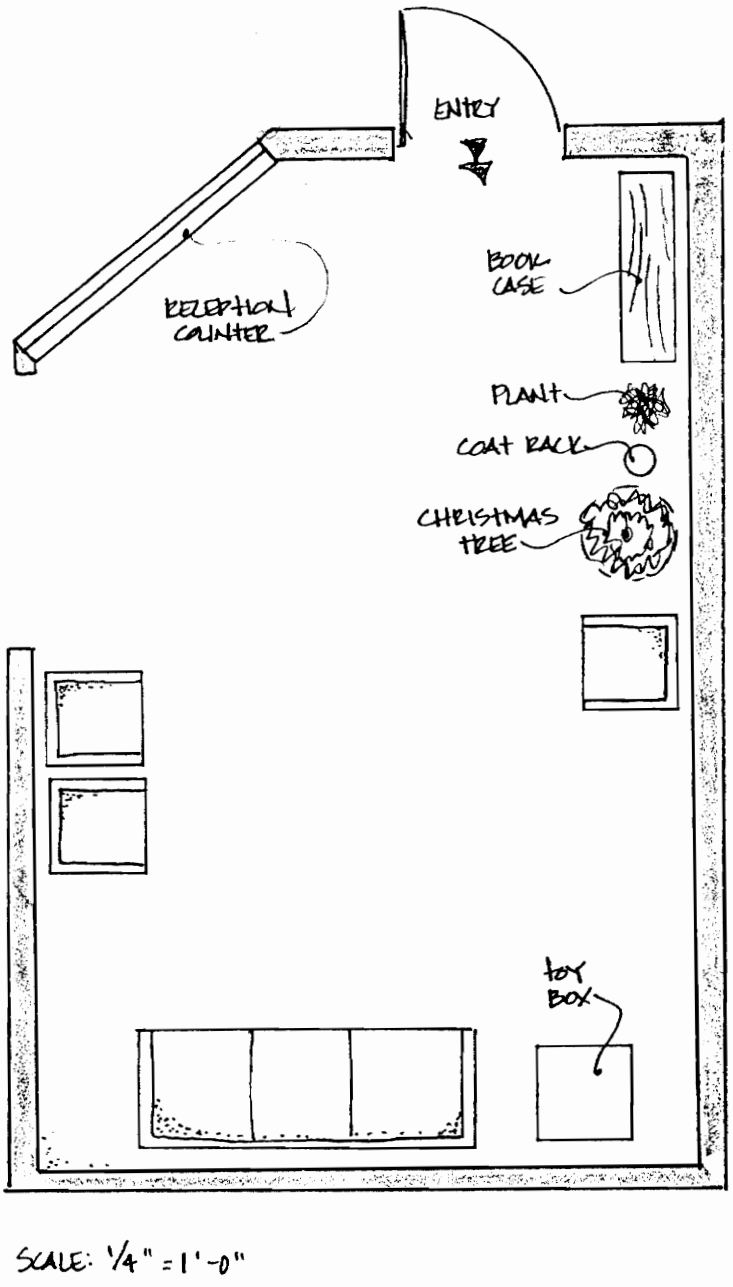
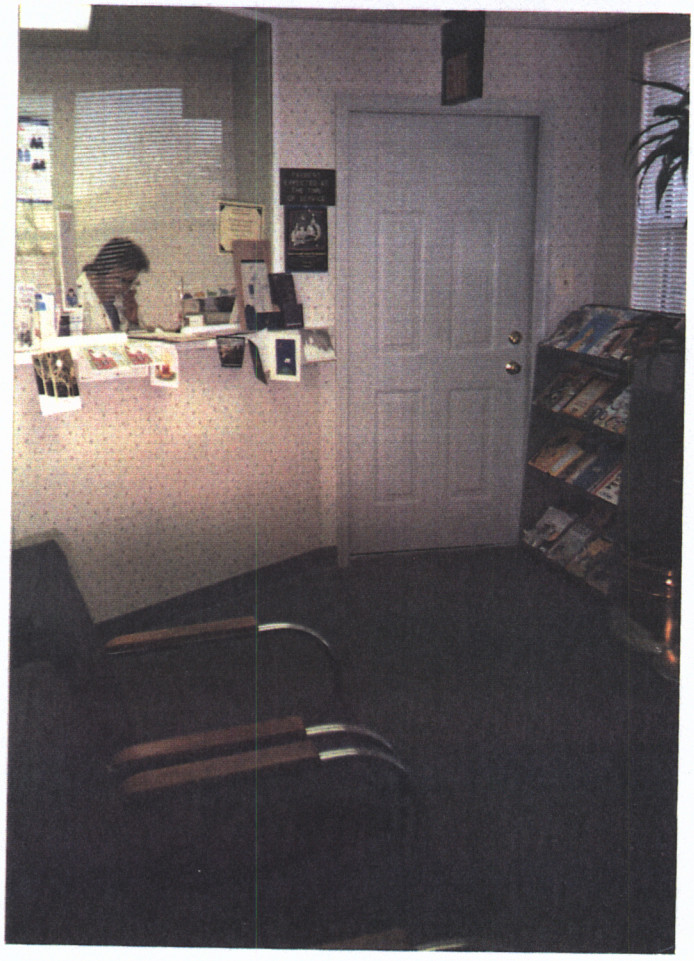


Figure 3-A Photograghs of clinic 1



Clinic 2

Clinic 2 is a private pediatric clinic in northern Virginia run by several physicians and staff members. The waiting area was divided into two sections, a well-waiting and sick-waiting area, that are separated by the entry and reception desk. Both waiting areas are rectangular in shape, however, the well-waiting area is bigger, approximately 147 square feet in size (see Figure 4). The well-waiting area consisted of eight side chairs, two 3-person couches, and one child-sized chair. Also in the waiting area is one book crate, one toy crate with toy cars and planes, and one play table. The play table consisted of a series of fixed wires with beads that children could push and manipulate ("Busy Beads", see Figure 4-A).

The finishes in the waiting area include a dark green patterned carpet, dark green vinyl on the side chairs, green-orange-blue patterned upholstery on the couches, off-white wall-covering, and dark green laminated counter tops with wood trim for the reception desk. The artwork on the wall consists of childlike images.

Seating in this clinic is sociofugal, i.e.,lined up against the walls across from each other.

Figure 4 Illustration of clinic 2

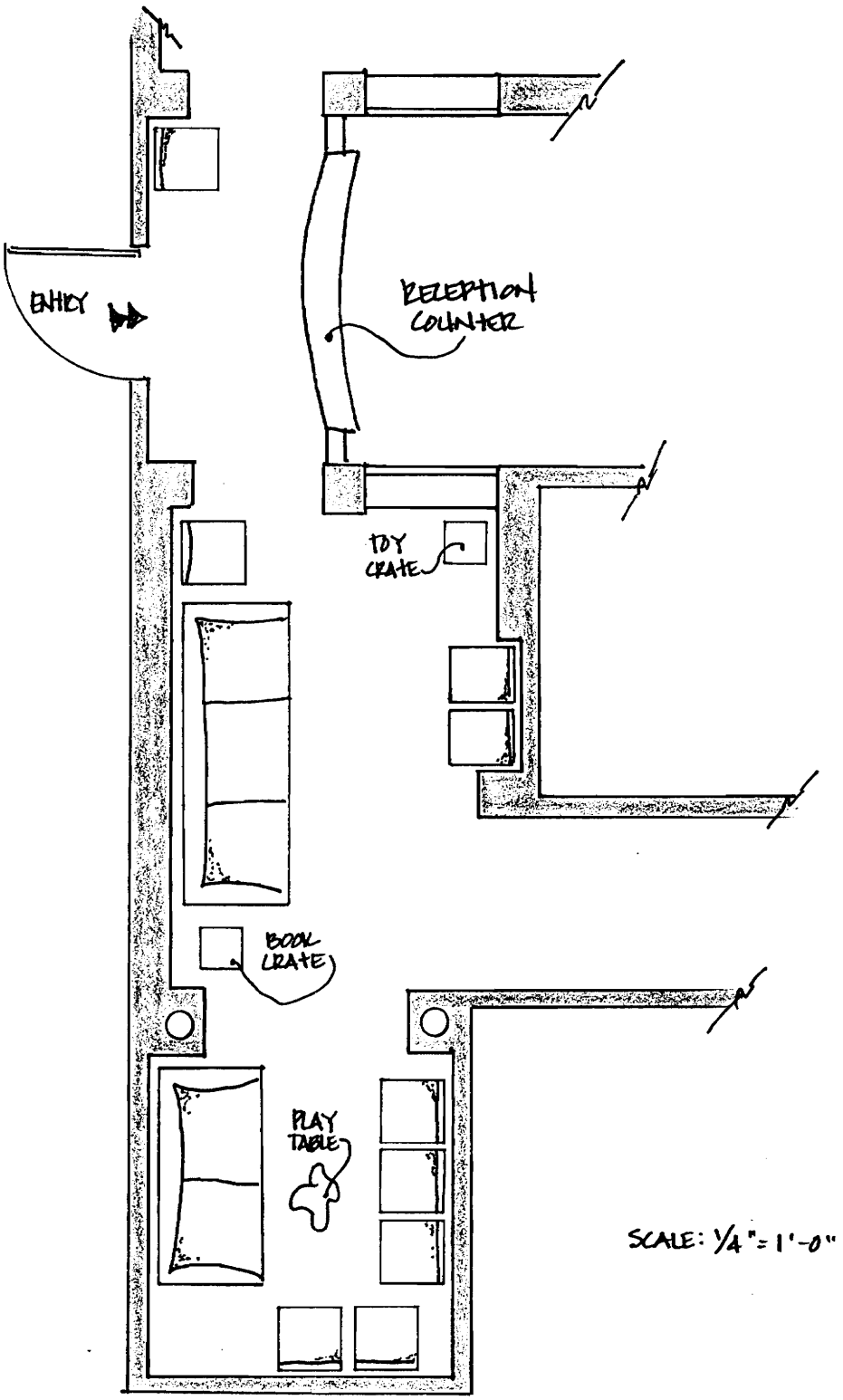
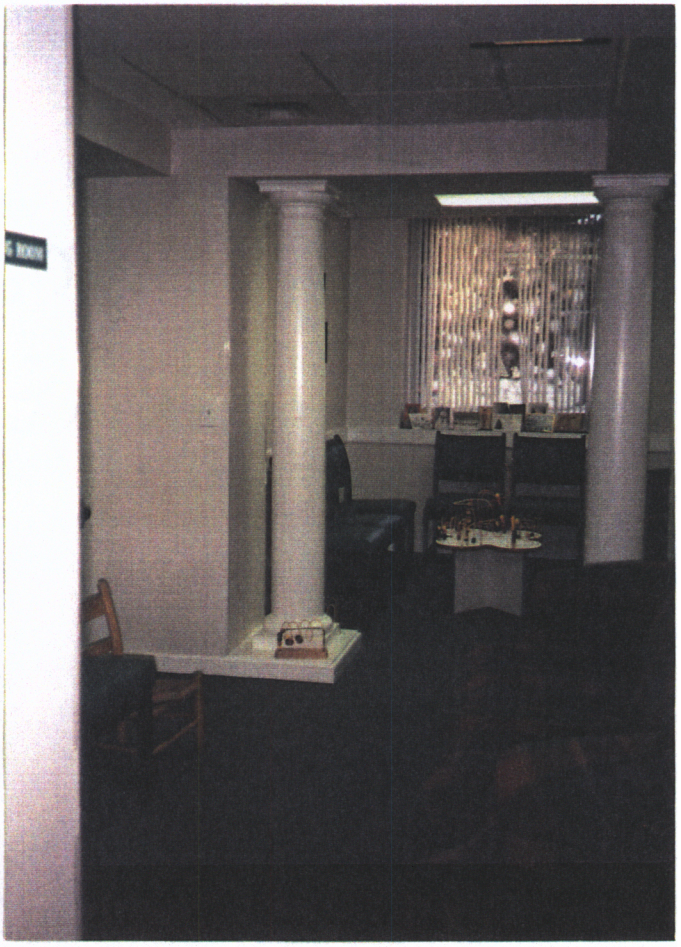


Figure 4-A Photograghs of clinic 2



Clinic 3

Clinic 3 is a small, private clinic in northern Virginia run by one physician and two staff members. The waiting area is rectangular in shape and is approximately 176 square feet (see Figure 5). The waiting area consists of an eight-foot wooden bench, three side chairs, a coffee table in front of the bench, a child-sized desk and chair, a changing table, and a small side table for pamphlets. The play area consists of a wooden rocking horse, a child-sized piano and chair, and a toy bench. The toy bench stored toy cars, planes, and a variety of dolls.

The finishes in the waiting area include a dark grey carpet, red vinyl cushion for the wooden bench, wood panelling on the wainscot along the walls with white paint above, dark wood finish on the furniture and built-in cabinetry, and art pieces on the walls (see figure 5-A). The reception desk was decorated with greeting cards and a garland for the holiday season.

Seating in this clinic is sociofugal, i.e., is lined up against opposite walls.

Figure 5 Illustration of clinic 3

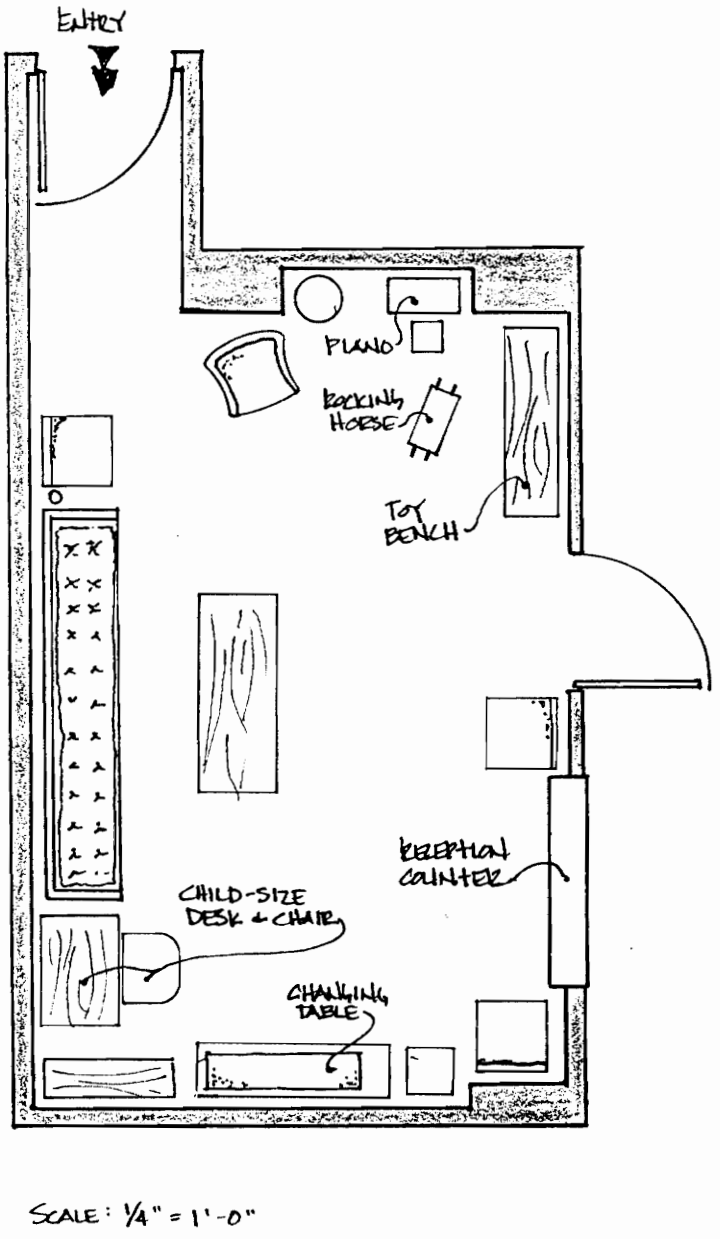


Figure 5-A Photograghs of clinic 3

Clinic 4

Clinic 4 is a private pediatric clinic in northern Virginia run by an associated group of physicians and staff members. The waiting area is divided into two sections - a well-waiting area and a sick-waiting area with a planter on a half wall dividing the two areas. Both areas are the same in size, shape and layout, approximately 344 square feet each (see Figure 6). The well-waiting area consists of 12 side chairs, two round tables, and a toy table. The toy table has a *LEGGO* surface with a mesh basket cut away in the middle of the table. The basket contains interlocking plastic pieces that can be fastened to the surface of the toy table. The wall opposite the window and the planter wall are both four foot walls.

The finishes in the waiting area include a dark blue carpet, dark blue and burgundy upholstery on the side chairs, light grey wall-covering, and a blue laminate on the round tables and reception counter. A light wood trim is visible throughout the waiting area (see Figure 6-A). There is one poster in the well-waiting area with a cartoon character.

Although the seating in the waiting area is placed around the perimeter, generally the furniture arrangement is sociopetal.

Figure 6 Illustration of clinic 4

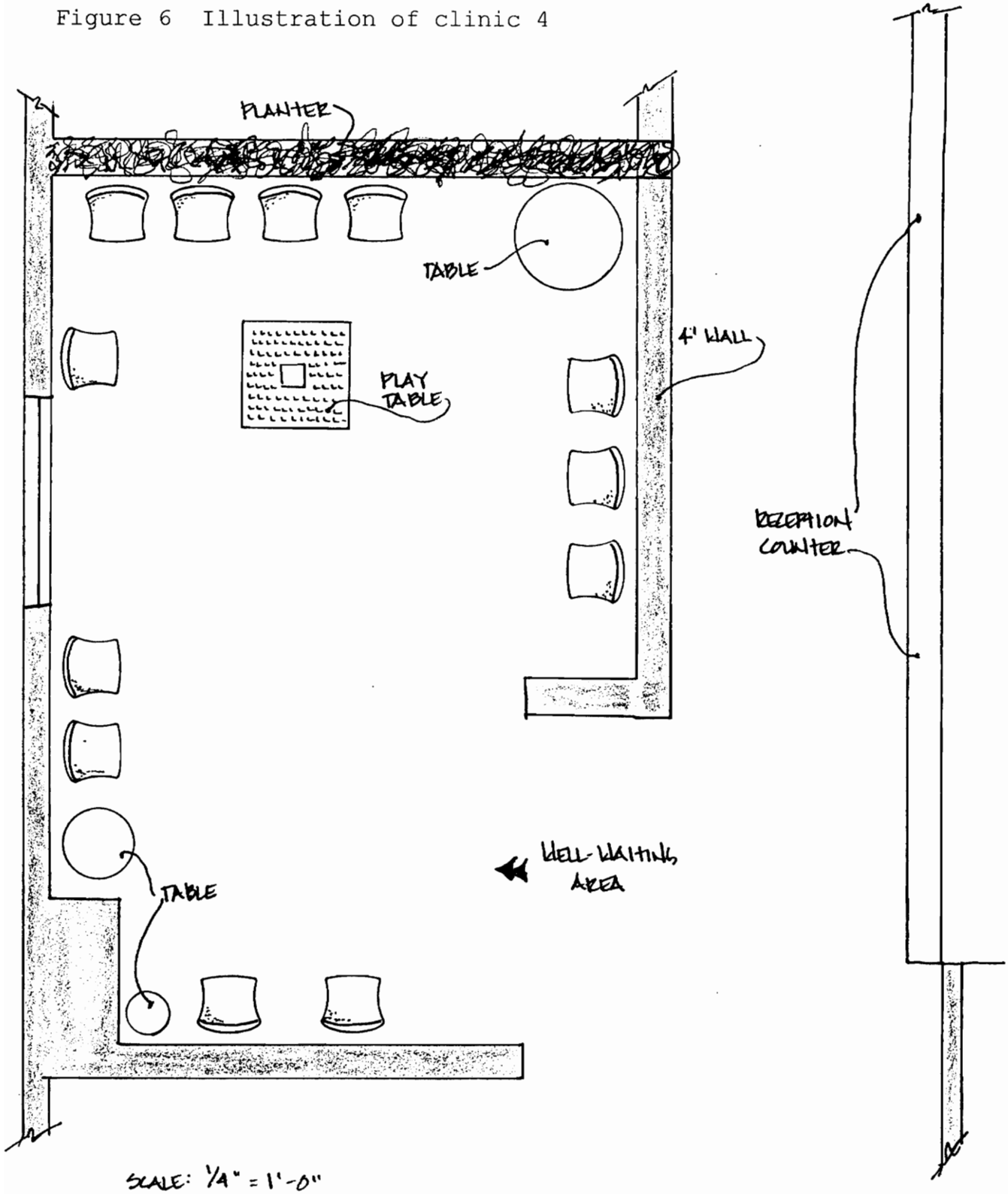


Figure 6-A Photograghs of clinic 4

Clinic 5

Clinic 5 is a private pediatric dentistry clinic in southwest Virginia run by one physician and staff members. The waiting area is basically rectangular in shape and is approximately 443 square feet in size (see Figure 7). The waiting area consists of 13 armchairs, a 3-person couch, a 2-person couch, a wooden rocking chair, and a small rectangular table for pamphlets. Also in the waiting area is a Christmas tree with a mechanical toy beneath it, a toy basket with toy cars and planes, and a built-in play structure. The play structure is built fron floor to ceiling and has two levels. It also has several activities inside for children to play.

The finishes in the waiting area include a dark blue carpet, red vinyl on the couches, red,yellow, and blue vinyl on the armchairs, off-white wall-covering with one wall accented in dark blue, and wall hangings with child-like themes (see Figure 7-A). The reception window was decorated with Christmas stockings, garlands, and a wreath for the holiday season. The Christmas tree was placed in the corner opposite the play structure.

The furniture is arranged with several different types of groupings and is considered a sociopetal arrangement.

Figure 7 Illustration of clinic 5

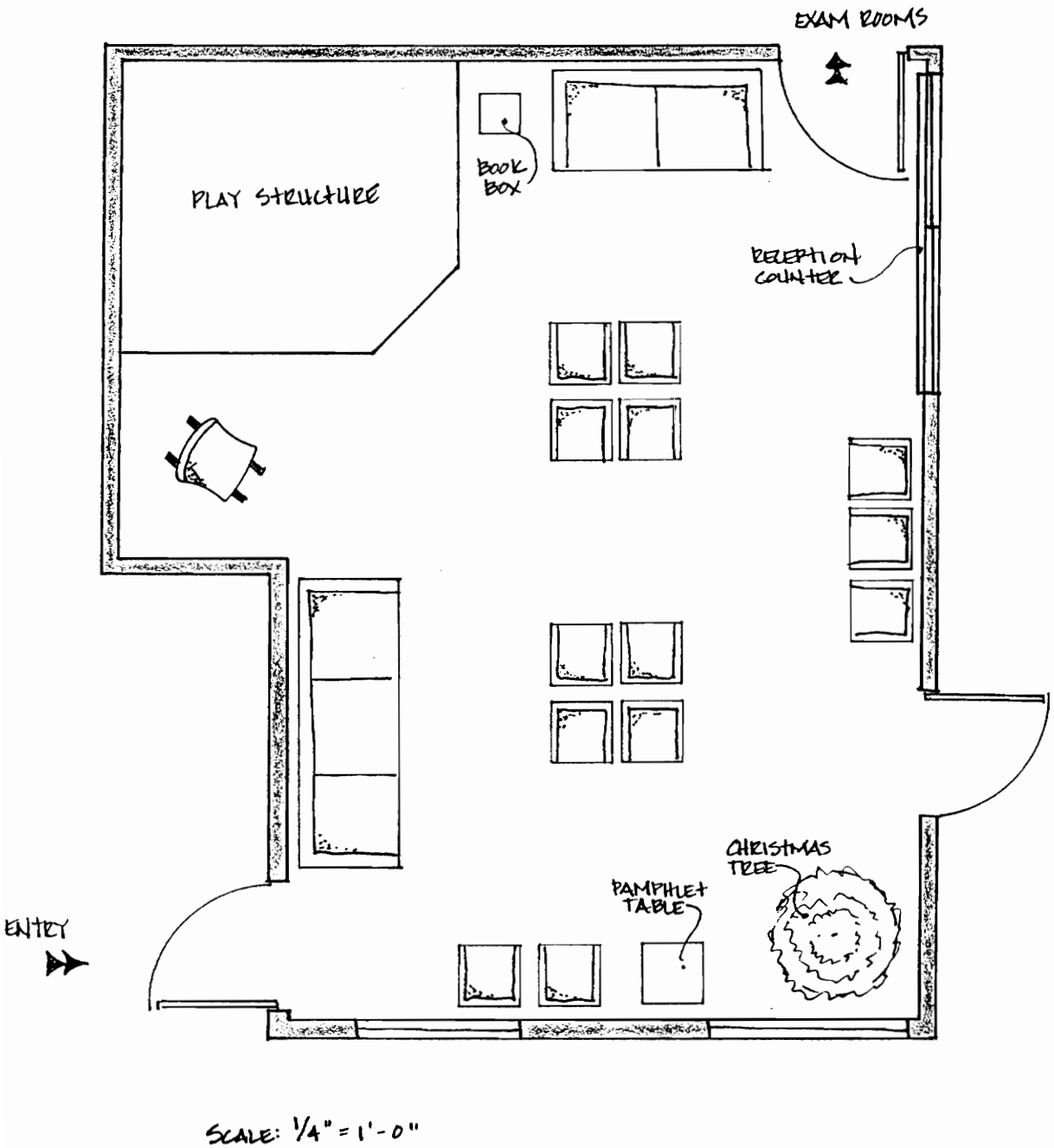


Figure 7-A Photograghs of clinic 5

Means of Data Analysis

1. For behavioral mapping:

This analysis documented the activities of the children and the parents in the waiting area of each clinic. The type of data that was collected was nominal data. The results from the observations were used to describe and compare the types of behaviors exhibited by the users at each clinic. Types of activities performed by the children and parents were documented in terms of number of people performing the behaviors and compared among the five clinics.

2. For parent survey:

This analysis evaluated the perception of the parents of the waiting room environment through their choice of adjectives using a Likert-type six-point scale involving 12 pairs of descriptive polar adjectives. The type of data that was collected was ordinal data. Using a descriptive question, the approach was using central tendency to find the mean for each pair of adjectives. A one-way analysis of variance (ANOVA) was used to compare responses in all five clinics for each descriptive adjective pair.

Pairwise comparison tests were used to identify which clinics differed significantly. These results were then summarized in a chart.

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter discusses the results of this research investigation and consists of three sections. In section 1, the results of the behavioral observations of the parents and the children will be discussed. In section 2, the results of the parental perception survey will be presented. Section 3 will discuss the comments from the two open-ended questions on the perception survey.

Behavioral Mapping Results

In hypotheses one and three, the behaviors of parents and children were expected to be influenced by the pediatric office environment and the furniture arrangement. To address this, the behaviors of both the children and the parents at each of the five clinics during the process of data collection were recorded. The observations are documented in terms of number of persons engaged in the observed behaviors at each clinic. The number of persons has also been documented in terms of percentages. The behaviors of the children are categorized as: playing at the play area, playing with other children, sitting, reading,

being held by the parent, and walking around. The behaviors of the parents are categorized as: sitting and watching the child play, sitting and playing with the child, reading, reading to the child, holding the child, and standing at the reception counter. Due to the small sample size of children in the 7 to 11 age group, observations could not be described. The behavioral observations on children were only documented from the 2 to 7 age group. The summaries of the behaviors of the children and the parents are presented in Figures 8 through 17.

Clinic 1

Children: The children observed in clinic 1 were all within the 2 to 7 year-old age group. Sixteen children were observed for data collection. Twenty-five percent of the children were observed sitting, while 19% were observed playing with other children. Another 19% of the children were observed walking around the waiting area, and 13% were observed playing by themselves at the play area. Of the remainder of children, 13% were observed being held by the parent and 6% were observed reading. One child was observed repeatedly trying to escape from the office through the entry door (see Figure 8).

Figure 8

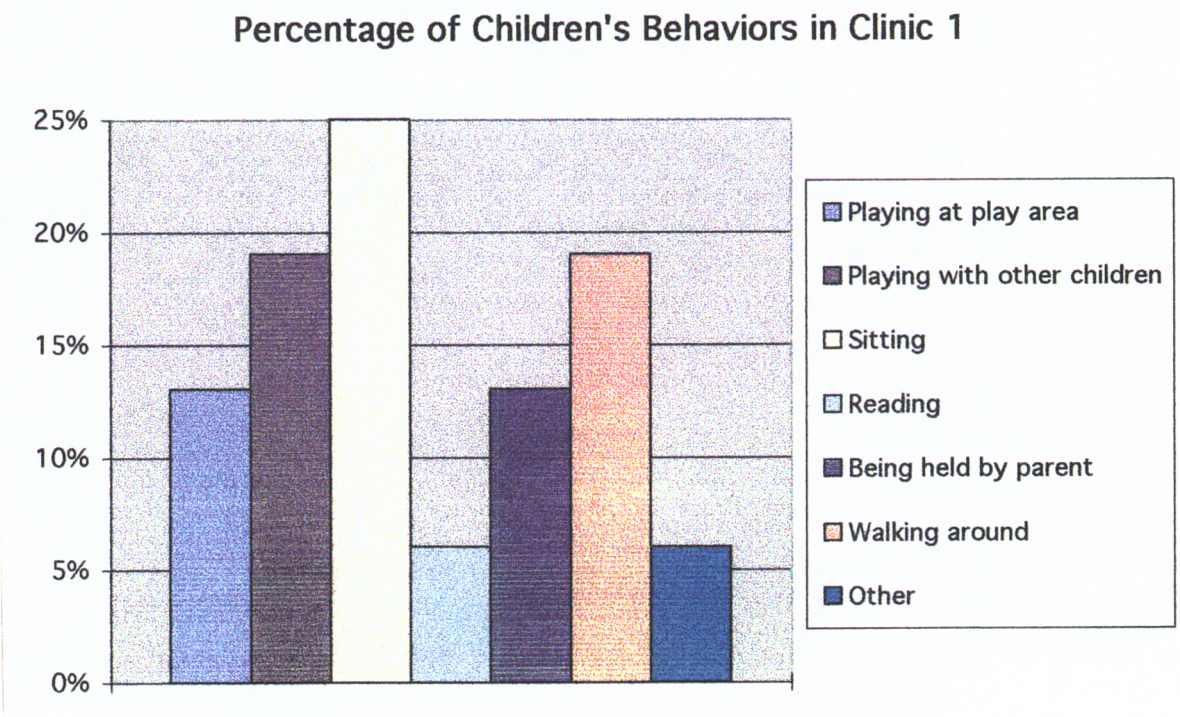
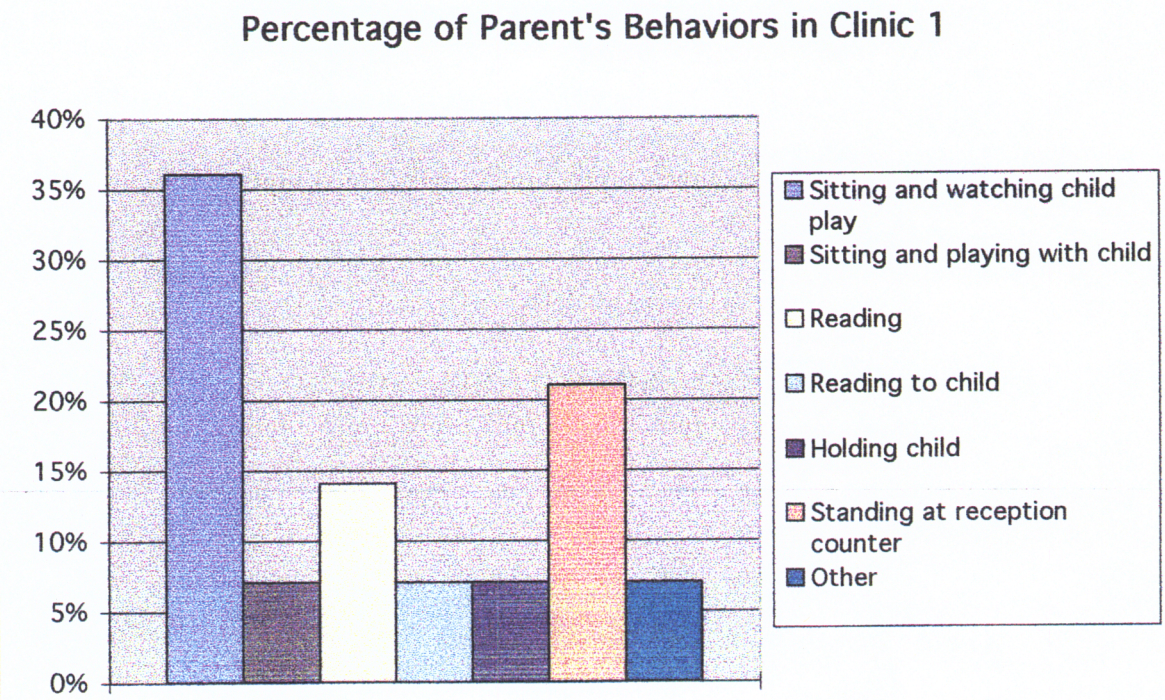


Figure 9



Parents: In clinic 1, 36% of the parents were observed sitting and watching their child play followed by 21% of the parents spending most of their time at the reception counter. Fourteen percent of the parents were observed reading to themselves, while 7% were observed reading to their child. Seventeen percent of the parents were observed sitting and playing with their child, and the remaining 7% were observed holding their child. One parent spent the whole time preventing the child from escaping the clinic (see Figure 9).

Clinic 2

Children: Of the children observed in clinic 2, 26 were in the age group of 2 to 7 years of age. Of these children, 58% were observed playing at the play area. Nineteen percent of the children were observed sitting, and 12% were observed being held by the parent. Eight percent of the children were observed walking around the waiting area, and 4% were observed reading (see Figure 10).

Parents: In clinic 2, of the 35 parents, 37% of were observed standing at the reception counter. Thirty-one percent of the parents were observed sitting and watching their child play, while 11% were observed sitting and playing with their child. Eleven percent of the parents

Figure 10

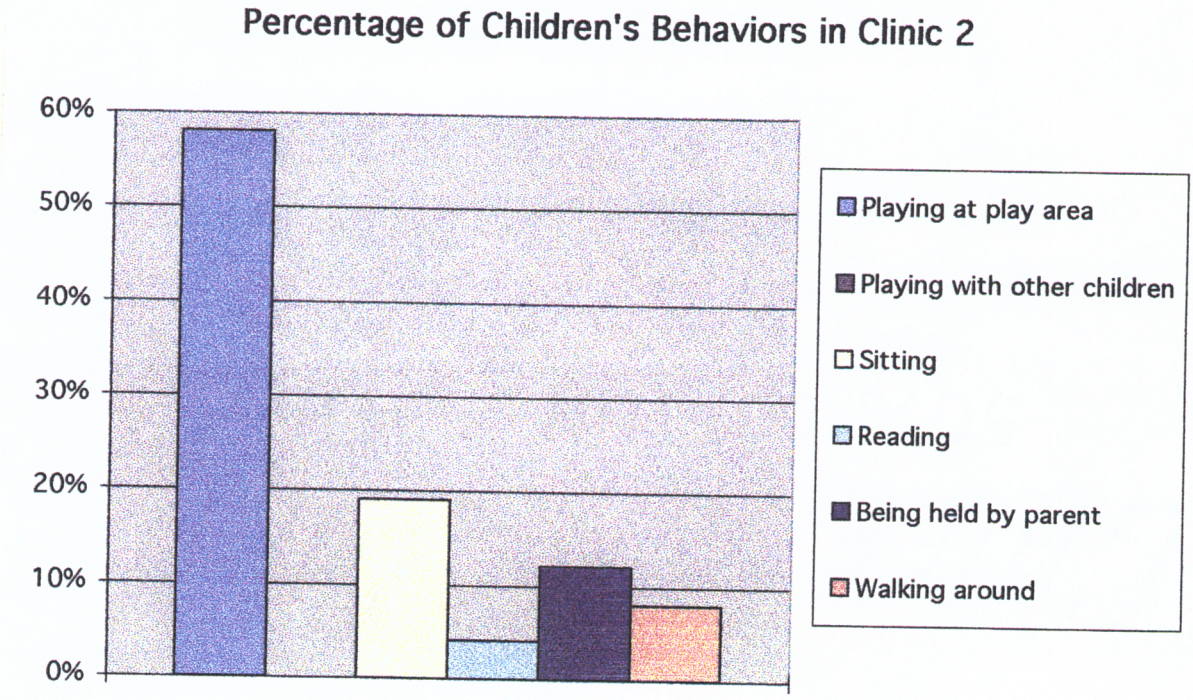
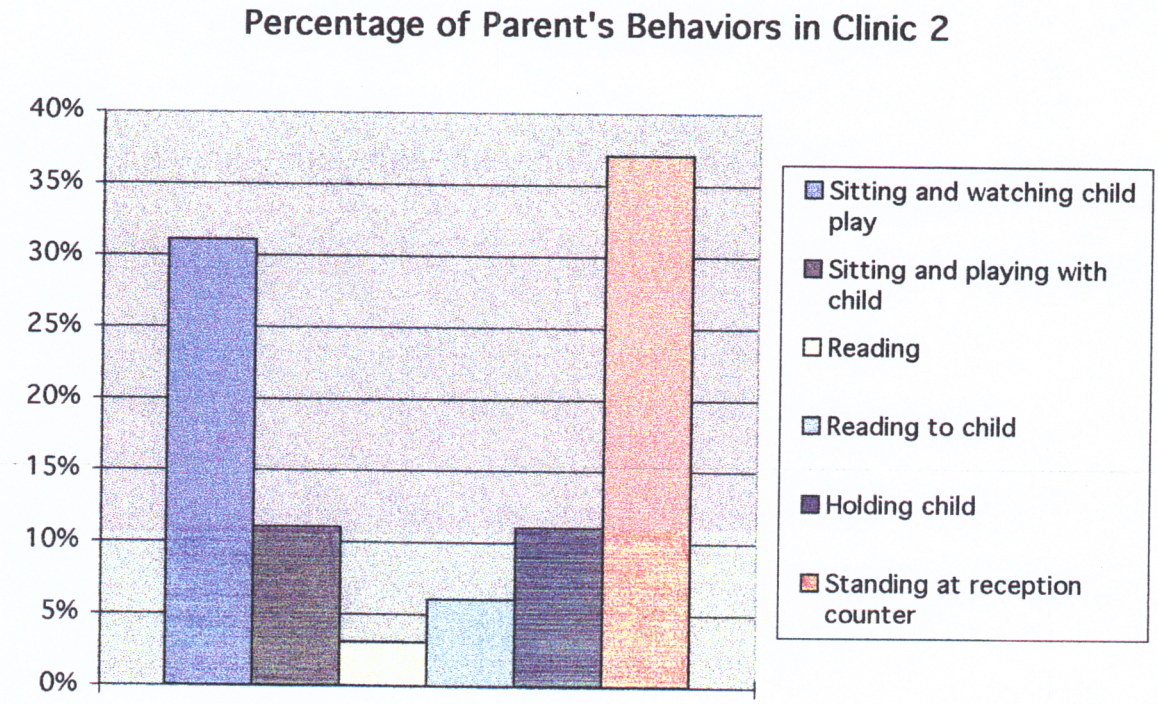


Figure 11



were observed holding their child. Six percent of the parents were observed reading to their child, while 3% were observed reading to themselves (see Figure 11).

Clinic 3

Children: The 13 children observed in clinic 3 were within the age group of 2 to 7 years of age. Of the observed behaviors, 39% of the children were observed playing at the play area in the waiting room. Thirty-one percent were observed sitting, while 23% were observed being held by their parent. Eight percent of the children were observed walking around the waiting area (see Figure 12).

Parents: In clinic 3, of the 11 parents, 55% were observed sitting and watching their child play. Twenty-seven percent of the parents were observed holding their child, and 18% were observed standing at the reception counter asking questions and filling out information (see Figure 13).

Clinic 4

Children: Of the children observed in clinic 4, 16 were within the age group of 2 to 7 years of age. Of the children, 50% were observed playing at the play area, while 25% were observed playing with other children. Nineteen

Figure 12

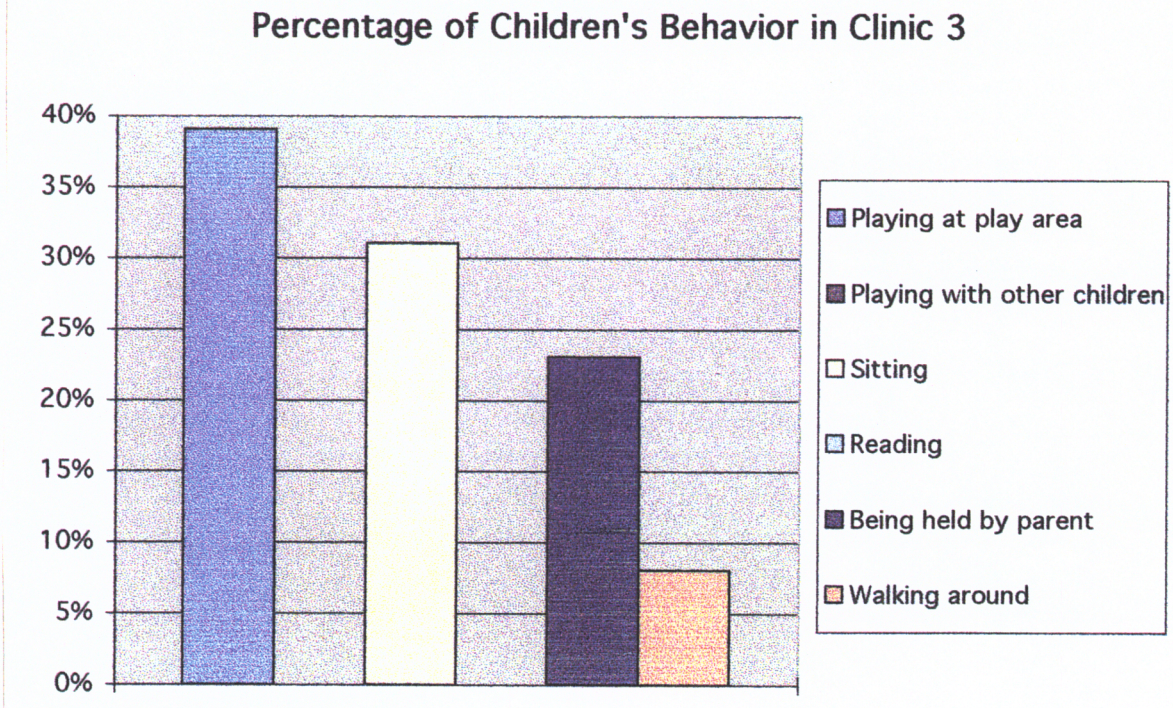
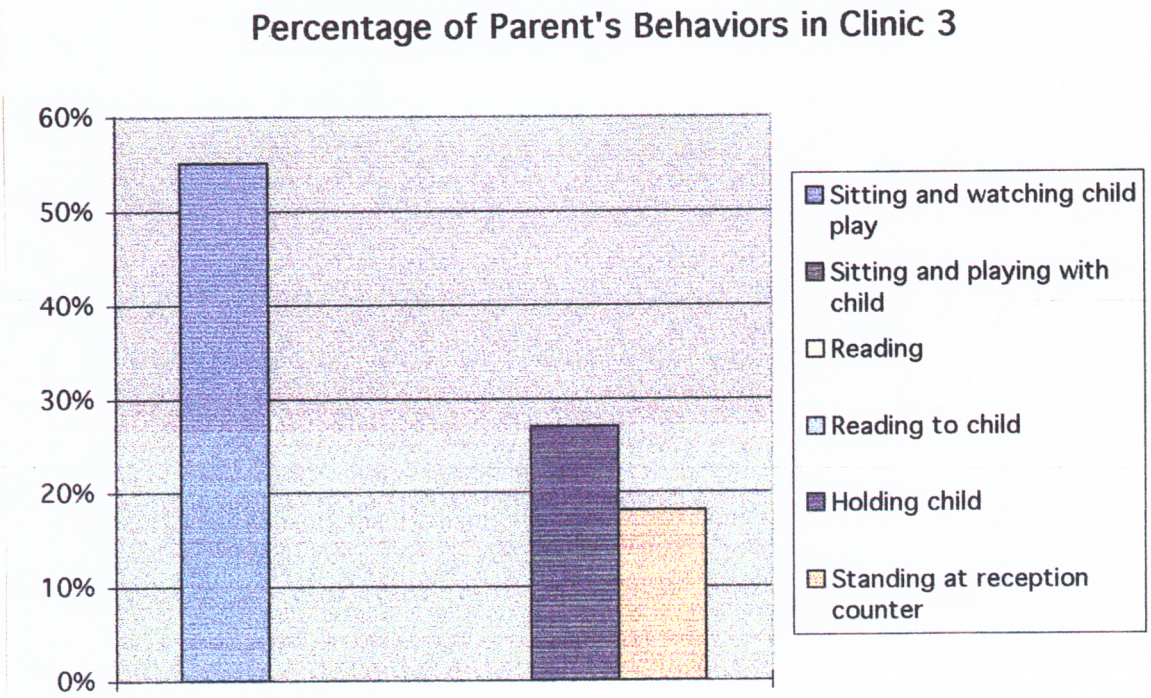


Figure 13



percent of the younger children were observed walking around the waiting area, and 6 % were observed reading (see Figure 14).

Parents: In clinic 4, of the 15 parents, 40% were observed sitting and watching their child play, while 33% were observed sitting and playing with their child. Thirteen percent of the parents were observed standing at the reception counter filling out forms and asking questions. Seven percent of the parents were observed reading to themselves, and 7% were observed reading to their child (see Figure 15).

Clinic 5

Children: Of the children observed in clinic 5, 17 were within the age group of 2 to 7 years of age. Of the group of children, 65% were observed playing at the play area. Twenty-four percent of the children were observed sitting, while 6% were observed reading. The remaining 6% were observed walking around the waiting area (see Figure 16).

Parents: In clinic 5, of the 20 parents, 65% were observed sitting and watching their child play. Twenty percent were observed reading to themselves, while 10% were observed holding their child. Five percent of the parents were

Figure 14

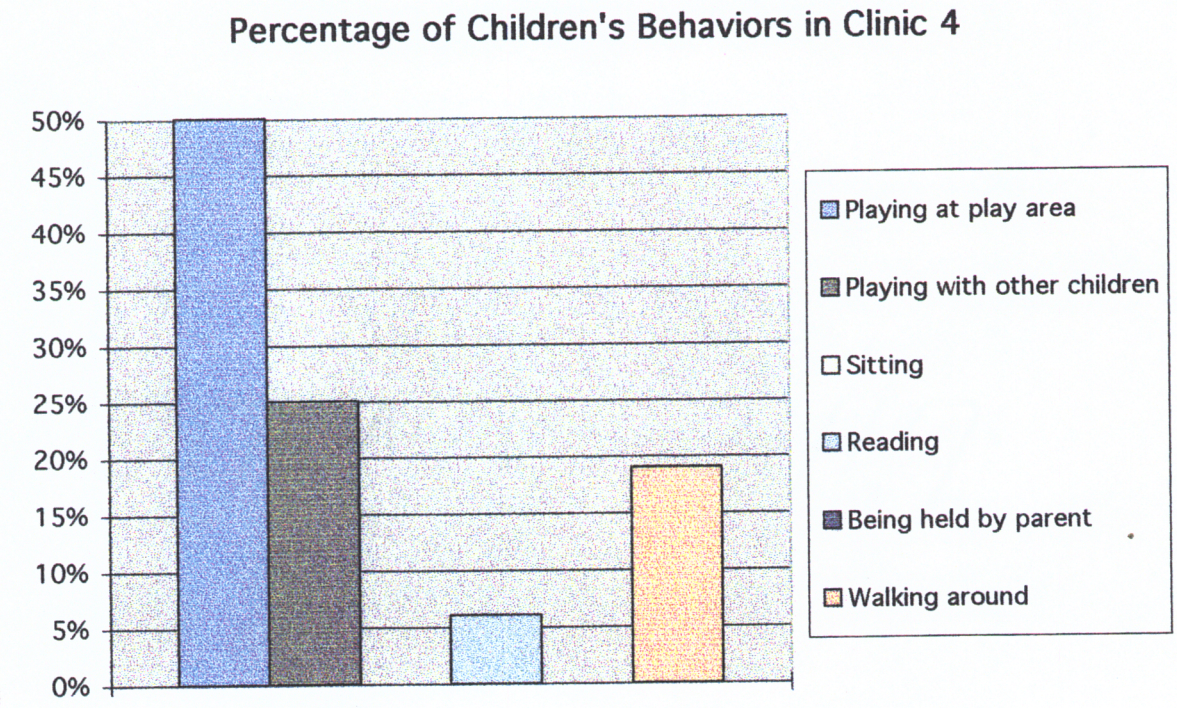


Figure 15

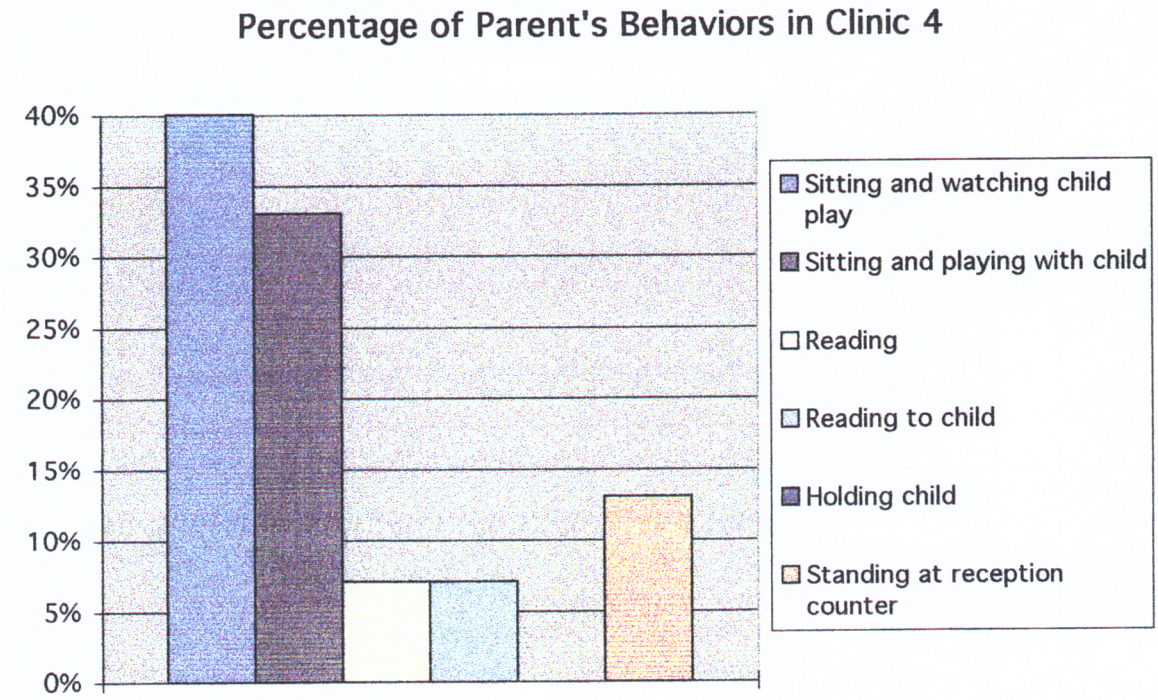


Figure 16

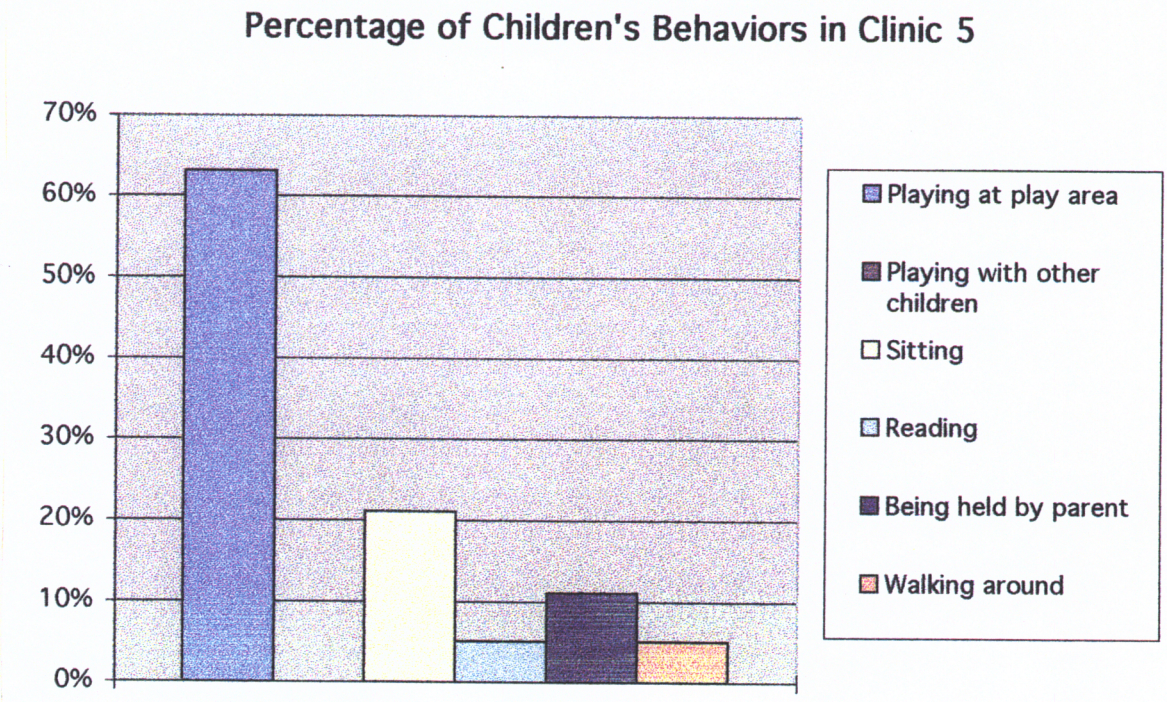
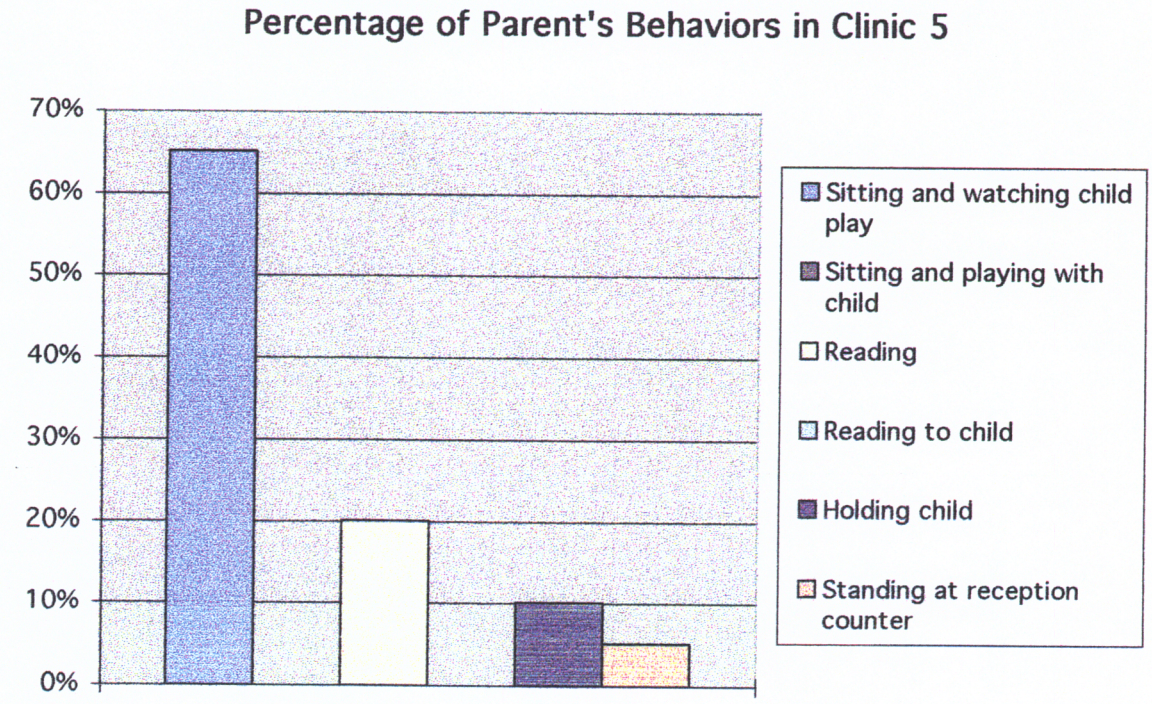


Figure 17



observed standing at the reception counter asking questions and filling out forms (see Figure 17).

Summary of the Behavioral Observation Results

The results of the behavioral observations documented the percentage of children ages 2 to 7 and their parents engaged in defined behaviors throughout the five clinics. The results of clinic 1 indicated that most children were observed sitting, playing with other children, and walking around the waiting area. The parents in clinic 1 were observed mostly sitting and watching their child play, standing at the reception counter, and reading. The results of clinic 2 indicated that most children were observed playing at the play area, sitting, and being held by their parent, while most parents were observed standing at the reception counter, sitting, and watching their child play, and playing with their child. The results of clinic 3 indicated that most children were observed playing at the play area, and being held by their parent, while most parents were observed sitting and watching their child play, and holding their child. The results of clinic 4 indicated that most of the children were observed playing at the play area, playing with other children, and walking around, while most parents were observed sitting and watching their child play, playing with their child, and standing at the

reception counter. Finally, the results of clinic 5 indicated that most of the children were observed playing at the play area, and sitting, while most parents were observed sitting and watching their child play, and reading.

Survey Results

To evaluate parents' perceptions of pediatric office environments (Hypothesis Two), surveys were distributed by the staff. A total of 30 surveys were returned to the researcher for data analysis. Response rates in clinics 1 - 5 were 29%, 14%, 64%, 40%, and 35% respectively. For data analysis, the data set of the survey was programmed by assigning a value of one through six for each of the six spaces on the semantic differential scale, with six being the most positive position and one being the most negative position (see Appendix B). The adjectives that were defined by the researcher as being the most positive were: pleasant, colorful, finished, quiet, cheerful, exciting, convenient, private, friendly, roomy, impressive, and airy. The adjectives that were defined by the researcher as being the most negative were: unpleasant, drab, unfinished, noisy, gloomy, boring, inconvenient, public, unfriendly, crowded, unimpressive, and stuffy.The number of people responding to

each pair of descriptive adjectives at all five clinics is presented in Appendix C.

One returned survey form was eliminated from the data set since the parents' ability to read English was questionable. All statistical calculations were conducted with survey sample size = 29.

Statistical Analysis

This section will focus on the statistical analysis of the survey results. The null hypothesis stated that there would be no difference in mean responses for each descriptive adjective pair among the five clinics. That is: the mean response for clinic 1 = mean response for clinic 2 = mean response for clinic 3 = mean response for clinic 4 = mean response for clinic 5 for each of the descriptive adjective pairs.

The data were analyzed using a one-way ANOVA test at $p=0.05$, an accepted level for statistical procedures in behavioral research, to compare each descriptive adjective pair among the five clinics.

As a result of the analyses, seven descriptive pairs were found to be significant: Pleasant/Unpleasant, Drab/Colorful, Quiet/Noisy, Gloomy/Cheerful, Exciting/Boring, Crowded/Roomy,and Impressive/Unimpressive.

The five pairs that were not statistically significant included: Finished/Unfinished; Convenient/Inconvenient; Private/Public; Unfriendly/Friendly; and Airy/Stuffy.

For the descriptive adjective pairs that were statisitically significant, a Pairwise comparison test which generates a *t* statistic was used to determine significant differences among the five clinics for each adjective pair. For each adjective pair, the means of the five clinics were arranged in increasing order for comparison. The results of the Pairwise comparisons were then charted out in visual form in order to draw conclusions (see Table 1). The means for each descriptive adjective pair were arranged in increasing order. Lines were drawn beneath the clinic number for each pair to indicate where the significant differences were present. Those adjective pairs which did not indicate statistical significance show no difference between the means. This effect is represented as a solid straight line (see Table 1).

For pair #1 - pleasant/unpleasant: there was a significant difference between clinic 1 and the other four clinics indicating that the overall perception for clinic 1 is more unpleasant.

Table 1: Summary of Pairwise Comparisons for Survey Descriptive Adjective Pairs.

Pair	Clinics in order of ascending μ values				
#1, unpleasant/pleasant*	1	4	3	5	2
#2, drab/colorful*	1	3	4	2	5
#3, unfinished/finished	2	4	1	3	5
#4, noisy/quiet*	2	4	5	1	3
#5, gloomy/cheerful*	4	3	1	2	5
#6, boring/exciting*	1	4	2	3	5
#7, inconvenient/convenient	1	4	2	5	3
#8, public/private	4	1	2	5	3
#9, unfriendly/friendly	1	4	3	2	5
#10, crowded/roomy*	2	1	4	3	5
#11, unimpressive/impressive*	4	1	3	2	5
#12, stuffy/airy	2	3	1	4	5

*p < .05

For pair #2 - drab/colorful: a significant difference between clinics 1,3,4 and clinics 2,5 indicates that parents describe clinics 2 and 5 as more colorful.

For pair #4 - quiet/noisy: there was overlapping in significant differences among the five clinics. Clinics 2 and 4 were perceived by the parents as more noisy. Clinics 1 and 3 were perceived as more quiet. The parents in clinics 4,5,and 1 had similar perceptions but didn't really show a strong inclination towards one adjective or the other.

For pair #5 - gloomy/cheerful: there was a significant difference between clinic 5 and the other four clinics indicating that the subjects in clinic 5 rated this clinic as more cheerful than parents in the other four clinics.

For pair #6 - exciting/boring: there was overlapping in significant differences among the five clinics. The parents in clinics 1,4,2, and 3 had similar perceptions, describing their environments as more boring. Parents in clinics 3 and 5 had similar perceptions, describing their environments as more exciting. The parents in clinics 2 and 3 had similar perceptions but did not show a strong indication towards one adjective or the other.

For pair #10 - crowded/roomy: there was overlapping in significant differences among the five clinics. Parents in clinics 2,1, and 4 had similar perceptions, describing their

environments as more crowded. Parents in clinics 3 and 5 had similar perceptions, describing their environments as more roomy. Parents in clinics 4 and 3 had similar perceptions but did not show a strong indication towards one adjective or the other.

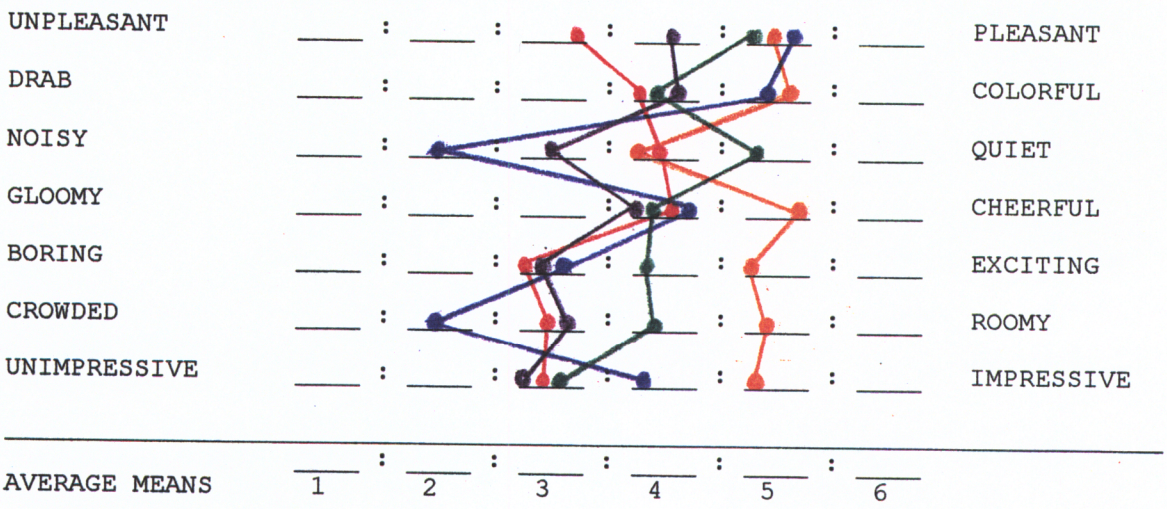
For pair #11 - impressive/unimpressive there was a significant difference between clinic 5 and the other four clinics indicating that the perception of the parents in clinic 5 describes the environment as the most impressive of the five clinics.

Summary of the Results of the Perception Survey

The results of the perception survey indicated that the parents in clinic 1 perceived their environment as being the most unpleasant, drab, and boring of the five clinics (see Table 2). The parents in clinic 2 perceived their environment to be the most noisy, crowded, yet pleasant of the five clinics. The parents in clinic 3 perceived their environment as being the most quiet, while the parents in clinic 4 perceived their environment to be the most gloomy and unimpressive of the five clinics. Finally, the parents in clinic 5 perceived their environment to be the most colorful, cheerful, exciting, roomy, and impressive of the five clinics.

Table 2: Summary of Means of Each Clinic for Significant Survey Descriptive Adjective Pairs.

Clinics	Color Code
1	red
2	blue
3	green
4	purple
5	orange



Summary of Comments

This section summarizes the comments written on the survey in response to the two open-ended questions: "What do you most like about this waiting area?" and "What do you most dislike about this waiting area?".

Clinic 1

Like: Two parents in clinic 1 indicated that they liked the aesthetics of the waiting area. Two parents indicated liking the toys and books provided for the kids. One parent indicated that there was plenty of seating in the waiting area.

Dislike: The most common dislike of clinic 1, indicated by two parents, was that there is not enough room in the waiting area. Another parent indicated that there needed to be more toys for the children.

Clinic 2

Like: Three parents in clinic 2 indicated that they liked having separate well-waiting and sick-waiting areas. One parent indicated liking the aesthetics of the waiting area.

Dislike: The only dislike indicated by four parents about clinic 2 was there was not enough room in the waiting area.

Some parents felt that they or their children could easily catch infections from the other children because of the small size of the waiting area.

Clinic 3

Like: Four of the parents in clinic 3 indicated that they liked the toys that were provided for the children in the waiting area. Two parents indicated liking the aesthetics of the waiting area commenting on how the old-fashioned decor reminded them of their own pediatrician's clinic.
Dislike: The only dislike that was indicated by one of the parents in clinic 3 was that the furniture was a little old-fashioned.

Clinic 4

Like: Three parents in clinic 4 indicated that they liked having separate well-waiting and sick-waiting areas. One parent indicated that they liked the large-sized toys provided for the children in the waiting area. One parent also indicated that there was enough seating in the waiting area.

Dislike: Three parents in clinic 4 indicated that the waiting area needed more toys since most of the toys provided were broken.

Clinic 5

Like: Five parents in clinic 5 indicated that they liked the play area provided for the children. Two parents indicated that they liked the aesthetics of the waiting area and one parent indicated that there was plenty of seating provided.

Dislike: One parent indicated needing more individual toys for children to play with. One parent indicated that there was not enough room in the waiting area stating that it oftentimes gets too crowded.

Summary

This chapter presented the results of the data collection for this research study . The results of the behavioral observations documented the percentage of children ages 2 to 7 and parents engaged in seven defined behaviors throughout the five clinics. The results from the survey indicated the perceptions of the parents describing the waiting areas of the five clinics in terms of 12 pairs of descriptive adjectives. Finally, a summary of comments based on the two open-ended questions on the survey described the parents' likes and dislikes of the waiting areas of the five clinics. The following chapter will discuss the results of the data collection in terms of the research hypotheses as well as discuss conclusions made as a result of this investigation.

CHAPTER FIVE

Discussion and Conclusions

This chapter begins with a discussion of the results of the research study on each of the five clinics. For each clinic, the behavioral observations of the children ages 2 to 7 and the parents will be discussed. Then the results from the perception survey including the open-ended questions will be disussed. This chapter ends with a summary of the research study and recommendations for further research.

Discussion

Clinic 1

In clinic 1, children were observed primarily sitting (25%), playing with other children (19%), and walking around (19%). These behaviors may be the result of the limited variety of play activities provided in the waiting area. Because the furniture was arranged against the walls, a relatively large open floor space was created. This open area combined with a lack of play activities may have encouraged the children to walk around the waiting area of clinic 1, suggesting restlessness or boredom on behalf of

the children. The combination of both these environmental conditions may have also encouraged the children to engage in play activities with other children.

The parents in clinic 1 were observed primarily sitting and watching their children play (36%), standing at the reception (21%), and reading (14%). The sociopetal arrangement, that is, arrangements which encourage interactions among people, in clinic 1 may have contributed to the behavior of watching the children play since all the seats faced the central space in the waiting area, the space where the children usually played.

Parents may have stood at the reception counter in clinic 1 since it was located near the entry door. That is, parents may have been encouraged to stand and engage in conversation rather than enter the waiting area. For parents who did enter the waiting area, clinic 1 provided a variety of reading materials for both the parents and the children. Consequently, other than watching their child play, reading was the next most frequently occuring behavior.

The results of the perception survey indicated that the parents perceived clinic 1 to be the most unpleasant, drab, and boring of the five clinics. These perceptions may be attributed to the environment of the waiting area in clinic 1. The waiting area provided little visual interest for

both the children and the parents. The finishes consisted of dark greys and off-whites, while the only ornamentation on the walls was two watercolor paintings. Variety and change can help a person maintain interest in the environment, but since clinic 1 provided little variety, the parents may have lost interest in their environment (Hall, 1990). This loss of interest may have been interpreted as the perceptions of unpleasant, drab, and boring in the waiting area of clinic 1.

Interestingly, however, the parents commented on the open-ended questions that they liked the aesthetics, the books, and the toys, though they felt there weren't enough toys. This variation between the perceptions of the environment and the comments could be a result of how the parents interpreted both the survey and open-ended questions. That is, when filling out the survey, the parents may have answered to the adjectives according to how appropriate a children's environment they felt clinic 1 to be. Then in the open-ended questions, the parents answered in terms of how they felt about the environment from an adult standpoint. Although the parents also commented that there was not enough room in the waiting area, they felt that the number of seats was adequate. The seating arrangement was sociopetal and the space in the waiting area was relatively small. The closeness in proximity to other

parents and children may have influenced the parents' perception of there not being enough room in the waiting area.

Clinic 2

In clinic 2, children were observed primarily playing at the play area (58%), sitting (19%), and being held by their parent (12%). The waiting area consisted of a toy crate and a play table which may have encouraged the children to engage in the play activities. The behaviors of sitting and being held by the parent were observed among the youngest children in the waiting area, primarily the two- to three-year olds. These behaviors may be the result of the social development and/or cognitive levels of the observed children (Miller, 1983), reflecting a lack of self-confidence to leave the parent's side and explore the environment.

The parents in clinic 2 were observed primarily standing at the reception counter (37%), and sitting and watching their children play (31%). Since there was some variety in the play activities for the children, the parents may have been encouraged to watch their children play while they were seated. Clinic 2, however, had the highest percentage of parents standing at the reception counter. Most of this behavior included parents asking questions,

filling out paperwork, or paying the bills. This behavior may be attributed to the fact that the parents were familiar and friendly with the staff behind the reception counter and therefore were more inclined to stand there. Another possible explanation for this behavior could be the location of the reception counter directly across from the entry door as well as centrally located between the two waiting areas. When the waiting areas in this clinic became crowded, the parents tended to stay at or near the reception desk. This behavior may be attributed to the parents' comfort level with the proximity of other people, or informal space - the distance maintained in encounters with others (Hall, 1966). That is, when the number of people increased, the parents became more uncomfortable with the closeness to the other parents and children (Sommer, 1969).

The results of the perception survey indicated that the parents perceived clinic 2 to be noisy and crowded, but the most pleasant of the five clinics. The perception of pleasantness may be attributed to the parents' perceptions of the office staff as well as the physical environment. That is, the pleasantness and high visibility over the counter of the staff members may have influenced the parents to perceive the environment as being pleasant as well. The parents' perceptions of the clinic being noisy and crowded may be attributed to the two separate waiting areas. By

dividing the space, the size of each waiting area was decreased. This decrease in space may have influenced the parents to perceive the waiting area of clinic 2 to be more crowded and noisy. Clinic 2 was also a larger clinic with a greater number of physicians attending patients simultaneously. This may have also contributed to the noise levels and the number of people in the waiting area.

The parents commented on the open-ended questions that they liked having the separate waiting areas for the well and sick children, and they liked the aesthetics of the waiting area. The furniture arrangement in clinic 2 was sociofugal, an arrangement which discouraged interactions among people (Sommer, 1969). This type of arrangement along with the small space may have influenced the parents to perceive the waiting area as being crowded. Some parents used the seats to place their coats and personal belongings, preventing other parents and/or children to sit in those seats. This behavior may be an example of territoriality which can result in a distancing between the people within the waiting area (Taylor, 1988).

Clinic 3

In clinic 3, children were observed primarily playing at the play area (39%), sitting (31%), and being held by their parent (23%). The waiting area provided a designated

play area which may have encouraged the children to engage in play behavior. Yet, of the five clinics, clinic 3 had the highest percentage of children sitting and being held by the parent. These behaviors, as in clinic 2, may be a result of the younger ages of the observed children and their social development and/or cognitive levels.

The parents in clinic 3 were observed primarily sitting and watching their child play (55%), or holding their child (27%). The separation of the play area from the sitting area as well as limited variety of reading materials may have encouraged the parents to engage in watching their children.

The furniture arrangement in clinic 3 was sociofugal, which allowed the parents to sit without facing each other. This arrangement may have limited the amount of interactions between the people in the waiting area by preventing visual contact with the other parents. Although the furniture arrangement may not have had the same influence on the interactions between children since children are accustomed to close proxemity with other children through school environments, the parents may have inadvertently prevented the children from interacting more with other people by holding them.

The results of the survey indicated that the parents perceived clinic 3 to be the most quiet of the five clinics.

The separation of the play and sitting areas along with the limited interactions may have affacted the perception that the waiting area of clinic 3 was quiet.

The parents commented on the open-ended questions that they liked the toys provided for the children, and they liked the aesthetics of the waiting area. They did comment, however, that they disliked the furniture which was old and not stylish.

Clinic 4

In clinic 4, children were observed primarily playing at the play area (50%), and playing with other children (25%). Clinic 4, like clinic 1, had a limited variety of play activities, consisting of a play table in the middle of the waiting area. The presence of a play table may account for the number of children engaged in play behavior. However, the lack of variety of play activities may have also encouraged the children to play with the other children in the waiting area. Although research suggests that adults start to feel more uncomfortable when proxemity distances are decreased, the opposite effect seems to occur with children (Hall, 1966). This may suggest that current research on proxemics may not accurately apply to children the same as adults and should be further explored.

The parents in clinic 4 were observed primarily sitting and watching their child play (40%), and playing with their child (33%). These behaviors may be attributed to a play table which was located centrally, and made watching or reaching the play table easier for the parents. The sociopetal furniture arrangement may have also influenced these behaviors.

The results of the perception survey indicated that the parents perceived clinic 4 to be the most gloomy and unimpressive of the five clinics. The environment of clinic 4 provided a limited variety of visual interests. The only suggstion that clinic 4 was a pediatric clinic was the play table. This lack of variety and child-related themes may have affected the parents' perceptions of clinic 4 to be gloomy and unimpressive. This lack of variety may have also enccuraged the parents to focus more on their children rather than the environment, possibly explaining the behaviors of the parents.

The parents commented on the open-ended questions that they liked having the separate waiting areas for the well and sick children, they liked the toys, and they thought there were plenty of seats. They did comment, however, that more toys were needed for the children's play .

Clinic 5

In clinic 5, children were observed primarily playing at the play area (63%), and sitting (21%). Clinic 5 provided a play structure as well as other toys for children to play with. By providing a variety of play activities, children may be encouraged to explore the environment, which in turn minimizes the amount of time spent idling, or waiting anxiously before a medical appointment (Olds and Daniel, 1987). The play structure was located in one corner of the waiting area removed from the general sitting area. This may have also encouraged the children to explore the play activities.

The parents in clinic 5 were primarily observed sitting and watching their child play (65%), and reading (20%). Having the play structure in the waiting area as well as the sociopetal furniture arrangement may have allowed the parents to watch their children from where they were seated. Some parents may have felt comfortable enough with their children's play activities to read rather than constantly supervise their children.

The results of the perception survey indicated that the parents perceived clinic 5 to be the most colorful, cheerful, exciting, roomy, and impressive of the five clinics. These perceptions may be attributed to the wide variety of visual interest throughout the waiting area.

Clinic 5 had a variety of colors in the finishes, primarily reds, blues, and yellows. There was also a variety in ornamentation with the pictures, posters, and wall-hangings. Since the waiting area was a relatively large space, the small sociopetal groupings may have influenced the parents' perception of the waiting area as being roomy.

The parents commented in the open-ended questions that they liked the play area and the aesthetics, and that there was plenty of seating provided in the waiting area. Two parents did comment, however, that there needed to be more individual toys, and that there was not enough room in the waiting area. Interestingly, this last comment contradicts the responses on the perception survey indicating clinic 5 to be the most roomy and may be the result of the parent having been in the waiting area when it was the most crowded.

Limitations

One of the limitations that was encountered in this study was the lack of consent on the behalf of the physicians to distribute the perception survey to the parents in the waiting area. This limitation forced the investigator to search for clinics that would permit the survey to be distributed.

Even when the physicians gave their consent to distribute the survey, another limitation to this study was the low response rate of the parents in completing and returning the surveys. This may be the result of levels of anxiety and/or patience exhibited by the parents in pediatric waiting areas.

A third limitation to this study was that the researcher viewed the observations and interpreted the data from the point of view of an interior designer and not as a behavioral scientist. That is, the focus of this study was not about individual behavioral characteristics of the sample, but about behaviors as they may be influenced by the environment. Thus behaviors were not considered independently of the space in which they occured.

Summary

Children often have misconceptions about why they have been taken to the doctor, and about what will happen to them there. They are particularly sensitive to their physical surroundings, therefore the unfamiliar and often institutional qualities of health care environments are intimidating (Hall, 1990). Researchers have noted that children need their families in these situations, and that

the families need to be cared for with the same compassion and attention to detail accorded children (Harper, 1993).

One area of research indicates that people's needs are addressed by the perception of space, therefore more attention should be given to how the aesthetics of an environment may affect the users of that space (Olds, 1991). In this study, for example, the parents' perceptions of each clinic were compared to the physical environments in order to investigate how each space supported the users' needs.

Based on the findings of environmental behavior in health care environments, the industries of architecture and interior design have found a challenge in rethinking conventional approaches to health care environments in order to make them more supportive of user needs (Hall, 1990). In light of this rethinking process, the objective of this investigation has been to describe how the physical environment of a health care setting may influence the behavior and perception of the users.

The sample in this study consisted of parents and children ages 2 to 11 years who were visiting the pediatric clinic. In the sample, however, only the children aged 2 to 7, the pre-operational period of cognitive development, provided enough sample numbers to describe their behaviors.

The study was conducted at five pediatric clinics in Virginia: one in southwest Virginia, and four in northern

Virginia. The clinics were observed in their existing conditions, i.e., they were not modified or manipulated in any way by the investigator. The researcher recorded the behaviors of the children and their parents using behavioral mapping to document the number ofchildren and parents engaged in a variety of behaviors at each clinic. The parents also completed a brief survey that was used to evaluate their perception of the waiting area at each clinic. The survey included a Likert scale and open-ended questions.

Observations were conducted for two days at each clinic from 9:00 a.m. to 12:00 p.m. The surveys were distributed to the parents during the observation times.

On the basis of this investigation, the following conclusions on the five clinics were made:

(1) The majority of children at all five clinics engaged in some form of play activity while in the waiting area. The greater the variety of play activities as well as the more defined the play space was, the higher percentage of children engaged in play activities. Clinic 5 provided the largest variety of play activities among the five clinics, and also had the highest percentage of children playing. Clinic 1 provided the least variety of play activities, and the lowest percentage of children engaged in playing.

(2) The majority of the parents in all the clinics, except clinic 2, primarily sat down and watched their children play. It was found, however, that in the clinics which had the reception counter located near the entry door showed a higher percentage of parents standing at the counter.
(3) Clinics that provided a variety of visual interest in the waiting area, such as clinics 2 and 5, were perceived as being more pleasant, colorful, cheerful, exciting, and impressive. In contrast, clinics that provided little visual interests in the waiting area were perceived by the parents as being more unpleasant, drab, boring, gloomy, and unimpressive.
(4) The two different furniture arrangements in the five clinics, sociopetal and sociofugal, seemed to have had no effect on the behaviors or perceptions of the users in and of themselves. However, the furniture arrangements combined with other environmental factors at each clinic generated behaviors and perceptions individual to each clinic. For example, in clinic 2, the sociofugal furniture arrangement along with the location of the reception counter may have influenced more parents to stand at the reception counter rather than enter the waiting area. The behavior of standing at the reception counter may have also been a result of the poor visibility of the reception and the staff behind it from most of the seats in the waiting area.

Another example is that the arrangement of the play area as well as the amount of square footage in clinic 4 may have had an effect on both the parents' and the children's behaviors. These findings support Liben's model (1981) which states that behaviors are a result of individual characteristics of people and characteristics within the environment. Although some behaviors can be justified by specific features in the environment, others occur as a result of a number of features of both the individual and the environment, and thus cannot be attributed to one specific factor. This warrants further investigation into specific aspects of individuals and their environments.

Recommendations for Further Research

Based on the findings of this research study, the following recommendations for future research have been generated:

(1) Since furniture arrangements were not found to affect the behaviors of the users, it is recommended that observations need to be made on one clinic waiting area, where the furniture arrangement is manipulated into two test conditions - a sociopetal and sociofugal arrangement. Only then can the variable of furniture arrangement be accurately analyzed.

(2) Visual interest in the waiting area environment produced specific results in the perceptions of the users in this study. However, since the environments were studied in their pre-existing conditions, it is difficult to hypothesize that the visual interests affected perception without contribution from any other features in the environment. For future research, data needs to be collected on one clinic in which the levels of visual interests are manipulated in order to determine the effects of art, posters, murals, and other wall hangings on perception.

(3) The current research on proxemics and territoriality is very important to the study of human behaviors. However, there may be differences between children and adults in respect to territory and proxemics. For further research, territoriality and proxemic issues should be more thoroughly investigated as they pertain to children and not adults.

(4) Based on this study, some design recommendations to better improve the pediatric waiting room environments can be investigated. If space permits in the waiting area, it is recommended that a separate, defined play area be provided for the children. Another design recommendation suggests that the reception counter should be placed at a point where both the parents and the staff members have adequate visual control over each other, preferably not

directly near the entry door. A final design recommendation is to provide ample space in the seating area so that people can circulate comfortably without having to bother others. (5) On a larger scale, health care providers need to understand the impact an environment can have on the behavior and perception of its users. The findings from this research along with existing research could be used and implemented in more critical care pediatric health care settings such as hospitals to better support the needs of their users. Future research could explore other environments such as in-patient rooms, examining rooms, and recovery rooms to determine the effects of those environments on the children patients and their families.

In the end, the same challenge will always remain for designers. This challenge is to create environments in which the sum total of the space is greater than any of the individual ingredients (Kellman, 1989).

List of References

Brinkley, J. (1993). An environment of caring. Designing for Child Health, 1 (1), 1-3.

Canter, D. (1974). Psychology for architects. New York: Halsted Press.

Hall, E.T. (1966). The hidden dimension. Garden City, N.Y.: Anchor Books.

Hall, J.H. (1990). Child health care facilities. Journal of Health Care Interior Design, 2, 65-70.

Harper, K. (1993). Supporting parents in the critical care unit. Designing for Child Health, 1, (1), 19-27.

Hillenbrand-Nowicki, C. (1993). The effect of plants on human perceptions and behavior within an interior atrium. Unpublished masters thesis, Virginia Tech, Blacksburg, Virginia.

Hirschfield, A.J. (1993). Developing an inpatient family centered pediatric unit. Designing for Child Health, 1 (1), 4-6.

Kellman, N. (1989). History of health care environments. Journal of Health Care Interior Design, 1, 19-27.

Klinzing, D.R., & Klinzing, D.G. (1977). The hospitalized child. Englewood Cliffs, N.J.: Prentice-Hall.

Liben, L.S. (1981). Spatial representation and behavior: Multiple perspectives. In L.S. Liben, A.H. Patterson, & N. Newcombe (Eds.), Spatial representation and behavior across the life span. (pp. 3-32). New York: Academic Press.

Malkin, J. (1982). The design of medical and dental facilities. New York: Van Nostrand Reinhold.

Malnar, J.M., & Vodvarka, F. (1992). The interior dimension. New York: Van Nostrand Reinhold.

Miles, M.F.R., & Baron, J.H. (1990, June). Hospitals should be beautiful as well as functional. In R.G. Kensett (Ed.), The Changing Scene of Health Care and Technology at the Queen Elizabeth II Conference Centre. London.

Miller, B., Banard, J., & Huelat, B. (1991, May). Partners in design: How to get what you want - Working with designers and architects on children's health care facilities. Association for the Care of Children's Health Annual Conference.

Miller, P.H. (1983). Theories of developmental psychology. New York: W.H. Freeman & Co.

Oglivie, L. (1990, winter). Hospitalization of children for surgery: The parent's view. Child Health Care, 19 (1), 49-55.

Olds, A.R. (1991). With children in mind: Novel approaches to waiting area and playroom design. Journal of Health Care Interior Design, 3, 111-122.

Olds, A.R., & Daniel, P.A. (1987). Child health care facilities. Washington DC.: Association for the Care of Children's Health.

Orr, R.D. (1993). Health care from the patient's perspective. Journal of Interior Design Education and Research, 19 (2), 34-37.

Reizenstein, J. (1989). Achieving consumer-responsive health facility design. Journal of Health Care Interior Design, 1, 45-53.

Ruga, W. (1989). Designing for the six senses. Journal of Health Care Interior Design, 1, 29-34.

Sommer, R. (1969). Personal space: The behavioral basis of design. Englewood Cliffs, N.J.: Prentice-Hall.

Sommer, R. (1983). Social design. New Jersey: Prentice-Hall.

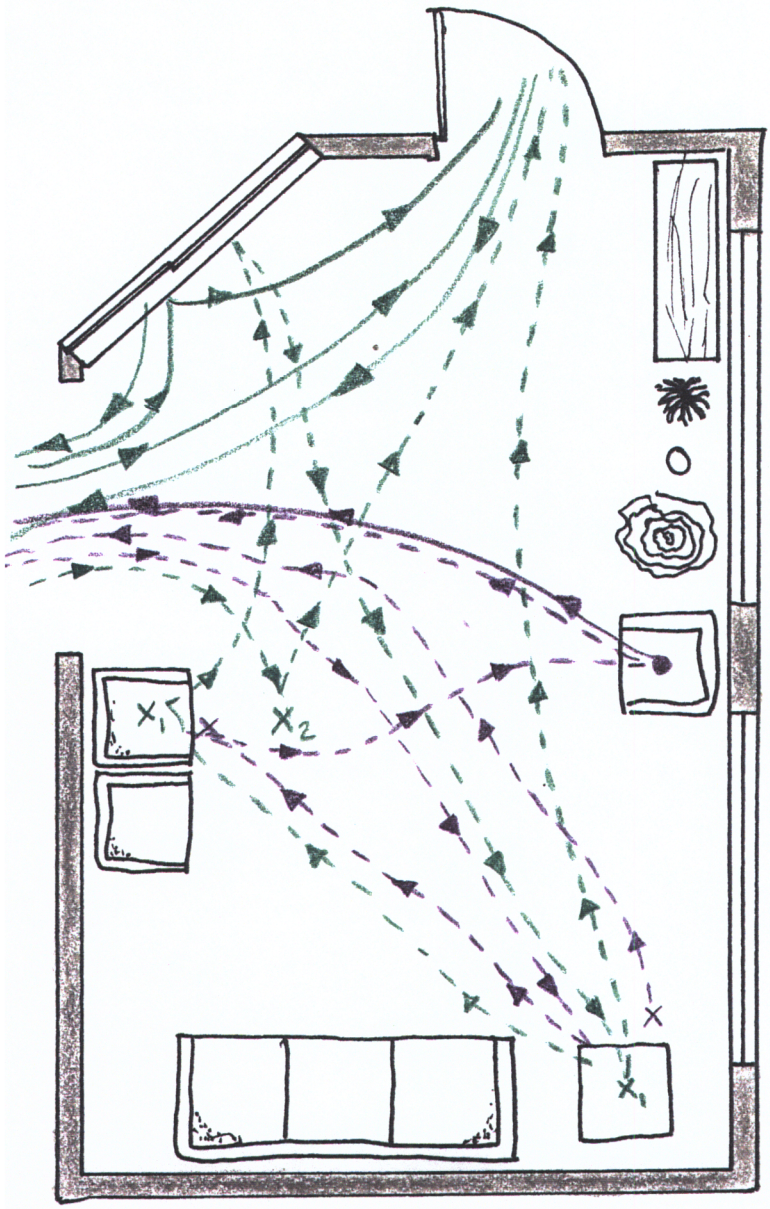
Taylor, R.B. (1988). Human territorial functioning. New York: Cambridge University Press.

Zeisel, J. (1981). Inquiry by design: Tools for environment-behavior research. Cambridge: Cambridge University Press.

APPENDIX A

Example of Behavioral Mapping

TIME: 10:30 - 10:45



- BOY + ● BOY ARE STILL PLAYING TOGETHER
- GRANDMOTHER IS STILL WATCHING
- BOY GOES to CHECK ON HIS MOTHER IN THE EXAM ROOM THEN COMES RIGHT BACK
- MOTHER CARRYING INFANT WALKS OUT OF WAITING AREA BUT THEN WALKS BACK IN
- A YOUNGER BROTHER (X_2) WALKS OUT OF EXAM ROOM (ABOUT 3 YRS) + OLDER BROTHER INTRODUCES HIM to ● BOY
  - NOW ALL 3 BOYS ARE PLAYING TOGETHER ON THE FLOOR
- OLDER BOY GOES to SIT ON THE CHAIR
- BOY JOINS HIM AT THE CHAIR
- MOTHER COMES BACK OUT WITH INFANT + GOES to RECEPTION COUNTER to PAY - THE OTHER 2 BOYS START to PUT THEIR COATS ON - THE FAMILY LEAVES
- GRANDMOTHER + BOY GO BACK INTO EXAM ROOMS

APPENDIX B

PEDIATRIC WAITING AREA

What are your perceptions of this pediatric waiting area? Please mark the scale position that best describes your response to the following adjectives

Example: If you think the waiting area is more warm than cold, mark

WARM	_____ : _____ : _____ : _____ : _____ : _____	COLD

PLEASANT	_____ : _____ : _____ : _____ : _____ : _____	UNPLEASANT
DRAB	_____ : _____ : _____ : _____ : _____ : _____	COLORFUL
FINISHED	_____ : _____ : _____ : _____ : _____ : _____	UNFINISHED
QUIET	_____ : _____ : _____ : _____ : _____ : _____	NOISY
GLOOMY	_____ : _____ : _____ : _____ : _____ : _____	CHEERFUL
EXCITING	_____ : _____ : _____ : _____ : _____ : _____	BORING
CONVENIENT	_____ : _____ : _____ : _____ : _____ : _____	INCONVENIENT
PRIVATE	_____ : _____ : _____ : _____ : _____ : _____	PUBLIC
UNFRIENDLY	_____ : _____ : _____ : _____ : _____ : _____	FRIENDLY
CROWDED	_____ : _____ : _____ : _____ : _____ : _____	ROOMY
IMPRESSIVE	_____ : _____ : _____ : _____ : _____ : _____	UNIMPRESSIVE
AIRY	_____ : _____ : _____ : _____ : _____ : _____	STUFFY

What do you most like about this waiting area? (please use back if necessary)

What do you most dislike about this waiting area? (please use back if necessary)

APPENDIX C

Survey Response Data for Pair 1
Pleasant/Unpleasant

	Clinics				
	1	2	3	4	5
	4	6	4	4	6
	4	5	6	5	5
	4	5	5	5	5
	3	6	5	4	6
		6	6	5	6
			5	5	5
			5		5
N=	4	5	7	6	7

Survey Response Data for Pair 2
Drab/Colorful

	Clinics				
	1	2	3	4	5
	4	6	4	3	6
	4	5	5	4	6
	4	5	4	4	6
	4	5	5	4	6
		6	5	4	6
			3	6	5
			2		6
N=	4	5	7	6	7

Survey Response Data for Pair 3
Finished/Unfinished

	Clinics				
	1	2	3	4	5
	6	2	6	5	6
	5	1	6	5	6
	4	6	6	6	5
	3	6	4	3	6
		6	5	5	4
			5	2	5
			5		6
N=	4	5	7	6	7

Survey Response Data for Pair 4
Quiet/Noisy

	Clinics				
	1	2	3	4	5
	5	3	5	2	3
	5	2	6	4	2
	3	4	6	5	4
	4	3	6	4	5
		1	4	4	6
			5	3	4
			5		4
N=	4	5	7	6	7

Survey Response Data for Pair 5
Gloomy/Cheerful

	Clinics				
	1	2	3	4	5
	5	5	3	4	6
	5	6	5	4	6
	4	3	5	4	6
	4	5	5	4	6
		5	6	5	6
			4	5	5
			3		6
N=	4	5	7	6	7

Survey Response Data for Pair 6
Exciting/Boring

	Clinics				
	1	2	3	4	5
	3	3	4	2	6
	4	5	4	4	4
	3	4	5	3	6
	2	5	4	3	5
		2	6	4	6
			3	2	3
			4		6
N=	4	5	7	6	7

Survey Response Data for Pair 7
Convenient/Inconvenient

	Clinics				
	1	2	3	4	5
	6	6	6	5	6
	5	5	6	5	5
	4	4	6	5	6
	4	6	6	4	6
		4	6	5	6
			5	5	3
			5		5
N=	4	5	7	6	7

Survey Response Data for Pair 8
Private/Public

	Clinics				
	1	2	3	4	5
	1	3	5	1	2
	5	1	5	1	1
	1	4	5	5	2
	4	4	6	2	6
		2	1	2	6
			6	1	3
			5		3
N=	4	5	7	6	7

Survey Response Data for Pair 9
Unfriendly/Friendly

	Clinics				
	1	2	3	4	5
	4	5	5	6	6
	5	5	5	5	5
	6	4	6	5	6
	4	6	6	5	6
		6	5	3	6
			6	6	5
			3		6
N=	4	5	7	6	7

Survey Response Data for Pair 10
Crowded/Roomy

	Clinics				
	1	2	3	4	5
	4	4	5	4	3
	4	1	4	2	5
	2	2	4	5	6
	4	4	5	3	6
		1	2	3	6
			6	5	4
			5		6
N=	4	5	7	6	7

Survey Response Data for Pair 11
Impressive/Unimpressive

	Clinics				
	1	2	3	4	5
	4	3	3	2	6
	5	3	5	4	4
	3	4	4	4	5
	3	5	4	2	6
		6	4	3	5
			4	5	5
			3		6
N=	4	5	7	6	7

Survey Response Data for Pair 12
Airy/Stuffy

	Clinics				
	1	2	3	4	5
	5	4	3	5	5
	4	3	5	4	4
	3	5	3	4	5
	4	5	5	4	6
		2	4	4	6
			4	5	5
			3		5
N=	4	5	7	6	7

VITA

Michelle Acevedo, daughter of Dr. Miguel A. Acevedo and Concepcion I. Acevedo, was born May 4, 1971 in Washington DC. She graduated from the historic Georgetown Visitation Preparatory School for women in 1989. In 1993, she graduated from Virginia Tech with a Bachelor of Science degree in Housing, Interior Design, and Resource Management.

She decided to continue her education by immediately enrolling in the graduate program in Interior Design at Virginia Tech. While in graduate school, Michelle held teaching assistantships in both Two-Dimensional Design and Contract Design. The requirements for a Master of Science Degree were completed in February of 1995. Her future endeavors include a career in health care design for both children and adults.