#3

ANALYSIS OF BEHAVIOURAL PATTERNS OF CHILDREN AND THEIR COMPANIONS IN A PAEDIATRIC HEALTHCARE ENVIRONMENT

Searching the Association Between Behaviour Maps and Space Syntax

NEVSET GUL CANAKCIOGLU
Ozyegin University
gul.canakcioglu@ozyegin.edu.tr

ALPER UNLU
Istanbul Technical University
aunlu@itu.edu.tr

ABSTRACT

The relationship between human psychology and space is studied through an ecological approach by Barker (1968) concerning that the harmony between human behaviours and physical and social attributes of space is dependent on the *synomorphy* of the place offering individuals a balanced amount of basic psychological needs of human beings; privacy and publicity. He puts forward the notions of ritual, display and surveillance as the dominating factors of space and develops the discourse called behaviour setting; stating that spaces have an impact on imposing individuals to behave in certain manners. Within this discourse, each space has a certain structure of behaviour setting so that individuals initially observe the behaviour patterns of others and later on follow the same social norms and behaviours when they first participate into a specific space. According to Barker, this kind of interaction of the individual with the environment has an effect on diminishing environmental stress arisen from the environment and enhancing adaptation of the individual.

In this manner, this paper focuses on the correspondent interaction between physical and social attributes of paediatric healthcare spaces where children are treated. Although paediatric spaces are supposed to be designed through a holistic approach respecting children's physical, cognitive, social and psychological needs, these spaces are nonetheless stressful settings especially for inpatient children to get accustomed to various physical attributes together with social attributes that are decision makers on the patient's physical integrity. For that reason, during the child's treatment period, the accompaniment of a parent is a necessity within a paediatric healthcare environment for the well-being of children to ensure them to require physical and psychological support. Accordingly, children and their companions who have diverse physical and social needs, simultaneously share the spaces of the paediatric healthcare environment displaying certain kinds of behaviour patterns.

The main aim of the article is to search for the relationship between various sociobehavioural patterns of two social groups (paediatric inpatients and their companions) and physical attributes of an existing paediatric healthcare environment through a methodology of behaviour maps and space syntax. Within the context of case study, behavioural frequency data of paediatric inpatients and companions is gathered, correlated by the syntactic values of the actual spatial structure and evaluated to search for any significant outcomes by regression analyses. The investigation is conducted by the participation of 30 children and 30 companions in a Paediatric Haematology and Oncology Service in Istanbul Cerrahpasa University.

KEYWORDS

Behaviour Maps, Behaviour Setting, Paediatric Healthcare Spaces, Space Syntax, Spatial Perception

1. INTRODUCTION

The interaction of the individual through the environment is studied through a multidimensional approach within *environment and behaviour theories*, regarding psychology, sociology, anthropology and architecture. Within this framework, this research area focuses on the examination of building design program through a holistic approach bringing forward the values, norms, needs and preferences of the users of a specific space. According to Moore (1979), decently designed buildings should support the spatial needs of the users by eliminating environmental stress, enhancing the existence of the individuals and enabling them to behave more free and competent. Within this approach environment is not only a configuration composed of physical attributes perceived by senses, but rather a concept which is affected by social circumstances. While the perceptual processes of the individuals tend to change imposing them to behave in certain manners under the stimuli triggered by the environment, the environment on the other hand tends to be affected by the acts caused by the individuals.

1.1 ECOLOGICAL APPROACH WITHIN ENVIRONMENT AND BEHAVIOUR THEORIES

Ecological approach within environment and behaviour theories is mainly developed by the studies of Barker and Gibson (Kaminski, 1989). Despite some significant differences between their attitudes, both researchers analyse perceptual processes of the individuals through the ones' physiological and biological presence regarding their adapted environment as an inseparable concept from their well-being. According to Gibson, analysing the perceptual process of the one is not possible without analysing the environment that the one has been adapted. Following this argument, it can be asserted that personal experiences of the individual is strongly engaged with the perception of the individual within that specific environment. Furthermore, Barker puts forward a grounded theory called as *behaviour setting* concept analysing the environment through the existence of the being since he mentions that the environment becomes existent with the aggregation of natural, spontaneous, temporary actions of the being himself (Kaminski, 1989).

Barker discusses the concept of space having a *synomorphy* whether there is a harmony between the individuals' behaviours with the physical and social attributes of the setting and argues the coherence of space through the concepts of *community and privacy* as the vital psychological needs of the humans. He puts forward the notions of *ritual, display* and *surveillance* in order to debate over building programs with various typologies. He asserts that such buildings like churches yield people to carry out some specific social *rituals*; such buildings like museums yield people to *display* themselves within a certain part of the society besides the *display* of objects; such buildings like libraries, prisons and hospitals yield people to be kept in *surveillance* by others. While display-oriented spaces do not include adequate amount of privacy, spaces designed through a public priority prevent the one's *personal* space to be sufficiently organised. In addition to that, Barker emphasises that spaces impose people to follow a specific kind of *behaviour setting* proper to that space; for instance, people tend to follow a certain type of behaviour setting in the theatres, airports, schools and even in laundries. In other words, an individual who has never been in a specific space experiencing a significant amount of environmental stress because of the one's first involvement, observes the others inside and follows out the same social norms and behavioural patterns so that this process helps to decrease the environmental stress and results as the adaptation of the being (Lawson, 2001).

According to Scott (2005), the strength of Barker's *behaviour setting* theory compared to other theories in psychology depends on the dominating effect of the concept of space free from the statue and different characteristics of individuals together with the concept of time; despite the temporariness of the individuals as beings in space, behaviour setting is permanent. Furthermore, according to Studer (1970), the key method to examine the interaction between

the individuals and the space can be attained through analysing the social organisation and through focusing on the actual experiences of them since the space created by the individual is a social phenomenon. For that reason, experiences of the individual should be systematically observed and recorded through behaviour maps in order to reveal behavioural patterns as a matter of fact.

In modern societies, the individuals are used to proceed a daily routine between their homes, schools and offices where they pursue some specific behavioural patterns. This case is not intrinsically different for children since from their early ages; they are also involved into such daily cycles where they eventually adopt specific kind of behaviour patterns. However, there are some periods interrupting that regular process such as illness periods throughout which the children may need to spend some time in a paediatric healthcare setting including unfamiliar physical and social attributes causing a significant amount of environmental stress. In relation to this discussion, Lawton and Nahemow (1973) assert that individuals who are highly stressed because of their illnesses, have more difficulty in fighting with the negative stimuli arisen from the environment.

Within this debate, it could be stated that children are regarded as more fragile beings compared to adults in terms of competing with environmental stress therefore they tend to react in fear and behave in unusual manners since their perceptual process are effected by their first-time experiences. Additionally, illness period of the child as an inpatient for a significant amount of time is also a stress generating time for the child's companion- an essential person fulfilling child's needs- because the daily routine of the companion is also harmed. For that reason, together with inpatient children, their companions' behavioural patterns are also deemed worthy to be examined as secondary social actors of this study.

The aim of this paper focuses on the interaction between the abruptly changed perceptual processes by behavioural patterns of children who are inpatients of a paediatric healthcare setting together with their companions, and existing physical characteristics of that setting. Through such an interdisciplinary approach using behaviour maps and space syntax, the study searches for statistically significant outcomes between the frequencies in behaviour maps and values gathered from syntactic analyses in order to discuss the social potentials of paediatric healthcare spaces in terms of *sociopedal* and *sociofugal* space. The notions of *sociopedal* and sociofugal space concepts are firstly put forward by Osmond (Lawson, 2001) in order to examine in what degree spaces are influential on the social interaction of the individuals; while *sociopedal* space tends to make an influence on individuals to socialize, *sociofugal* space tends to make an influence on individuals to become distant from each other, dependent on the configurational characteristics in both circumstances.

1.2 METHODOLOGY

The quantitative dataset of the behavioural patterns of both inpatient children and their companions revealed by *behaviour maps* are statistically correlated by the quantitative dataset of existing physical characteristics of the healthcare setting revealed by syntactic analyses. Data gathering process is conducted in two phases. In the first phase, each inpatient and his/her companion are separately observed for one hour to find out (1) behavioural frequency of each single space regarding inpatients (2) behavioural frequency of each single space regarding companions and in the second phase, the existing layout of the healthcare setting is analysed by Syntax 2D to find out the *integration, isovist area, isovist perimeter, compactness, circularity, occlusivity, connectivity and mean depth* values of each single space. Generated values are correlated by regression analyses through SPSS to search for significant outcomes.

Case study is implemented with the participation of 30 children between the ages of 7-18 and their companions. Selected space is in the Paediatric Haematology and Oncology Service of Medical Faculty of Cerrahpasa Hospital, Istanbul which accommodates a child-centred design facility. While the children participated into the study consist of 15 boys and 15 girls, all of the companions are women; 28 of whom are mothers and 2 of them are sisters of the inpatients.

The paediatric healthcare setting consists of a linear configuration that inpatients wards and other administrative spaces are lined up through each side of a long corridor (Figure 1). Inpatient wards are designed to accommodate a child with his/her companion including a bathroom inside. A transparent window visually connects the interior of each ward with the corridor so that a group of specialists may track the course of disease as a daily routine without entering inside because of the risk of an infection. The setting consists of 12 inpatient wards, a linear common balcony that can be reached through 10 of the wards, a nurse station with its dressing room and bathroom, medication room, specialist room, meeting room for the specialists, microscope room, medical intervention space, shared bathroom area for the companions, laundry, two storage rooms, common kitchen space for the companions to cook extra food, hospital school for the children to pursue their ongoing education and a playroom including various handicraft tools to spend their spare times.

In order to obtain mathematical data to reveal behavioural patterns of the participants, the paediatric healthcare setting had been visited for 20 days from 10:00 am to 18:00 pm observing and recording each participant for one hour. The participants were chosen from the ones between the ages of 7-18 who is staying in the healthcare setting five days in minimum. Behavioural patterns of the selected participants were recorded without disturbing them by eye contact so that they would not be aware that they are tracked. Together with recording who is visiting which space for how long, observed *behaviour setting* of noteworthy spaces is also revealed regarding each group of participants (Table 1).

Figure 1. Plan of the layout.

	Observed Behaviour Setting Regarding Inpatients (Children)	Observed Behaviour Setting Regarding Companions
In the ward	relaxing, sleeping, watching TV, playing with tablet, having conversation with their companions, nurses and other inpatients, watching sea from the window.	having conversation with their children, talking on the phone, handicraft activities like knitting, keeping medical track of their children, watching TV, cleaning the floors, changing the bedclothes, perform the ritual prayers of Islam.
In the play room	drawing, painting, having conversation with other companions, playing with a game console, playing with toys, doing a handicraft activity with a volunteered instructor, watching theatre, eating, watching others.	doing recreational activities, having conversation with other companions, doing a handicraft activity with a volunteered instructor, watching theatre, feeding their children, watching others, celebrating special occasions such as religious festivals and national holidays.
In the Hospital School	doing homework, learn something with the instruction of a teacher.	do not attend
In the Kitchen	are not allowed to enter.	preparing food on the table, cooking, accompanying others who are preparing food, drinking beverages, washing the dishes, having conversation with other companions
In the Corridor	walking back and forth with the serum hanger, having conversation with the nurses, companions and other inpatients, riding with a three-wheeled bicycle.	Having conversation with other companions, exchange information with the medical specialists, walking back and forth with their children, talking on the phone, taking raw food to prepare or to cook.
Laundry, Common Bathroom, Specialists Room	are not allowed to enter	Washing the laundry, talking to nurses and other medical specialists in their rooms, having a bath.

Table 1 - Observed behaviour setting dependent on some noteworthy spatial components of the paediatric healthcare setting.

2. DATASETS AND METHODS

2.1 WITHIN THE ACCUMULATION PROCESS OF BEHAVIOUR MAPS,

1. A grid representation of the layout is initially prepared for each inpatient and companion. Depending on the actual observation of an inpatient and his/her companion for 60 minutes, the time spent in space is highlighted – blue for the inpatients, magenta for the companions- in the units of minutes, as 1 minute equals to 1 pixel in the grid, recorded as the behavioural frequency of each single space (Figure 2).

2. In order to display the movement patterns of participants, another distinctive type of behavioural representation is implemented to indicate each participant's behaviour as an uninterrupted and continuous action so that every action of the being could be displayed in such a way that how the being 'weaves' the space. Whether the participant remain unchanged in one space, the action of the self is represented by a fixed dot in the map. Through the accumulated representation of behaviour patterns belonging to each group separately, it became possible to discover how the inpatients and companions weave the identical space through a unique way of movement (Figure 3).
3. By the time the observation process of all the participants is accomplished, a single representation of behaviour maps belonging to all 30 inpatients and 30 companions is arranged showing each group in total, on one separate representation (Figure 4).
4. Besides, the number of the change between spaces of each participant is also recorded to obtain every participant's behavioural frequency so that the mobility of each group is revealed as a quantitative data.

Figure 2 - Examples of behaviour maps of a child (left, with blue) and a companion (right, with magenta) through a pixel representation on a grid system of the plan.

Figure 3 - Examples of behaviour maps of a child (left with blue) and a companion (right with magenta) through weaved space representation.

Figure 4 - Behaviour maps of all participants represented with pixels and weaved space regarding the inpatients on the left, companions on the right.

Regarding the spatial usage frequency of each group, it is revealed that while the average spatial usage frequency of children is 4,03 and the average spatial usage frequency of the companions is 17,63. Together with the two representational expressions within the behaviour maps (Figure 4), this result shows that the mobility of the companions is significantly higher than the mobility of inpatients, and the companions travel back and forth between spaces very frequently.

3. RESULTS

3.1 RESULTS REGARDING THE BEHAVIOUR MAPS OF THE INPATIENTS

While the lowest behavioural frequency of children is identified as "1" regarding 11 children, the highest behavioural frequency of children is identified as "18" regarding only one child which means the children do not show an enthusiasm to change their spaces frequently. Regarding the fact that the wards (total spatial usage frequency of 12 wards: 1275) and the playroom (spatial usage frequency: 326) are the most visited spaces, the concepts of *personal space* and *privacy* become as prominent as the concept of *social interaction*. In this context, it could be stated that children had to spend a significant amount of time in their wards since they feel tired and exhausted because of their fragile circumstances but still prefer accompanying other children in the play room even with their serum hangers and masks on their faces, when they feel well. For that reason, play room can be evaluated as a *sociopedal* space regarding children's behaviour maps. On the other hand, corridor (spatial usage frequency: 106) is mostly used as an exercise axis to go back and forth since they are not allowed spending time at outdoors in case of an infection risk.

3.2 RESULTS REGARDING THE BEHAVIOUR MAPS OF THE COMPANIONS

While the lowest behavioural frequency of companions is identified as "1" regarding only one companion, the highest behavioural frequency of companions is identified as "32" regarding two of them. Compared to the children's behavioural frequency, it could be stated that the companions bear tremendous amount of responsibility since they have a heavy day routine supporting both the physical and psychological circumstances of their children.

The highest spatial usage frequency is the kitchen (spatial usage frequency: 280) as a space not only for cooking but also to adopt a new daily routine. Second highest frequency belongs to the ward number 9 (spatial usage frequency: 280) which is actually a coincidental case since the participants of the study were chosen unintentionally from this ward. Third highest frequency belongs to the corridor (spatial usage frequency: 199) as can be discovered from the high number of pixels and thickening lines (Figure 4) in the two behavioural representations. This result shows that corridor is not only used as a space to travel back and forth between spaces, but rather used to exchange information with the medical specialists, have a communication with others, welcome visitors on feet, have conversations on phone or burst into tears without showing themselves to their children.

3.3 RESULTS REGARDING THE SYNTACTIC ATTRIBUTES OF THE HEALTHCARE ENVIRONMENT

Through the accessibility graph which is structured to display walkable areas of the layout, the values of *integration, compactness, circularity, occlusivity, connectivity* and *mean depth* are obtained from the entrance fields of every space. Regarding this (Figure 5), while the highest integration value is revealed on the thresholds of the wards, the lowest integration value is revealed on the bathroom spaces within the wards. Secondary highest integration value is revealed at the common balcony that can be reached from 10 of the wards. Nonetheless, this spatial component is actually the least visited space because of the infection risk of the inpatients. Kitchen which is revealed as the most visited space by the companions in the behaviour maps, is syntactically exposed as a relatively deep space. However, in the actual condition, this space is far beyond its function providing solidarity between the companions in the service. The play room which is also a significant space having an average integration value is a significant space in the behaviour maps.

Figure 5 - Accessibility graph

The *isovist* graph which is structured to display visual connections between spaces present that windows providing visual contact both between wards-corridor and play room-corridor and make the total layout to be comprehended in a different manner (Figure 6). The highest visibility is displayed in a part of the corridor adjacent to the play room. The visibility of the play room may explain the sociopedal characteristic of that space as it is exposed in the behaviour maps, due to an assumption that children tend to spend significant amount of time in the playroom since they can be observed visually from the corridor and feel safe.

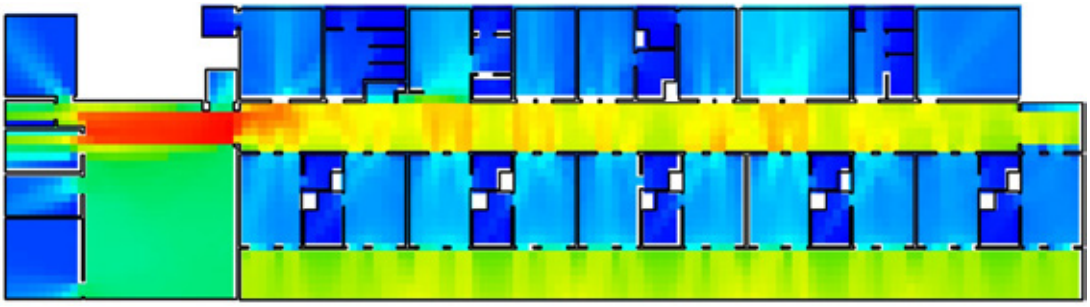

Figure 6 - *Isovist area* graph of the paediatric health care setting.

The compactness and circularity graphs are structured to display the spatial components related to the time spent in spaces; as the compactness value increases, time spent in that space increases, as the circularity value increases, that space tends to become a transferring area which is passed by quickly (Figure 7). For that reason, these two values should be evaluated together; while the compactness value is the highest in the play room providing inclusiveness, safety and joy in the compactness graph, circularity value is high in the corridor. However, corridor as exposed in the behaviour maps, is not actually a *passed by* component but rather a *sociopedal space* providing social interaction between the shared actors of the healthcare setting.

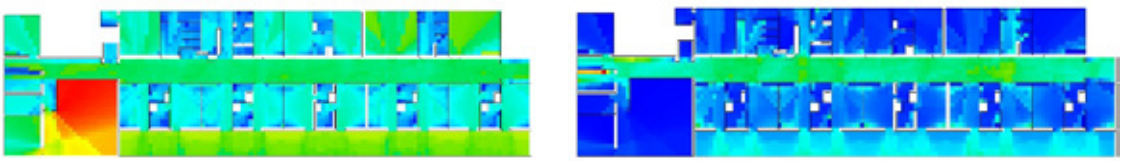

Figure 7 - *Compactness* graph (on the left) and *Circularity* graph of the paediatric health care setting.

According to Benedikt, in order to acquire a significant quantitative data of the total configuration regarding the interaction of the individual with the environment, more than one isovist input should be obtained and the relationship between these inputs should be examined (Batty, 2001). *Occlusivity* is identified by Benedikt (1979) as the "length of occluding boundaries within the isovist" (Batty, 2001; p.127) stating that *occlusivity* fields of a layout demonstrate the obstructed isovist spots so that *occlusivity* value might guide in redesigning of an environment.

Within this context, in the *occlusivity* graph, some specific areas in the play room, hospital school and nurse station appeared to be the most occlusive spaces (Figure 8). As shown in the isovist and compactness graphs, playroom has a high value in terms of visibility and compactness so that it might be assumed that the *occlusivity* of this space impose children positively to spend time within this setting. Despite the high *occlusivity* value in the hospital school, it is hard to make any comments since the classroom is only opened and used in control when the teacher comes to the healthcare environment. Additionally, it is also hard to make any comment about the *occlusivity* in the nurse station since this part is dominantly used by the nurses who are not in the scope of this study.

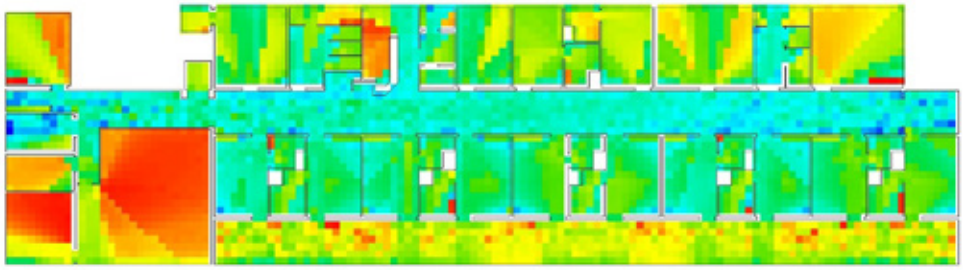

Figure 8 - *Occlusivity* graph of the paediatric health care setting.

In the *connectivity* graph which is structured to display the most associated and connected portions, some parts in the corridor connecting the doors opposing each other have high connectivity values (Figure 9). However, because of the fact that the wards are not welcoming spaces for the outsiders due to the risk of an infection, this syntactic value has no effect on the behavioural patterns of the participants.

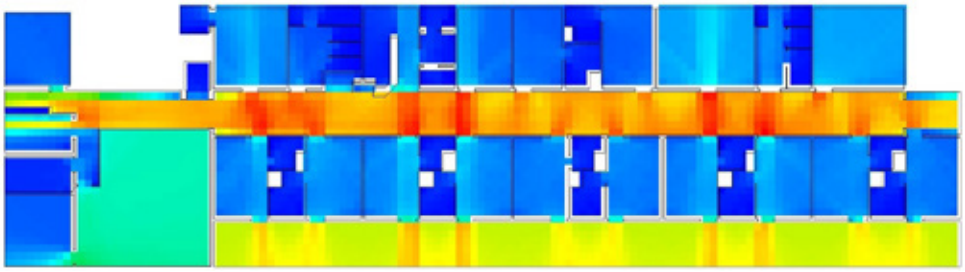

Figure 9 - *Connectivity* graph of the paediatric health care setting.

In the *mean* graph (Figure 10), while the corridor is the shallowest component, the deepest parts of the setting are demonstrated as the bathrooms inside the wards number 11 and 12. However, these wards are not used in a different manner compared to the other wards, so this syntactic value has no effect on the behavioural patterns of the participants. On the other hand, mean depth value of the play room nearly shows the same value as the bathrooms. Nevertheless, the play room is a frequently visited space both regarding inpatients and the companions as revealed in the behaviour maps. For that reason, this syntactic value also does not seem to have any impact on the behaviour patterns of the participants.

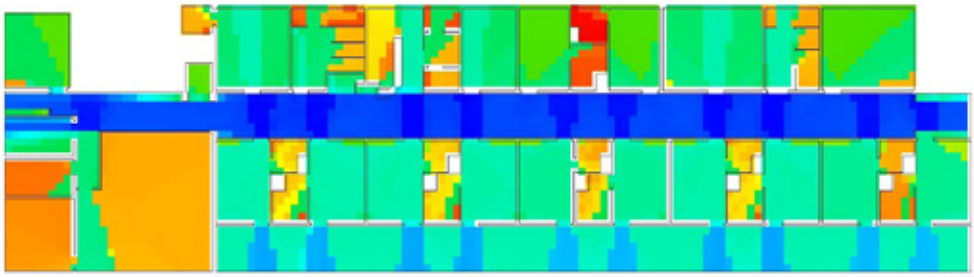

Figure 10. *Mean depth* graph of the paediatric health care setting.

3.4 CORRELATIONS

Considering the correlations between the spatial frequencies regarding the inpatients and the syntactic values of the spaces, behavioural patterns of children are not significantly correlated with any of the syntactic values.

The integration value of the layout does not affect the behavioural patterns since the inpatients do not have the option to move freely and actively because of their illnesses. Isovist area and perimeter values do not have any impact on the behavioural usage of spaces since children choose to either stay in their wards in an uninterrupted position keeping themselves in their personal spaces or spend time with some leisure activities in the play room in order to get into social interaction. Although the children tend to spend a lot of time in the play room, behavioural frequency of this space is not significantly correlated by its syntactic value since the highest amount of time is spent in the wards compared to the playroom. Corridor with the highest value in terms of circularity does not affect the behavioural frequency of inpatients since children actually use the corridor for a reason beyond its function; they pace back and forth to make some exercise even with their serum hangers since it is suggested to do so by medical staff. Connectivity value also does not affect the behavioural frequency of the inpatients since most of the spaces is restricted to be used by others. Mean depth value, with the highest degrees in the bathrooms of the wards, also does not have an impact on the behavioural frequency of the inpatients.

In summary, insignificant correlations regarding children, demonstrate that their fragile conditions caused by their serious illnesses concerned with oncology retain them to act freely so that they spend a significant amount of time in the wards in a relaxed position. But still, during the limited times when they feel relatively better, they prefer to visit the playroom even with their serum hangers, masks on their faces, or in wheel chairs and they spend plenty of time with other inpatients. Another reason of the playroom having high frequency in the behaviour maps of children is due to the fact that this setting is such a long-awaited spatial component resembling their schools where they were accustomed to gather with friends, play games and learn something. In other words, play room represents their previous daily routines they were bounded up.

Considering the correlations between the spatial frequencies regarding the companions and the syntactic values of the spaces (Table 2), behavioural patterns of companions are significantly correlated with *isovist area* and *isovist perimeter, circularity, occlusivity* and *mean depth* and not significantly correlated with *integration, compactness* and *connectivity* values. In other words, the behavioural patterns of the companions, as the mobile actors in the setting carrying tremendous physical and psychological responsibility, are correlated with the *visible, shallow, circular* and *occlusive* characteristics of spaces. Some comments regarding these results could be stated as follows;

1. The highest integration value of the corridor as exposed in the accessibility graph does not have a significant impact on the behavioural frequency of companions. This result shows that although the companions use the corridor for numerous reasons, they use the corridor for small amount of intervals but rather prefer to spend higher amount of time where they get into an extensive social interaction with others.

2. Compactness value also does not affect the behavioural frequency of the companions because they only visit the spaces with the highest compactness value – the play room- whether their children are there. Otherwise, they prefer spending time in the kitchen where they come across with their peers.
3. *Shallowness* regarding the significant results in the *mean depth* value and *circularity* values regarding the corridor, have a significant effect on the high frequency of the behaviour patterns of the companions. Companions use the corridor very frequently both to keep up their daily routines in the service and search for social interaction due to the lack of a gathering space for them.
4. *Isovist perimeter* and *isovist area* values regarding the playroom have a significant effect on the high frequency of the behaviour patterns of the companions. Children feel safe in this setting because of the reason that they do recreational activities, and they also feel safe due to the visibility value of this space. Since the companions go along with their children all the time during the day, they also share this space with other children and their companions, so that playroom turns into a space for solidarity for everyone in the health care setting.

	r^2	p	significance
Behavioural frequency of spaces regarding companions; integration value of spaces	0,207	0,188 > 0,05	insignificant
Behavioural frequency of spaces regarding companions; isovist area value of spaces	**0,323**	**0,037 < 0,05**	**significant**
Behavioural frequency of spaces regarding companions; isovist perimeter value of spaces	**0,513**	**0,001 < 0,05**	**significant**
Behavioural frequency of spaces regarding companions; compactness value of spaces	-0,4	0,801 > 0,05	insignificant
Behavioural frequency of spaces regarding companions; circularity value of spaces	**0,472**	**0,002 < 0,05**	**significant**
Behavioural frequency of spaces regarding companions; occlusivity value of spaces	**-0,328**	**0,034 < 0,05**	**significant**
Behavioural frequency of spaces regarding companions; connectivity value of spaces	0,22	0,161 > 0,05	insignificant
Behavioural frequency of spaces regarding companions; mean depth value of spaces	**-0,308**	**0,048 < 0,05**	**significant**

Table 2 - Linear regression correlations between the frequencies of companions and the syntactic values of the layout.

4. CONCLUSIONS

The daily routine which the children are accustomed to pursue through specific kinds of behaviour patterns, is occasionally interrupted due to an illness that might force them to be treated within a paediatric healthcare setting as inpatients. Such an unfamiliar kind of setting generates a significant amount of environmental stress on children imposing them to behave in different manners. Due to this fact, paediatric healthcare settings are used to be designed through a child centred approach presenting an effective layout including both *sociofugal* spaces to have some privacy, and *sociopedal* spaces to have social contact with other inpatients. However, other social attributes of paediatric healthcare environments, especially the inpatients' companions in the scope of this study, also need equivalent kind of physical and psychological desires since they are the active team mates dealing one-to-one with the ongoing illness period and fulfilling their children's necessities. This study examines how an actual healthcare layout effects the behavioural patterns of the participants -both inpatients and the companions- by using an interdisciplinary analysing method; space syntax and behaviour maps.

Inpatients are treated in a paediatric haematology and oncology healthcare setting within such circumstances that outdoor environments are kept in minimum due to a risk of an infection. So, configurational design quality of the layout gains significant importance in order to present the children a satisfying environment sustaining their well-beings and keeping them within a learning environment together with their peers. The wards where they spend plenty of time and keep their privacy can be arranged in such a way allowing them to add some kind of personalization enhancing their place attachments.

Within this context, regarding the sociofugal spaces in which companions can have an adequate amount of personal space and privacy, the syntactic configuration of a healthcare setting should allow companions where they can dress up, store some personal belongings, talk on the phone privately, watch TV and etc. Such kind of an arrangement could be facilitated through an open plan within the ward area. Additionally, regarding the sociopedal spaces in which companions can have an adequate amount of social interaction, the syntactic configuration can be organised in such a way that additional spaces for the companions can be organised where they welcome visitors and get into social interaction with their peers. Furthermore, during the periods when they accompany their children in the playroom, flexible arrangements could be organised allowing companions to learn something new and developing themselves during this mandatory period. All types of attempts associated with additional setting for the companions should be organised through a design attitude providing adequate amount of transparency to keep their children in sight so that they could pursue their daily routines without neglecting their children.

In conclusion, significant results exposed in this study verified that the spatial layout of the paediatric healthcare settings should be evaluated enabling such spatial components maintaining the *personal space*, *privacy* and *social interaction* requirements through a holistic approach regarding all of the social actors; mainly the companions right along with enhancing the spatial conditions of the inpatients. It can be concluded that while a child-centred design approach within a paediatric health care environment supports the well-being of the inpatient both physically and psychologically, the design program and spatial characteristics of these settings should also facilitate such spaces supporting the companions' needs, focusing both their *privacy* and *social interaction*.

REFERENCES

Batty, M. (2001). 'Exploring isovist fields: space and shape in architectural and urban morphology'. *Environment and planning B: Planning and Design*, 28(1), 123-150.

Benedikt, M. L. (1979), 'To take hold of space: isovists and isovist fields'. *Environment and Planning* B, 6(1), p. 47-65.

Kaminski, G. (1989). The relevance of ecologically oriented conceptualizations to theory building in environment and behavior research. In Advance in Environment, *Behavior and Design* (pp. 3-36). US: Springer.

Lawson, B., (2001). *Language of Space*, Oxford: Architectural Press.

Lawton, M. & Nahemow, L. (1973). Ecology and the aging process. In C. Eisdorfer and M. Lawton (Eds.), *The psychology of adult development and aging*. (pp. 619-674). Washington: American Psychological Association.

Moore, G. T. (1979). 'Architecture and human behavior: The place of environment-behavior studies in architecture'. *Wisconsin Architect*, 18-21.

Scott, M. M. (2005). 'A Powerful Theory and a Paradox Ecological Psychologists After Barker'. *Environment and behavior*, 37(3), 295-329.

Studer, R. G. (1970). 'The Dynamics of Behavior-Contingent Physical Systems', In: H.M. Proshansky, and L.G. Rivlin, (eds.), *Environmental psychology: Man and his physical setting*, (pp.56-76), New York: Holt, Rinehart and Winston.