

#125

SOCIAL INTERACTION IN CIRCULATION SPACES OF ELDERLY CARE INSTITUTIONS

ESRA AKAN

Istanbul Technical University
esakan65@hotmail.com

ALPER ÜNLÜ

Istanbul Technical University
aunlu@itu.edu.tr

ERINCIK EDGÜ

Istanbul Commerce University
erincik@gmail.com

ABSTRACT

The world is getting older; according to the UN Population Fund (UNFPA) in 2050 the expected population of people over 60 is estimated reach around two billion. Both because of the aging population and the changing family compositions, in today's society elderly care institutions have become the preferred living spaces. Therefore it is pertinent that the relationship between spatial configuration and socio-behavioural patterns of the elderly be examined and clarified for the benefit of users and future designs of such institutions.

According to Lawton and Nahemow's Ecological Theory of Adaptation and Aging (1973), interactions between behavioural and perceptual responses of users in a spatial configuration play a crucial role in the formation of the environment. The physical configuration can be transformed into a new setting, where the hard programmed circulation spaces gain fluidity enabling a softer medium. As a part of a dissertation, it has been previously observed that circulation spaces are among these softer environments where users may change the functional layout according to their preferences. Therefore, the purpose of this research is to examine the social interaction of residents in the circulation spaces of two elderly care institutions. The case study has been conducted with a total of sixty elderly users, where their behavioural modes and usage frequencies are observed along with the collection of their socio-demographic data by face to face interviews. Outcomes of the behavioural and syntactic data are analysed and compared through simple regression correlations.

Consequently, it is seen that two different spatial configurations have both adaptive and non-adaptive determinants on the spatial behaviour. For example, in one institution, social interaction needs of the residents have led them to transform circulation spaces into social gathering areas, where socio-petal functional usage frequency complies with syntactic outcomes. On the other hand, the second institution strictly follows the rules of predesigned functions even though syntactic outcomes point out deeper spaces. These results imply that different spatial configurations have different effects on the behaviour and perceptions of the elderly, which can be transferred into future investments and designs of care institutions to ensure the comfort of this age group.

KEYWORDS

Elderly care institutions, social interaction, circulation spaces, adjustment.

1. INTRODUCTION

The world is getting older; according to UN Population Fund (UNFPA) in 2050 the expected population of people over 60 is estimated to reach around two billion. Family and social structures have been changing since the early 20th century leading a transition from extended family structures to nuclear families. Other factors such as death of a spouse, financial, physical or psychological issues have also accelerated the isolation of the elderly causing the care institutions to become the preferred designated places for them. In previous research examples (Havighurst, et. al., 1968; Linn, 1974; Carstens, 1985; Bowhuis, 2003, Webb and Weber, 2003; Imamoğlu, 2007; Taneli, 2007), it was found that the process which directs the elderly to the institutions is mainly related to financial, housing and adaptation problems and through these studies several models of elderly housing were presented. For example, The Progressive Privacy Model (Trotter et al., 1998) allowed public, semi-public and private areas to be separated into different zones in order to keep the level of access and control in balance. Zeisel (1981) changed both design and configuration in the renovation work done for the assisted living facility built for Alzheimer's disease patients; architecture, landscaping and interior spaces were re-planned to increase the auto-control skills and memories of the patients. Functional zones were located in the perceptible and easily accessible spaces in the general layout and therefore programming supported the participation of the users. According to Zeisel, by making such changes, users felt more competent and were able to maintain their social interactions by controlling their environment both physically and psychologically. Hanson and Zako (2005) examined the quality of life and spatial relationships in living environments by explaining the relationship between the design components of the space and user performance. The results of the analysis showed that the hotel-type elderly living houses provide a better life quality with a well-equipped environment, controlled choices and easy access to social areas. Meanwhile, in Wojgani and Hanson's (2007) configuration, public spaces with high social interaction were located around the main entrance, while spaces providing privacy were positioned away from the entrance. The technological developments, gerontology, and the changes in the approach to the administrative policies have transformed and improved the design intellect towards designing more elder friendly spaces. In this context, we see a divergence from a home environment towards a new medium for the elderly. However, even though this trend has evolved, until now little importance has been given to research on the spatial features of these institutions.

This paper discusses the spatial features of elderly care institutions based on observations conducted in the circulation spaces, as a part of a larger dissertation research. As we will discuss further in the following section, decreased levels of movement, i.e., the loss of mobility is among the gerontological definitions of elderly behaviour. Therefore this research focuses on the movement based social interaction and the occurrence of functional adjustments within the configurations of circulation spaces, in the context of two elderly care institutions from Istanbul, Maltepe Elderly Care and Rehabilitation Institute (MECRI) and Etiler Elderly Care and Rehabilitation Institute (EECRI). As the initial observation suggested that the horizontal configuration eased the spatial adjustment within the predesigned circulation spaces, contrary to the vertical configuration that maintains its defined function-space relationship, the paper focuses on the reasons behind this initiative. It is found that based on the location of predesigned social spaces, horizontal configuration directed the social interaction towards circulation routes while the vertical configuration accumulates social interaction at the centre. Considering the effect of movement for encounters and therefore socialising, the aim of this research is to demonstrate how the elderly users transformed the circulation spaces of the building programs according to their sensory needs, user interaction and socio-cultural backgrounds.

2. CONCEPTUAL FRAMEWORK

Comparison of socio-spatial behaviour of the elderly users necessitates behavioural, gerontological and syntactic theories to be discussed. Initially considering the cognitive memory of space, we think that aging is caused by two important factors: the first one is the imaginary parameters that are occupied in the spatial memory and the second one is the decrease of these images due to decrease of mobility. Imaginary parameters that are occupied in the spatial memory are the representations of points in the cognitive maps and cognitive memory. Although this idea can be seen as a general theoretical phenomenon due to the fact that regardless of age component these images compose the memory, the scale of cognitive map boundaries of the elderly however, begins to shrink with age. There may be lesser imaginary nodes that create richness in the elderly brain to be presented; therefore we need to examine the common characteristics of these lesser cognitive nodes.

Referring to the second factor we have mentioned above, the main reason of the lesser imaginary nodes in the cognitive memory of the elderly is the decline of mobility. The important imaginary points detected in the cognitive memory can be summarized as points of stratification composed of small memory units superimposed on the daily movements, routine and monotonous behaviours of the elderly. These small memory units help the elderly users' daily motion trajectories, while forming their cognitive memories. Therefore the elderly adopt these routine modes of movement and demand these specific places to continue their routines, and even though these places are sometimes fixed spaces, they are always preferred.

An important element of spatial memory and cognition is the spatial behaviour. The place where a certain behaviour occurs, social aspects of the behaviour, posture, mobility and immobility, kinaesthesia, social environment, the phenomenology of space; in short, the intertwining of the limited movement, content and the routine of the place constitute the basis of the gerontological spatial memory. The analysis described above can be explained by the Adaptation Level. According to Lawton and Nahemow's Ecological Theory of Adaptation and Aging (1973), interactions between behavioural and perceptual responses of users in a spatial configuration play a crucial role in the formation of the environment. They evaluated the affective and behavioural conditions with personal efficiency, competence and the warnings received from the interaction between the physical and social environment. As shown in Lawton and Nahemow's theory, the medium and the content of the movement that affect the memory of the elderly is being trapped between press and competence and also its appearance on the spatial memory. The level of adaptation is important for the elderly; in this sense, elderly people either show behavioural reactions against spatial configurations of their institutions or they adjust themselves, while modifying the functions of spaces with their usage modes. This adjustment is easier when the physical configuration can be functionally transformed into a new setting, within circulation spaces gaining fluidity, and enabling a softer medium.

Architectural space brings people together or keeps them apart. Osmond (1959) classified two kinds of conversational space; non-supportive socio-fugal and supportive socio-petal. Being large, open, and expansive, with high ceilings and bright lighting, socio-petal spaces tend to bring people together, encouraging conversation while, socio-fugal spaces with lower overhangs and dim lighting tend to drive people apart and discourage social interaction (Sommer, 1969; Hall, 1966). Recent researches claim that the spatial layout of the building influences the user's social life by creating different patterns of encounter and communication (Penn, 1999; Sailer and Penn, 2009; Sailer et al, 2013). In consideration of this situation, space syntax (Hillier and Hanson, 1984; Hillier, 1996), as a robust methodology providing objective metrics, has been applied in an increasing number of studies on environmental-behaviour research linking human behaviours to spatial configuration (Hou, C., Marquard G, 2015). Both these concepts are important in meeting the social needs of elderly care institution users. As the literature suggested long, one-dimensional axial shapes of narrow roads give little feeling of space, the visual field along with postures affects the flow of movement and social behaviour, whereas large convex spaces are the places where elderly people rest, children play and bazaars are set up (Gibson, 1950; Seamon, 1994; Chang, 2002; Edgü, 2003). Older adults want to see rather than to be seen; therefore prefer to sit in areas with larger visual scopes such as the fringes of socio-petal spaces.

3. DEFINITION OF METHODOLOGY AND CASE STUDY AREA

As mentioned before this paper is derived from a Ph.D. dissertation and the proceeding methodology definition and stages are part of larger research (Akan, 2017). Within the scope of this paper, change of functional uses in the circulation spaces due to social interaction of two elderly institutions is comparatively examined. Space syntax is used as a tool to diagnose the different configurations of the institutions in relation to socio-psychological and socio-spatial parameters.

The case study dealt with the analyses of spatial configurations of the circulation spaces on the ground and first floors, on the basis of social interaction of the elderly. The selected institutions in Istanbul, abbreviated as MECRI and EECRI were designed by two of the most prominent architects of Turkey. MECRI was built in 1975 in a suburban region of Istanbul for lower-middle class residents while, EECRI was built in 1985 in a central neighbourhood for the upper-middle class. MECRI is a low-rise horizontal building in a large plot with three blocks, connected by a linear circulation route; while EECRI is a high rise vertical building on a relatively small plot with enclosed circulation routes within blocks. MECRI has its social block connected to the administrative units, while in EECRI the social block is separated from the administration. As we will discuss further in this paper, the clear separation of administrative units versus the integration of these, affects the behavioural patterns of the elderly. The motivation for this research was the question as to why the circulation spaces of MECRI were being used for social interaction other than obvious movement based functions whereas EECRI circulation spaces were not.

The data for the socio-psychological and socio-spatial parameters of the comparative research are obtained by three stages. In the first stage behavioural modes and usage frequency at the institutions are observed. This method is used to present the frequency and duration of interaction between residents and spatial configuration. In the second stage a total of sixty elderly users are interviewed face to face in order to collect socio-demographic data; however the outcomes of this stage is used for data comparison and presented only in interpretations. In the third stage, regarding integration, connectivity, isovist area and isovist perimeter values, building plans and sections are analysed using space syntax tools. All of the data are analysed and compared through simple regression correlations using the SPSS in order to determine if the designs of elderly care institutions acted in coincidence with users.

3.1 THE DATA FROM OBSERVATION

In both institutions, eight observation nodes, selected from entrances, circulation routes and day time gathering spaces are determined for the research (Figures 1 and 2). These nodes represent the highest level of interaction, on the circulation areas where comparisons are conducted. In MECRI the determined nodes are MA₁ (A block entry), MA₂ (A block ground floor corridor), MA₃ (A block first floor corridor), MA₄ (A block corridor transformed by elderly), MC₁ (C block entry), MC₂ (C block ground floor corridor), MC₃ (C block first floor corridor), MC₄ (C/social block connection corridor). In EECRI the determined nodes are EA₁ (A block entry), EA₂ (A block ground floor corridor), EA₃ (A block first floor corridor), E₄ (circulation area of the social block in ground floor), EC₁ (C block entry), EC₂ (C block ground floor corridor), EC₃ (C block first floor corridor) and E₇ (circulation space of social block on first floor). Figures also present interior views from the mentioned nodes, however the photo shots were intentionally blurred in order to maintain the privacy of residents. We can briefly, express that in MECRI it is observed that the residents prefer to spend time in spaces that involved activity rather than the allocated spaces of social interaction, whereas the allocated social spaces were occupied by residents of EECRI. The frequencies collected from the observations are then compared with syntactic data. In MECRI it is also observed that users prefer corridor areas for social interaction where both internal and even external mobility in the garden could be seen. In EECRI, however corridor areas only presented interior motion and deep structure in general caused these spaces to be used only for circulation.

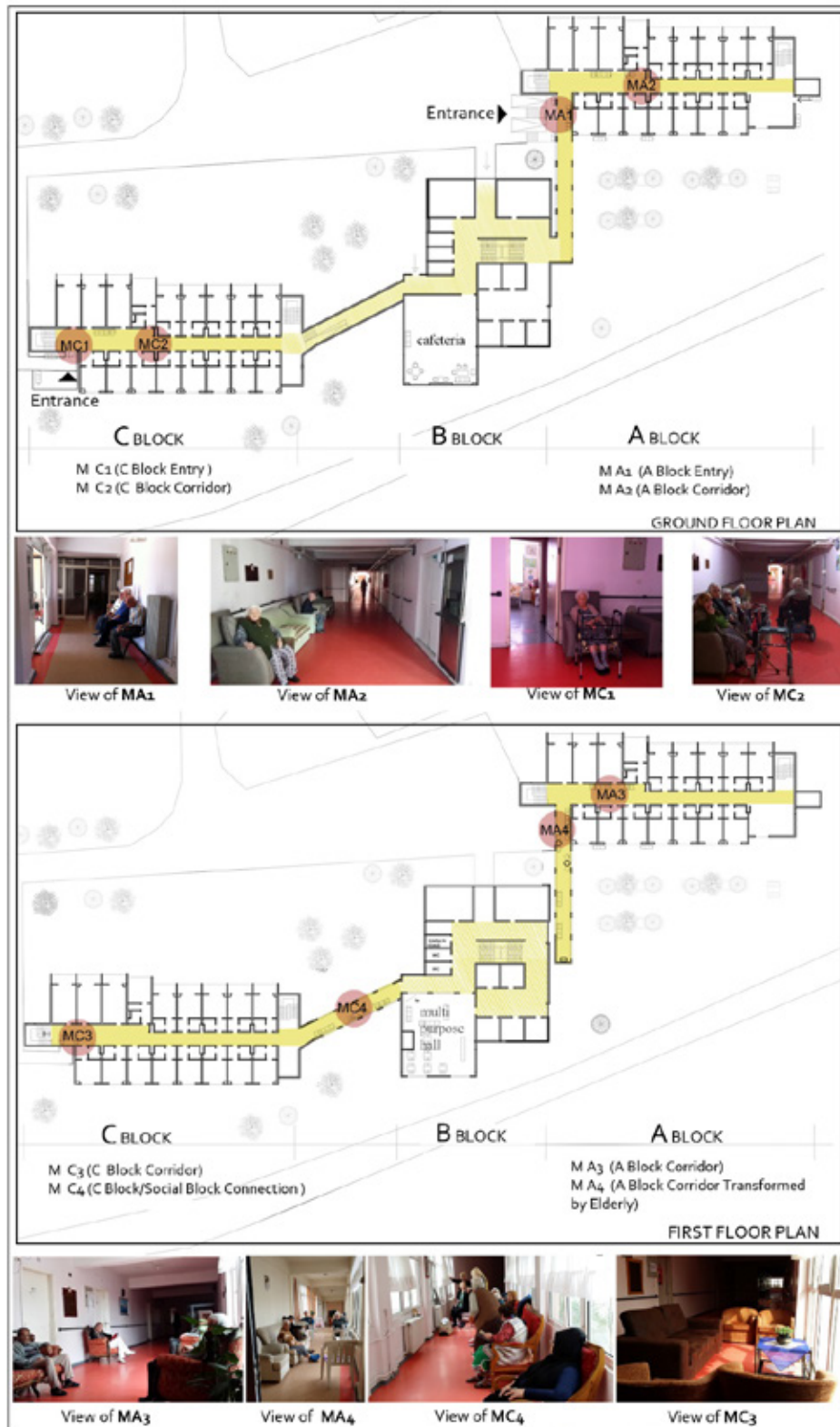


Figure 1 - MECRI Views from the Observation Points on the Ground and First Floors.

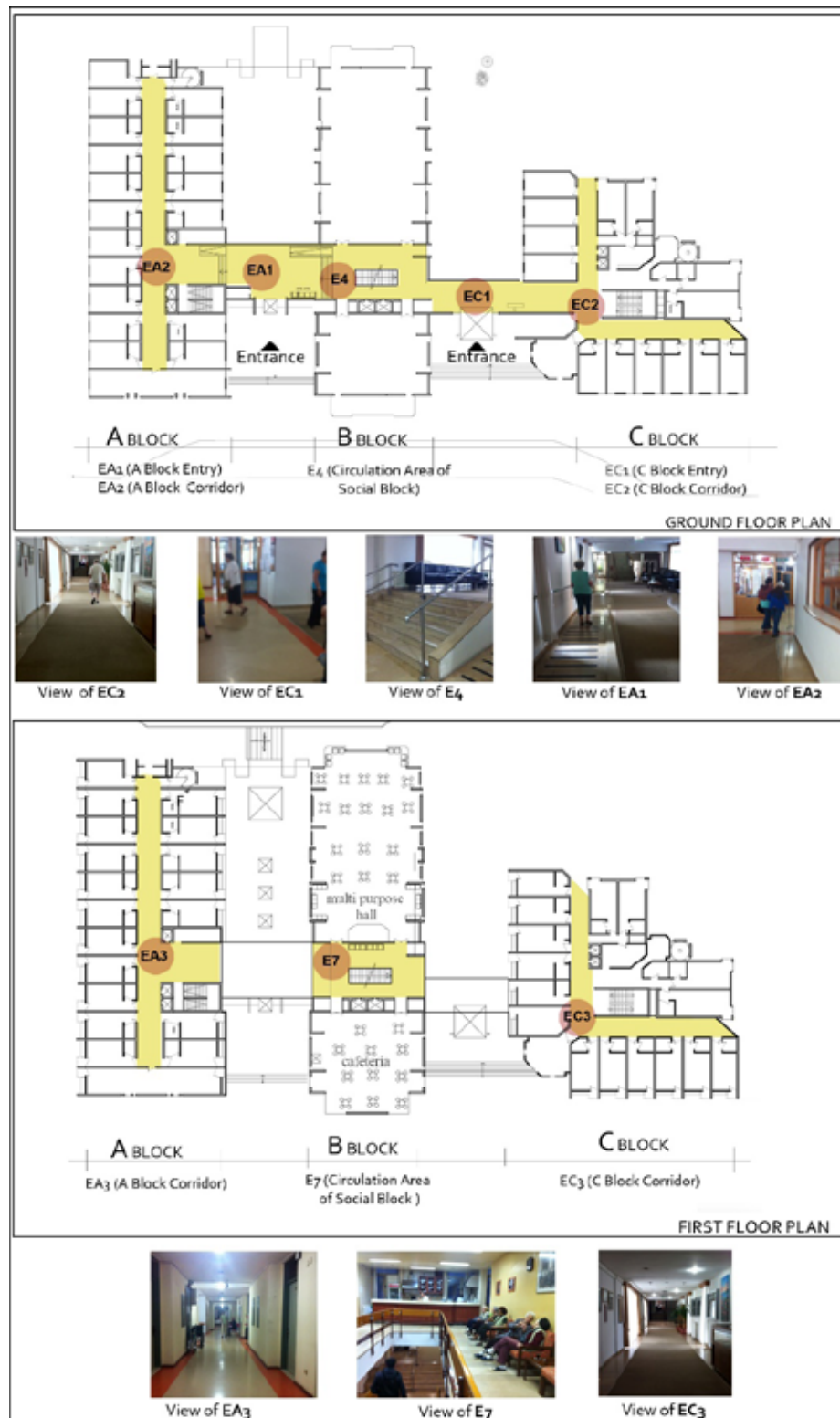


Figure 2 - EECRI Views from the Observation Points on the Ground and First Floors.

In order to define the most socially active spaces, an observation method was executed at both institutions on weekdays from 10.00-12.00 a.m. to 14.00-17.00 p.m. (30 minute intervals) on ground and first floors (Table 1). This observation presents the frequency of interaction between the elderly users due to the spatial configuration. The modes are grouped according to individual activities and social activities that took place within the selected nodes. As it can clearly be seen from the table, MECRI users are observed to have spent relatively more time in the circulation spaces compared to EECRI users. As mentioned before, the socio-demographic data of the elderly users were conducted to collect information on the residents' ages, gender, level of education and experience at the institutions. Although the length of stay in the elderly care institution, defined as the experience, is rather high for both groups therefore preventing occurrence of any significant difference, the remaining data gathered at this stage is used for interpretations of the acquired data. In this sense, users of the lower status institution prefer to spend more time in public spaces of the building compared to observed privacy of the higher status institution users.

Circulation Spaces		Behavioral Modes			Usage Frequency (Number OfTotal Users)
		Individual Modes		Public Interactive Modes	
		Chilling	Watching/ Reading	Chatting	
MECRI	MA1 (A block entry)	44	0	11	55
	MA2 (A block corridor/ground floor)	41	0	7	48
	MA3 (A block corridor/first floor)	0	0	15	15
	MA4 (A block corridor transformed by elderly / first floor)	25	39	27	91
	MC1 (C block entry)	5	1	2	8
	MC2 (C block corridor/ground floor)	13	18	0	31
	MC3 (C block corridor/first floor)	9	4	0	13
	MC4 (Cblock/social block connection corridor)	23	9	25	57
EECRI	EA1 (A block entry)	14	0	4	18
	EA2 (A block corridor/ground floor)	1	0	0	1
	EA3 (A block corridor/first floor)	1	0	0	1
	EC1 (C block entry)	1	0	0	1
	EC2 (C block corridor/ground floor)	3	0	0	3
	EC3 (C block corridor/first floor)	0	0	4	4
	E4 (circulation space/social block/ground floor)	24	22	32	78
	E7 (circulation space/social block/first floor)	12	0	21	33

Table 1 - Usage Frequency in Circulation Spaces of MECRI and EECRI

3.2 PLANAR AND SECTIONAL ANALYSIS

In order to define the syntactic properties of the elderly care institutions, the ground and first floors of the buildings are analysed through the University of Michigan licensed "Syntax 2D" software. As the hypothesis suggests a relation between elderly user's spatial behaviours, social interaction and configuration, integration and isovist area analyses are executed (Figures 3, 4 and 5). In order for the analyses to be compared on a similar quantitative base, plans were divided into a grid system, where 2.25 cells were calculated per m² on a span size of 150 units. According to this assumption, MECRI was divided into 6324 cells, while EECRI was 6356 cells.

Integration analyses are used to show if the socially interactive spaces of the configurations overlap with the actual user preferences and if there is a significant change related to the configuration of the circulation spaces. Isovist area analyses are used to show if the range of vision promotes user preferences in socially interactive spaces and if there is an adjustment made by users. In both cases the gardens are included in the analyses as the visual access of the elderly is considered more important than their physical access, especially when the factor of daylight played a crucial role. Since a user sitting by the window can easily perceive both outside and inside, with the highest isovist area count, it is seen that the width of the visual scope and thus integration are congruent with the actual user preferences independent of the original function attached, as we will discuss in the following section. Especially in MECRI, the mean syntactic values obtained showed that the stage-like characteristics of the linear connection tubes provided a reason for functional transformation of the spaces.

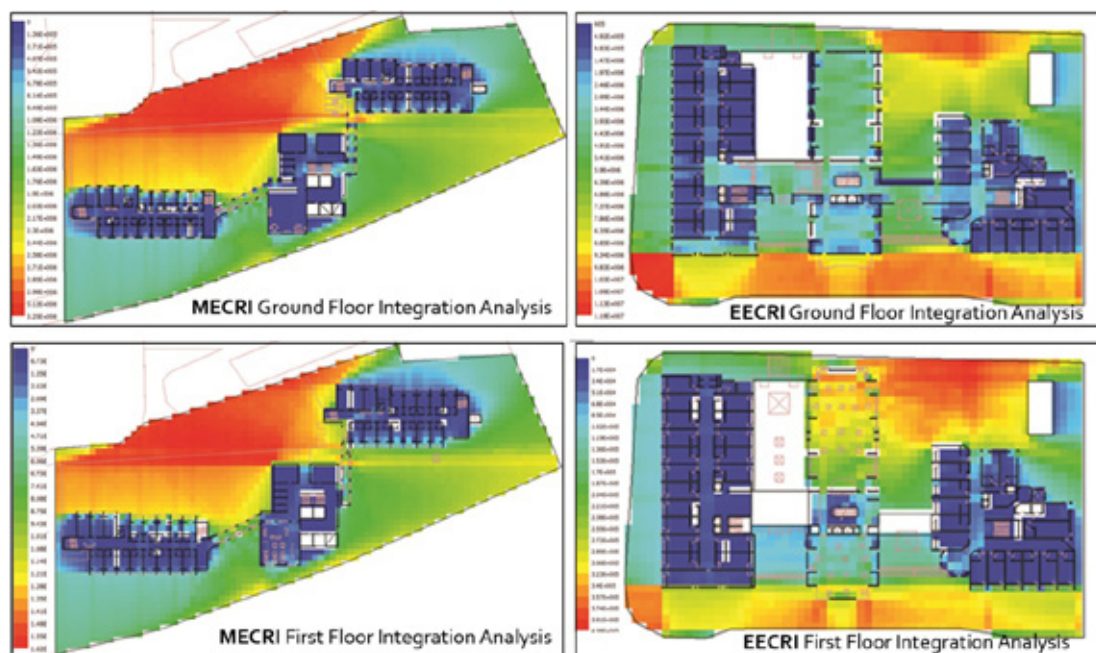


Figure 3 - MECRI and EECRI Ground and First Floor Integration Analyses.

MECRI showed the most shallow and therefore the most integrated areas of the ground floor plan is the A Block entrance, while on the first floor highest integration values are obtained from the daytime room, the corridor entrances, and the connection corridors between the blocks. These integrated spaces are defined as sociopetal spaces that increased social interaction complying with the data obtained from the observations. Within the configuration of EECRI we also see congruence between the frequency of usage and the high integration level of predesigned social spaces such as the multipurpose hall and cafeteria. In EECRI, elderly users prefer to occupy defined social interaction areas that have high integration values; therefore they do not feel the need to convert the circulation spaces (Figure 3).

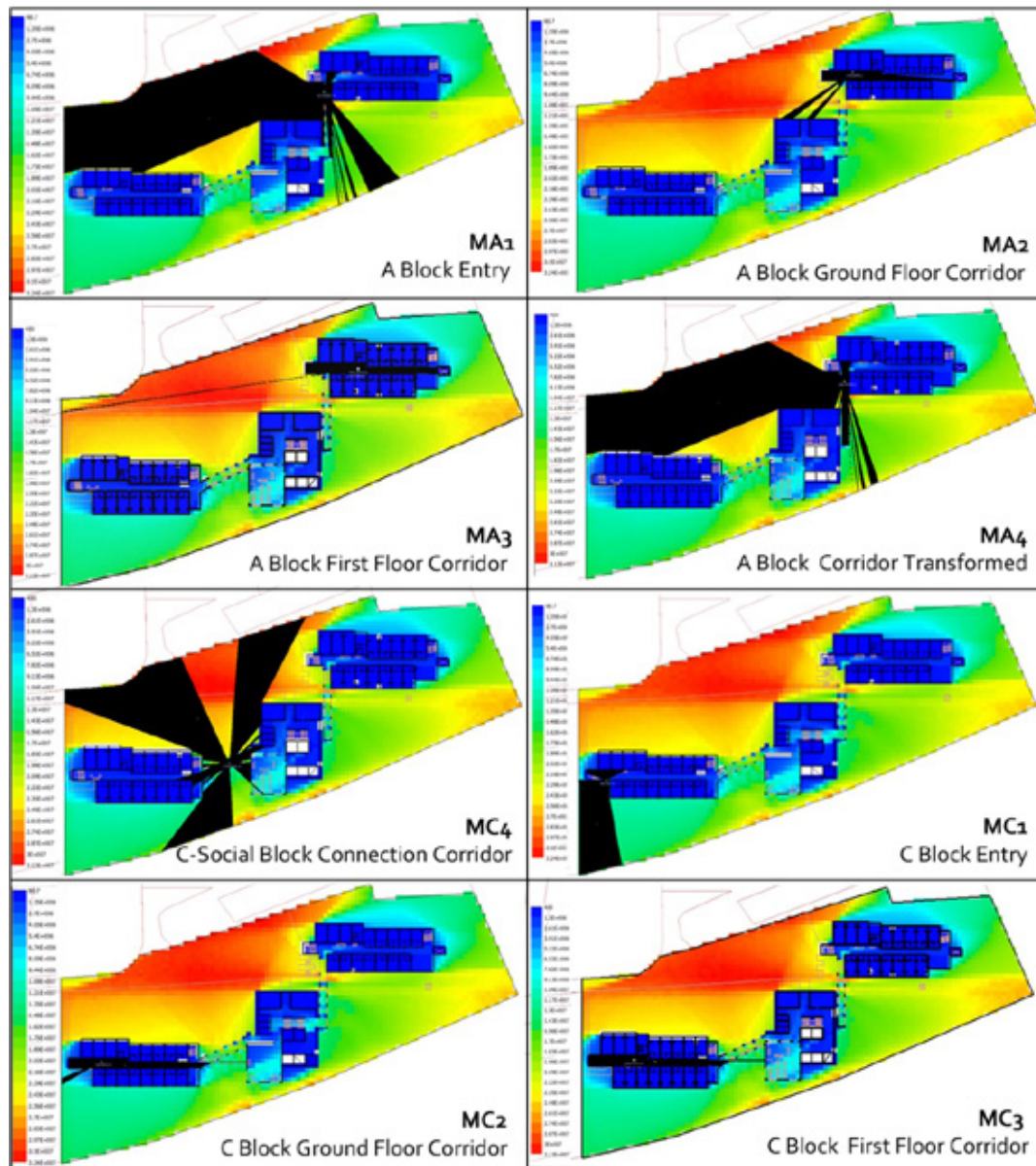


Figure 4 - MECRI Isovist Area Analyses from Observation Points.

In MECRI, circulation area nodes of MA₁, MA₄ and MC₄ are the converted social interaction spaces that also have the highest levels of isovist area values. Similarly the expanding corridor entrances such as MA₂, MA₃, MC₂, and MC₃ nodes also attract users and thus social interaction to these spaces (Figure 4). In these results we can clearly see the effect of garden view in the user preferences. On the other hand, in EECRI, EA₁ and EC₁ as the ground floor entrance nodes, have the highest levels of isovist area values. However the user preferences of these nodes are not in compliance with syntactic outcomes, as EA₁ is preferred for hanging; EC₁ does not present any significant user activity. The isovist area values of nodes EA₂, EA₃, EC₂ and EC₃ do not present significant user activity as they do not carry social interaction. E₄ and E₇ on the other hand, owe their user activity frequencies to the functional uses of these areas, where these nodes are located on the circulation routes that that connect social spaces. At this point, it is noted that EECRI users are not as flexible as MECRI users (Figure 5).

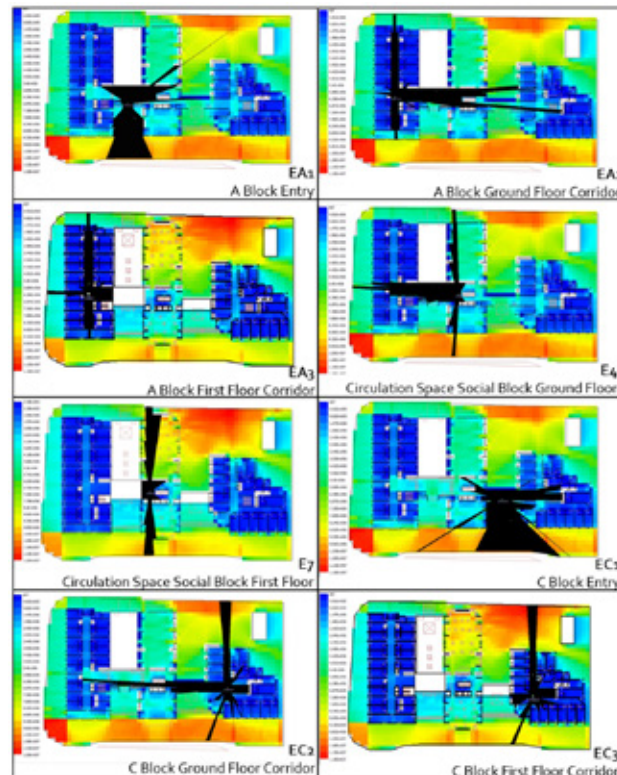


Figure 5 - EECRI Isovist Area Analyses from Observation Points.

On the other hand, in the section analyses, as the floor height is 3.00 m, eye level is considered to be located at the 1.50 m regarding age related shortened stature. As the section boundaries are set according to building heights, horizontally configured MECRI and vertically configured EECRI have different isovist areas based on these geometric layouts (Figures 6 and 7). A user at eye level can have maximum visibility potential with reference to the configuration of the circulation spaces at the node. Presumably, MECRI circulation spaces have vast potential at the section level; an elderly can easily see both interior and exterior dynamic life, so the isovist areas are larger than EECRI.

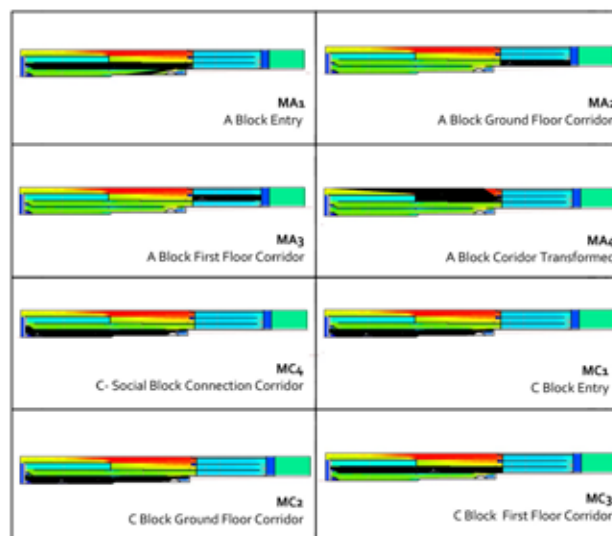


Figure 6 - MECRI Section Isovist Area Analyses from Observation Points.

As it can be seen from the sectional isovist area analyses, related to its horizontal layout MECRI has the highest isovist area values of front garden from A Block entrance, and the converted corridor area located on the first floor. The front garden is the immediate exterior space with high mobility and dynamism; lower status users appreciate their larger panoramic views more than the higher status users. On the other hand, vertical configuration of EECRI maintains highest levels of isovist area around the social centres which also explains the reason of increased social interaction in these nodes. Corridors are deep spaces which are only used for circulation as the user frequency observations also suggest. According to the spatial configuration of the buildings, the section analyses show that MECRI expands the social interaction horizontally, while EECRI accumulates social interaction in the centre around the social block.

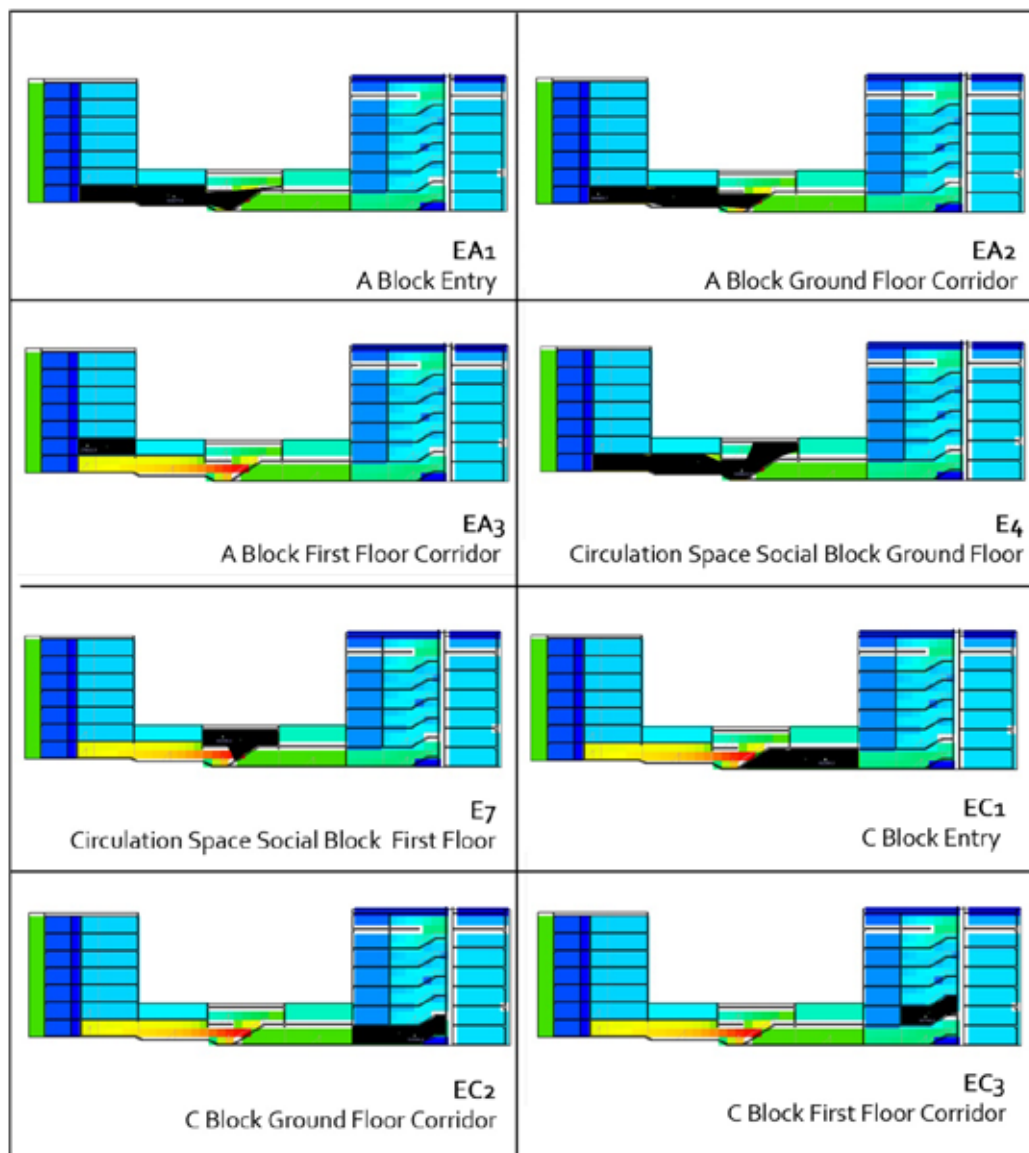


Figure 7 - EECRI Section Isovist Area Analyses from Observation Points.

4. ANALYSES AND RESULTS OF THE CASE STUDY

Behavioural and syntactic data obtained from the circulation spaces of the elderly care institutions, are analysed and compared through SPSS (Statistical Package for the Social Sciences) software. As the literature suggested that elderly people prefer to be a part of the action as the audience rather than an active participant, the configuration of the social interaction spaces, was attached importance. However as it was observed, elderly behaviour was different in the circulation spaces of the institutions. The linearity of the low rise horizontal configuration enabled users to transform and convert the functions of the predesigned circulation spaces in favour of social interaction, while the compact/vertical configuration maintained its defined function-space relationship. Therefore, it is seen that both configurations have adaptive and non-adaptive determinants on spatial behaviour.

The observation method, helped to determine the actual usage frequency of elderly residents, and it was observed that in MECRI they were interacting within spaces which did not include the intended functions. It was determined that the most frequently used spaces in the institution were the A Block entrances, connection tubes (corridors) and the thresholds of these transition spaces instead of the configured social interaction spaces. Although the interaction was side by side instead of face to face in the linear order, elderly users moved social spaces to shallow regions. The fact that in the general spatial configuration, the spaces where the social interaction could be formed, such as the multi-purpose hall and cafeteria, were overlooking the backyard, yet not meeting the sensory and affective needs of the elderly, lowered their usage frequency. Elderly users preferred not to use these designated spaces, both because of their perceptive distance from where corridors needed to be walked and the unwillingness to reach there by passing through administration halls.

The results of the comparison of total user frequencies acquired from the observations with values of integration, connectivity, isovist perimeter and isovist obtained from planar analyses are given in Table 2. As the table shows, these values were positively correlated with the user preferences in MECRI's circulation areas, whereas in EECRI there was no significance in correlations. As mentioned before, elderly residents in EECRI preferred to spend time and socialize in the predefined social activity spaces and they used the circulation areas solely for passing functions. The largest values of isovist area in EECRI were obtained from the block entrances. Although these points are located on thresholds, predefined functions of the spaces attracted more users and thus frequency of usage was higher in these nodes. Integration values on the other hand, overlapped with functional usage located on the central axes, so this value did not reflect any significance in correlation on the circulation routes.

In the case of MECRI however, we see higher values of correlation with the user frequencies and syntactic data. As it can also be seen from Table 2 and Table 3, the highest values of both isovist area and integration within the interior of the institution, were collected from the circulation tubes that connect the building blocks together. Even though they may be located on a relative shallower section of the configuration, the assigned spaces for social activities however, remain on the opposite side of the garden view. Therefore, it was not surprising to see that the elderly residents preferred to spend more time on these circulation routes, where there is movement and sunshine; thus they socialized by means of encountering and interaction. We see a transformation of circulation spaces into social interaction spaces; i.e. we see a softened programming. Regarding the regression analyses of usage frequency and syntactic values in the circulation spaces, a significance was seen in the correlations of usage frequency-integration $R=0,752^*$, $p=0,031<0,05$ and usage frequency-isovist area of MECRI $R=0,759^*$, $p=0,024<0,05$. Whereas in EECRI correlation of usage frequency-integration and usage frequency-isovist area presented no significance. As seen in the simple regression analysis, EECRI circulation spaces are used for transition, while MECRI circulation spaces for social interaction.

Institution	Behavior Modes	Syntax Values From Layout			
		Isovist Area	Isovist Perimeter	Integration	Connectivity
MECRI	Chilling	R=0,586 p=0,127>0,05	R=0,572 p=0,134>0,05	R=0,594 p=0,120>0,05	R=0,585 p=0,128>0,05
	Watching/ Reading	R=0,340 p=0,410>0,05	R=0,353; p=0,391<0,05	R=0,313; p=0,0450<0,05	R=0,321 p=0,438>0,05
	Chatting	R=0,686 p=0,061>0,05	R=0,706 p=0,050=0,05	R=0,690 p=0,058>0,05	R=0,691 p=0,058>0,05
	Total Usage Frequency	R=0,759 p=0,024<0,05	R=0,768 p=0,0264<0,05	R=0,752 p=0,031<0,05	R=0,751 p=0,032<0,05
EECRI	Chilling	R=0,484 p=0,224>0,05	R=0,682 p=0,063>0,05	R=0,437 p=0,279>0,05	R=0,430 p=0,276>0,05
	Watching/ Reading	R=0,265 p=0,526>0,05	R=0,493 p=0,214>0,05	R=0,213 p=0,612>0,05	R=0,229 p=0,585>0,05
	Chatting	R=0,232 p=0,581>0,05	R=0,387 p=0,343>0,05	R=0,194 p=0,646>0,05	R=0,200 p=0,634>0,05
	Total Usage Frequency	R=0,337 p=0,414>0,05	R=0,537 p=0,170>0,05	R=0,290 p=0,486>0,05	R=0,299 p=0,472>0,05

Table 2 - Syntax Values from Layout.

In the section analyses a mild correlation can be implied between isovist areas and watching/reading, functions contrary to expectations of chatting function which suggests a social interaction. However we can interpret this situation in relation to the preference of elders being an audience, as the users prefer to occupy socially interactive spaces with large views in MECRI even though they are busy with individual actions.

- In MECRI users prefer to spend time in integrated circulation spaces containing movement and dynamic activities, closer to their private room units, while EECRI users prefer to act with the designed configuration as getting social in social activity spaces and only using the circulation routes that are close to these socially interactive spaces.
- MECRI users prefer to be side by side while in EECRI privacy control is preferred.
- As the level of education increases, movement according to configuration increases, layout can be easily decoded and used; however the formal or flexible manners of the administrations also play a major part .
- Socioeconomic factors also affect the social interaction, relations with the neighbour users and immediate environment gains importance as the income level drops; whereas access to exterior socio-cultural life increases parallel to the level of status. Relatively lower social status is observed to be in connection with traditional social interaction levels such as conversations with neighbours on streets or village weddings of Anatolian cities.

The case study conducted in the elderly care institutions focused on the interrelation of effects of spatial configurations on the spatial behaviours of elderly users, and the responses towards the configurations, by means of mutual interaction and conversion. Therefore in MECRI we see that transformation of linear circulation spaces into social gathering areas, where user frequencies of socio-petal functions complies with syntactic outcomes, are related to the social interaction needs of the elderly residents. On the other hand, EECRI strictly follows the rules of predesigned spaces of the vertical configuration and use the assigned functions, even though syntactic outcomes may indicate deeper spaces.

The horizontal geometric configuration in MECRI has a structure that frames the front garden with three main blocks and connection corridors linking them together. This causes the spaces

of social interaction within the building to concentrate on the borders. In EECRI, the vertical configuration directs users towards centralized predesigned social interaction spaces which are closer to the garden. In addition differences between a multi-storey, tower-like structure of EECRI, and horizontal, low-rise human scaled formation of MECRI also affect elderly spatial behaviour. The effect of garden panorama in MECRI is an important factor of social interaction by aligning the garden with the corridors forming the borders. In EECRI garden panorama is accessed from the rooms on the upper floors. As it is shown in the above explanations, dynamics such as cultural structure of the elderly, level of education, economic level and social environment can influence the formation of the spatial configuration of social interaction of circulation spaces of elderly institutions.

5. CONCLUSION AND DISCUSSION

As we live in a world where the population of people aged over sixty increases and family structures continue to change towards a nuclear family, it is relevant that the design of institutions which cater to the elderly receive more attention by the architectural community in order to utilize features such as spatial configuration and socio-behavioural patterns to the benefit of elderly residents. In this research it is seen that by exploration of the spatial features of elderly care institutions, controlled choices and easy access to social areas gain importance in relation to social status of the users. Relationship between spatial configurations and socio-behavioural parameters such as aging, adaptation and interaction of the elderly users rely on their spatial perceptions and competencies based on movement patterns. As a result of the research conducted it is evidenced that different configurations have different effects on the spatial behaviour and perceptions of the elderly, who may choose to adjust configurations or reject and reorganize them according to sensory and affective needs, user interactions or socio-cultural backgrounds.

Horizontal low-level design leads to a more flexible structure for peripheral access to the interior and exterior. Areas of social interaction necessitate easy access so as to allow elderly users this peripheral access regardless of active participation. An additional affective factor is the institution's administrative support and positive reaction to elderly user's preferences. Furthermore an increased amount of linear routes, where both residents and guests frequent the space also contribute to the social interaction in circulation areas. These factors offer elderly users a theatre like experience to observe the dynamics of the facility regardless of participation.

In this context, it is recommended that a suitable approach in the design of elderly institutions such as areas for social interaction follow hard programming that allows users of the configuration to be adjusted to harmonize with the spatial behaviour of the elderly enabling users to feel safe and in greater control of both social interaction and privacy leading to a better quality of life in elderly institutions. These findings can be transferred into future investments and designs of elderly care institutions in order to ensure the specific needs of this age group, such as considering the physical, psycho-social and psycho-spatial features of the architectural designs.

REFERENCES

- Akan, E. (2017). Yaşlılık Kurumlarında Yaşlı Mekansal Davranış ve Bilişiminin Mekansal Dizim Bağlamında İrdelenmesi (Examination of the Cognition and Spatial Behaviour of Residents in Elderly Care Institutions Using Space Syntax). PhD diss., Istanbul Technical University, Istanbul.
- Bouwhuis, D.G. (2003). Design for person-environment interaction in older age: A gerontechnological perspective. *Gerontechnology*, Vol.2, pp. 232-246.
- Carstens, D. Y. (1985). *Site Planning and Design for The Elderly*, New York, Van Nostrand Reinhold.
- Chang, D. (2002). Spatial choice and preference in multilevel movement networks. *Environment and Behavior*, 34: 582.
- Edgü, E. (2003). Konut Tercihlerinin Mekansal Dizin ve Mekansal Davranış Parametreleri ile İlişkisi (Relation of the House Preferences with Space Syntax and Spatial Behaviour Parameters). PhD diss., Istanbul Technical University, Istanbul.
- Gibson, J. (1950). *The Perception of the Visual World*. Boston: Houghton Mifflin Press.
- Hall, E. T. (1966). *The Hidden Dimension*. New York: Doubleday & Company, Inc., pp. 70-75.
- Hanson, J; Zako, R. (2005) Configuration and design in caring environments: syntax and quality of life in a sample of residential care homes for older people. Presented at: Proceedings of the 5th International Space Syntax Symposium June 2005, Volume 2.
- Havighurst, R.J., Neugarten, B.L., Tobin, S.S. (1968). *Disengagement and Aging. A reader in social psychology*. Chicago University of Chicago Press.
- Hillier, B., Hanson, J. (1984). *The Social Logic of Space*. Cambridge University Press, Cambridge.
- Hillier, B. (1996). *Space is The Machine. A Configurational Theory of Architecture*. United Kingdom: University of Cambridge.
- İmamoğlu, Ç. (2007). Assisted Living as a New Place Schema: A Comparison With Homes and Nursing Homes. *Environment and Behavior*, March 2007 39:246-268. <http://online.sagepub.com/> Retrieved May, 2015, from <http://eab.sagepub.com/content/39/2/246.full.pdf+html>
- Lawton, M. P., Nahemow, L. (1973). Ecology and the Aging Process. In C. Eisdorfer & M. P. Lawton (Eds.), *the Psychology of Adult Development and Aging*, 619-674, American Psychological Association, Washington D.C.
- Linn, M. (1974). Predicting Quality of Patient Care in Nursing Homes. *Gerontologist*, Vol.14, p. 225-227.
- Osmond, H. (1959). The relationship between Architect and Psychiatrist. *Psychiatric Architecture; a review of contemporary developments in the architecture of mental hospitals, schools for the mentally retarded, and related facilities*. Edited by C. E. Goshen. Washington, DC: American Psychiatric Association.
- Penn, A. (1999) Space Syntax: a theory with a toolkit. Presented at: First International Space Syntax Symposium.
- Sailer, K., Pachilova, R., Kostopoulou, E., Pradinuk, R., Mackinnon, D, Hoofwijk, T. (2013). How Strongly Programmed is a Strong Programme Building? A comparative Analysis of Outpatient Clinics in Two Hospital, Proceedings of 9th International Space Syntax Symposium, Seoul, South Korea, 31 October - 03 November 2013.
- Sailer, K., Penn, A. (2009). Spatiality and tran spatiality in workplace environments. In: Koch, D. and Marcus, L. and Steen, J., (eds.) *Proceedings of the 7th International Space Syntax Symposium*. (pp. p. 95). Royal Institute of Technology (KTH): Stockholm, Sweden.
- Seamon, D. (1994). The Life of the Place, *Nordic Journal of Architectural Research*, 35-48.
- Sommer, R. (1969). *Personal Space: The Behavioural Basis of Design*. Englewood Cliffs, NJ: Prentice-Hall, Inc.
- Taneli, Y. (2007). *Assessing The Relationship Between Long-Term Care Environments and Agitation in People with Dementia: A Systemic View of The Long-Term Care Environment*. Phd Dissertation, Wisconsin Milwaukee University.
- Trotter, E., Phillips, M., Watson, L. (1998). *Remodelling Sheltered Housing*, Housing 21, London.
- Webb, J.D., and Weber, M. J. (2003). Influence of Sensory Abilities on the Interpersonal Distance of the Elderly. *Environment and Behavior*, September 2003 35: 695-711, <http://online.sagepub.com/> Retrieved May, 2015, from <http://eab.sagepub.com/content/35/5/695.full.pdf+html>.

Wojgani H., Hanson J. (2007). Extra Care Housing: A Paradigm Shift. Proceeding 6th Space Syntax Symposium, Istanbul. Weisman, G.D. (1981).

Zeisel, J. (1981). Inquiry By Design: Tools for Environment-Behaviour Research. Cambridge University Press. Pp. 166-171.

URL-1 <<http://www.unfpa.org/ageing>> Accessing Date 5.01.2017.