

Behavioral responses of the elderly regarding spatial configuration: An elderly care institution case study

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Abstract

This article details a study presenting behavioral responses of elderly users regarding spatial configurations within an elderly care institution, using the “Space Syntax Method” within the framework of “Environment Behavior Studies”.

The case study reveals a variance of both adaptive and maladaptive behavioral responses towards spatial configurations regarding the elderly and their residential environment. A linear configuration is seen at the Maltepe Elderly Care & Rehabilitation Institution where behavioral responses are emphasized by analyses of how the design of elderly care institution corresponds directly with the spatial behaviors of elderly users’ overtime, utilizing the Observation Method. The linear configured elderly care institution shows an increase in behavioral responses in low level interaction (socio-fugal) areas whereas a decrease is seen in highly social interaction (socio-pedal) areas. Two different syntactic analyses are made with the inclusion of the garden area and without demonstrating the visual relationship with outer space. In doing such, it can be seen that both affective and behavioral needs of this particular age group into the design of elderly care institutions are a relevant parameter to be included as a conceptual framework within the architectural design process.

Keywords

Behavioral responses, Elderly, Elderly care institution, Spatial configuration, Space syntax.

1. Introduction

The aging of the population is an increasingly important issue in this century, especially considering how this issue affects all aspects of society including but not limited to health, social security, environment, architecture, socio-cultural activities and family.

From the beginning of the 20th century, influenced by the age of industrialization, rapidly improving technologies, urbanization and an individualized life cycle there have been many changes in both family and social structures. The transition from extended family structures to immediate family which has been influenced by status and the decreased ability of function in the elderly has caused many of the elderly to become isolated. Factors such as the change in traditional family structure, death of spouse, decrease in income levels, not having social security, nor security in living alone have made the lives of the elderly living alone quite difficult. Therefore for these and other reasons, elderly care institutions have become the preferred living space for the elderly in recent times. However whereas trends may have changed in recent times, until now little importance has been given to studies on the spatial features of such elderly care institutions being sufficient in meeting the physical, social, psychological needs and expectations of the elderly.

2. Conceptual framework

As part of "Environment Behavior Studies", the conceptual framework includes the scope of "psycho-spatial" and "psycho-social" concepts as well as "architectural design" and "elderly user spatial behavior and responses" which due to their importance are being set forth and examined syntactically with the Space Syntax Method. Due to having a framework which holds multiple disciplines together, the importance of parameters regarding the study are being discussed with a transactional approach.

2.1. Environment behavior studies

According to Altman (1975), the features of human-environment relations are classified in biological, physical,

psychological and socio-cultural levels. In research, the psycho-spatial processes concerning the elderly have multiple conceptual infrastructures. For this reason, separate identification of these concepts is important in terms of the behavioral spatial processes of the elderly users in order to understand and measure information concerning elderly care institutions. These concepts are the factors that form behavioral patterns concerning spaces and are discussed within the context of ecological harmony regarding the elderly and environmental stress, personal space, belonging, and social interaction, in order to form a space syntax relation. Osmond (1959) classified two kinds of conversational space; non-supportive socio-fugal and supportive socio-pedal. Being large, open, and expansive, with high ceilings and bright lighting, socio-fugal spaces tend to drive people apart and discourage social interaction. In opposition, he believed that smaller spaces with lower overhangs and close lighting, socio-pedal spaces tend to bring people together, encouraging conversation. Both these concepts are important regarding the elderly care institutions meeting their social needs. The literature suggests that older adults want to see rather than be seen, they sit in the areas surrounding open spaces, almost preferring the exterior edges of socio-pedal spaces (Sommer 1969).

The primary target of analysis conducted is to understand the potential of physical spaces bringing the elderly users together dependent on their spatial behaviors. Within the scope of this article, the harmony of elder users' spatial behaviors within spatial configurations form interactions at specific locations anticipated by the architect or reactions towards spatial configuration in which conversion or localizations of space in the different areas were seen.

Within the context of Environment Behavioral Studies, Lawton and Nahemow (1973), as part of "Ecological Theory of Adaptation and Aging" evaluated the affective and behavioral conditions with personal efficiency, competence and the warnings received from the interaction between the physical and social environment or as a results of its relation with environmental

press. When a user reaching a certain level of competence shows behavior in an environment where there is also a certain level of press, the behavioral output is seen in the zone continuing between positive and negative zones. These zones are rated according to their level of behavior and influenced between competence and press is defined as the adaptation level.

If environmental press reaches a high level, it means the competence level is also increased. Alternatively when there is a drop in environmental press, although behavioral output is generally positive if in fact it is of any significant measure the situation may lead to distress, sensory illness and behavioral anxiety, which is not organized (Ünlü, 1998). In that sense, elderly people in their institutional care environments show behavioral reactions against spatial configuration or harmony with their spatial behaviors such as when modifying the function of the space.

Site Planning and Design for the Elderly, by Carstens (1993), did discuss issues relating to aging and presented recommendations for meeting elderly requirements and preferences (orientation and wayfinding, predictability and control, socializing, sensory stimulation, and environmental comprehension) and the practical requirements (safety and security, comfort, and physical, psychological and visual access).

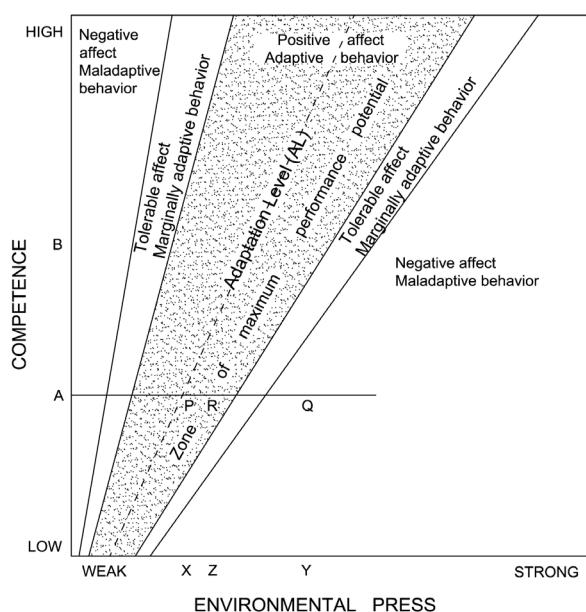


Figure 1. Lawton & Nahemow's ecological model of aging (1973).

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According to psychology, institutionalized elderly residing in a corporate environment are at a greater risk for depression. Long term care institutions recommend the elderly and their relatives to bring familiar and personal belongings in order to personalize the environment and alter the perception of the environment. Yet although significant, a negative impact is still seen (Eshelman et al., 2002). However, regarding interior decoration objects, wallpaper upholstery materials combined with a friendly environment similar to a home image accentuated with the use of lighting elements aids it giving a feeling of familiarity and safety (Kopec, 2012).

According to Zeisel's (2005) case study in the Alzheimer's Assisted Living Treatment Residence, both the design and layout were modified for people living with Alzheimer's disease and the architecture, landscape and interior were planned to augment memories and the ability of self or auto-functioning. By taxing the areas of residents' brains which functioned well and relieving damaged areas, the entire individual was supported. Residents felt at home, competent and in control as much as their age allowed.

2.2. Social structure of space and space syntax based theories

Space syntax is a theory and methodology used to define structural environments. The theoretical base was first set forth by Hillier and Hanson (1984) in a book entitled "Social Logic of Space" in which the thesis states there is a relation between outside factors that generate forms and social powers. According to Hillier and Hanson (1984) the biggest obstacle in creating better designs lies in the fact that the relation between social structure and spatial organization was not being fully understood. In order to achieve this more emphasis must be placed on the interdisciplinary literature of space and society. The Space Syntax theory is used as a parameter of spatial scheme defining behavioral changes, cultural differences and social functions. This theory is used within the context of elderly care institutions by measuring the design forms of buildings as well as

the interaction between elderly users, which aims to provide readability from an architect's perspective.

According to Seamon's (1994) phenomenological approach, humans are in close relationship with the world and it is believed that the two create and reflect upon each other. For example, long, narrow roads are cold, give little feeling of space and are perceived with their one-dimensional axial shapes, movement flow and circulation area. On the other hand, large convex spaces are the places where elderly people rest, children play and district bazaars are set up. If axial spaces are mostly connected with gradual change and interaction amongst residential districts and neighborhoods, convex places are connected with the meaning of these spaces which provides an opportunity to read architectural plans with Space Syntax analysis (Edgü, 2003).

In a study regarding the elderly conducted on the remodeling of a care institution, progressive privacy is turned towards access to public and common areas as much as possible such as outside sheltered areas and can be controlled entirely by the user dividing the space into subsections (Trotter et al., 1998). The Progressive Privacy Model with public, semi-public and private areas separated into different zones allows balance to be kept in the levels of access and control.

Concerning Wojgani and Hanson (2007) their configuration in which they redesigned an elderly care and rehabilitation center, located general spaces around the main entrance where social interaction was strong, removing personal spaces that enabled privacy from the entrance. With that configuration, they identified the physical features of spatial configuration as well as determined the social interaction of the space.

In this context, we see a move away from a home environment towards one that involves more experiences forcing users into a new environment for the elderly which carries the perimeter which includes psycho-spatial behaviors.

In the thesis study that formed the basis for this article, the hypothesis was that spatial configuration in elderly

care institutions is a determining factor on spatial behaviors and perception of elderly users. Therefore, with that in mind elderly care institutions should be analyzed in terms of environmental perception combined with the influence of spatial configuration which is demonstrated in this case study. It has been shown that spatial configuration does in fact cause behavioral responses on elderly users and the relation of spatial configuration in elderly care institutions concerning behaviors of these users are set forth and examined at a syntactic level.

3. Case study

In this case study, to what extend spatial configurations conflicted with spatial behaviors of the elderly and the level of relation between them have been emphasized as well as the adaptive or maladaptive behavioral responses imposed from the elderly.

In the elderly care institution that was chosen for this case study, behavioral responses of elderly users were emphasized by analysis of the influence of spatial configuration on spatial behaviors and responses as well as the interactions between them. Behavioral patterns within the scope of the architectural program were determined by observational method and perceptual features were digitized within Space Syntax parameters including the interaction between space configuration and users responses. By interpreting usage frequency of the space with a syntactic value and socio-pedal or socio-fugal space characters, the developed adaptive or maladaptive behavioral responses of users towards spatial configurations were shown.

The Maltepe Elderly Care & Rehabilitation Institution (MECRI) was designed by Yalçın Emiroğlu in 1975 and included in the complex was a residence for mobile and semi-mobile elderly with two units for eighty to one hundred people, a rehabilitation center, social services unit, central kitchen, laundry, infirmary and recreational facility. Each unit has three floors with gardens and sitting areas between them. The structural complex has a linear plan scheme on a horizontal settlement plan (Figure 2).

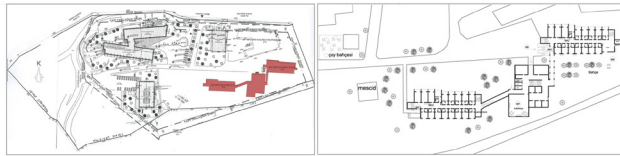


Figure 2. MERCI, layout and ground floor plan.

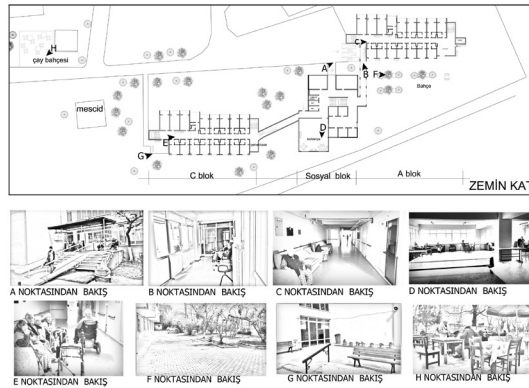


Figure 3. Views from the observation points on the ground floor.



Figure 4. Views from the observation points on the first floor.

With regards to the scope of this case study, Block A and C apartment units are discussed and have living units that generate a linear layout by lining up across along a corridor. All living units have a balcony and face south overlooking the landscape. The social block unit was planned separately from the living units, connected to the administration and in the entrance lies waiting, secretary, manager and meeting rooms. Further on the social area unit is accessible where in lies a multi-purpose hall, service area and cafeteria (Figures 3-4).

3.1. The identification of the method of case study

The relation between numerical values obtained and social structure are objectively identified. During identification of this relation, outcomes were

obtained from two stages of analyses providing definition of the different point characteristics of space. Firstly, by Observation Method, data acquisition at the MECRI was conducted on a day from 10:00 a.m. to 5:00 p.m. Secondly, by using the Space Syntax Method to acquire numerical and graphical data: Integration, Mean Depth, Isovist Area, Isovist Perimeter Analyses were made. These analyses and obtained values were then input into a two-dimensional plan of the space in the University of Michigan licenses "Syntax 2D" program and floor plans with the Space Syntax Method.

Data and Space Syntax data were overlapped with the "SPSS (Statistical Package for the Social Sciences)" statistical analysis program. During the first stage, correlation values were formed by overlapping elderly usage frequency data acquired with Observation Method and syntactic values acquired with the Space Syntax Method were then interpreted within the context of the hypothesis.

In order for these studies to be conducted initially effective parameters on spatial behavior and perception of the elderly users in an elderly care institution were set forth and associated (Figure 5).

Next, the necessary data within the context of the parameters and methods used to acquire data were determined. While specifying the method of study, concepts such as the elderly users, spatial configuration, spatial behaviors and perceptions were approached conceptually within the scope of the Space

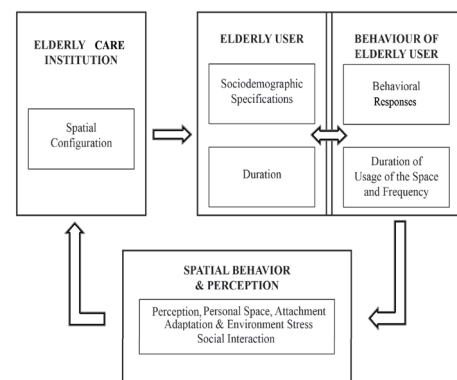


Figure 5. Parameters of elderly user's spatial behavior and perception in the elderly care institution.

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Syntax. By observing how elderly user perceived the environment and how they were affected by it, their spatial behavior was evaluated together with their adaptive or maladaptive behavioral responses.

The study conducted within this context is as follows:

- The method of periodic observation was used to present the frequency and duration of interaction between elderly users and spatial configuration.
- Analysis was performed regarding: integration, mean depth, isovist area and isovist perimeter utilizing the Space Syntax Method.
- Data were overlapped and read using the SPSS to determine if the designs of elderly care institutions act in coincidence with elderly users as well as the behavioral responses which the designs created on the user.

3.2. The data from observation

In the MECRI, interaction with spatial configuration and elderly users was conducted with the Observation Method. For elderly users to be observed in the institution, identification of the spaces where social interaction was most intense was necessary and such observations were conducted on the ground and first floors of the preferred spaces.

It was observed that elderly users preferred areas such as corridors and block entry areas which involved activity rather than places which were originally planned to be the social interaction areas. All observed points are described as follows:

- MA1 (A Block Entry Area),
- MA2 (A Block Ground Floor Corridor Area),
- MA3 (A Block First Floor Corridor Area),
- MA4 (A Block Daily Resting Room),
- M1 (Cafeteria),
- M2 (Multi-Purpose Hall),
- MC1 (C Block Entry Area),
- MC2 (C Block Ground Floor Corridor Area),
- MC3 (C Block First Floor Corridor Area),

- MC4 (C -Social Block Connection Area).

The areas allocated in the architectural planning as social interaction areas and also the spaces preferred by elderly users which were transformed to social interaction areas over time as well as the paths they followed while reaching these spaces are marked below (Figure 6-7).

In addition the behavioral patterns and the number of elderly users that were affected by the use of these spaces as well as their frequency have been shown below (Table1).

Utilizing the Observation Method, spaces and how often elderly users in the institutions used them along with behavioral moods and patterns which were periodically performed in this institution as well as social areas with high/low interaction levels are indicated in the below figures (Figures 8-9). The light colored areas are inter-grated, highly social interaction and socio-pedal areas, while the dark areas indicate depth and low social interac-

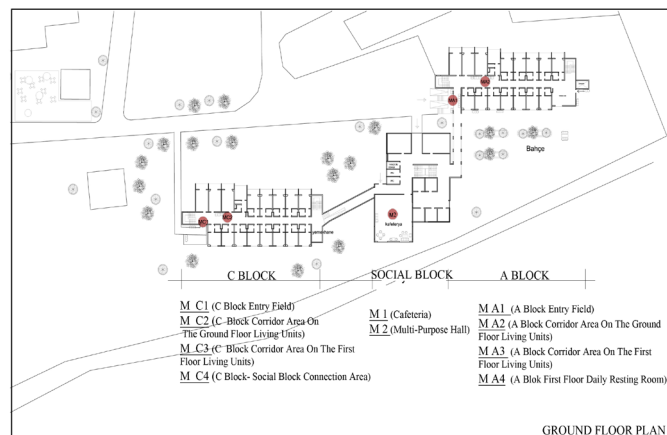


Figure 6. Ground floor observation points in MECRI.

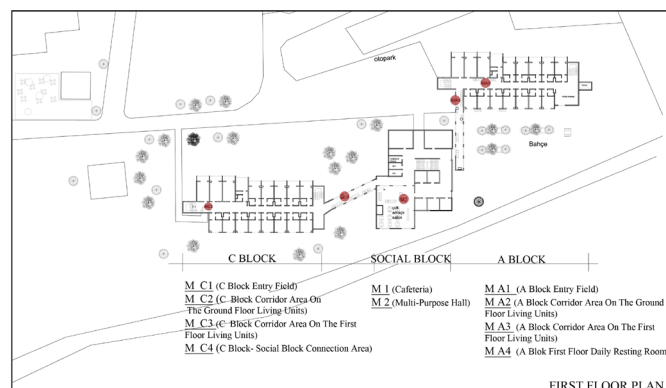


Figure 7. First floor observation points in the MECRI.

Table 1. The usage and the frequency of the spaces in the MECRI.

SPACES	OBSERVATION PERIOD 1. PERIOD (10:00-13:00) 2. PERIOD (14:00-17:00)	BEHAVIORAL MODES						NUMBER OF PEOPLE PASSING (30min Periyod)	USAGE FREQUENCY (Number of Total Users)
		INDIVIDUAL MODES			PUBLIC INTERACTIVE MODES				
		Waiting, Looking Around; Drinking Tea or Coffee etc.	Watching TV	Reading Newspaper or Book etc.	Standing Chat	Sitting Chat	Playing Card Game		
M A1 (A Block Entry Field)	10:00-17:00	44	0	0	8	3	0	99	154
M A2 (A Block Corridor Area On The Ground Floor)	10:00-17:00	41	0	0	6	1	0	51	99
M A3 (A Block Corridor Area On The First Floor)	10:00-17:00	0	0	0	11	0	0	32	43
MA 4 (A Blok Day Resting Room)	10:00-17:00	25	19	20	6	24	0	0	94
M C1 (C Block Entry Field)	10:00-17:00	5	1	0	1	1	0	20	28
M C2 (C Block Corridor Area On The Ground)	10:00-17:00	13	18	0.	0	0	0	13	31
M C3 (C Block Corridor Area On The First Floor)	10:00-17:00	9	0	4	0	0	0	21	34
M C4 (C - Social Block Connection Area)	10:00-17:00	23	1	8	4	16	0	3	55
M 1 (Cafeteria)	10:00-17:00	5	0	5	0	0	39	0	49
M 2 (Multi-Purpose Hall)	10:00-17:00	4	6	0	0	0	0	0	10

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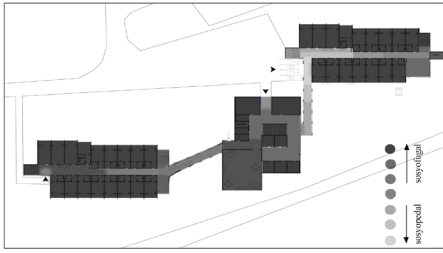


Figure 8. Ground floor social interaction character analysis in MECRI.

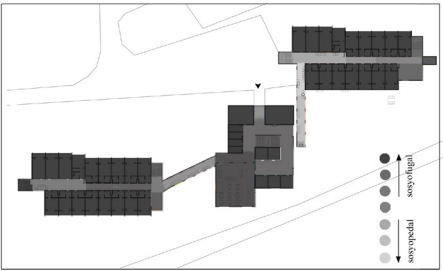


Figure 9. First floor social interaction character analysis in the MECRI.

tion and socio-fugal areas.

To what extent spatial configuration of the institution was, to what effect on the intergration level of the elderly was made and to what extent as well as the behavioral responses of the elderly were determined.

In the model below, set within the context of Person-Environment-Behavior, A- Environment Figures is quantitative figure for the MECRI, set forth by the Space Syntax Method. However, B- the Behavior in the Environment is qualitative and was acquired in the case study (Figure 10).

3.3. Space syntax data

The functional structure of the observed elderly institution was defined mathematically by identification of space and relations among them as a network.

The relation between the acquired numeric data and social structure was defined objectively and determined using the Space Syntax Method. For acquiring numerical and the graphical data four analyses were made; Integration, Mean Depth, Isovist Area, and Isovist Perimeter Analysis. Values were obtained by accessing the University of Michigan licensed "Syntax 2D" program in which separate analyses for the institution, the interaction between the spatial configuration and the elderly user behavior were questioned.

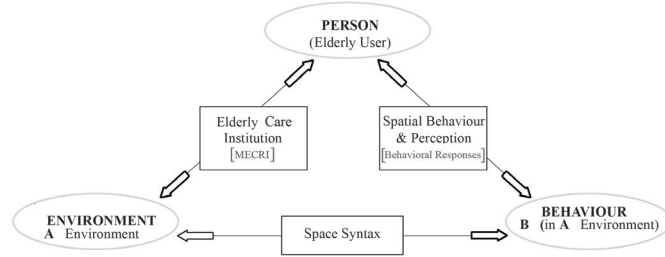


Figure 10. The model of space syntax association with the elderly user's spatial behavior and perception in the elderly care institutions.

Proceeding from this, how much the spatial configurations of the institution conformed to elderly behaviors and their behavioral responses were discussed. The spatial configuration of the floor plan was questioned with regards to the design of the elderly institution. These values were converted to numerical data by the Space Syntax Method combined with the Observation Method, then overlapped by the SSPS statistical program.

Therefore analysis regarding the design and the elderly user's spatial behaviors in the elderly institution, as well as adaptive or maladaptive responses that elderly users formed against the spatial configuration was set forth. There is a possibility to compare different forms on the same quantitative basis with the Space Syntax analyses (Kim, 1999; Penn, 2003). The concepts being set forth by this method help the space, together with the physical and lexical parameters in the elderly care institutions to be understood. Space Syntax data analysis was calculated separately by inserting Ground Floor and First Floor plans into the Syntax 2D program with Isovist Area, Isovist Perimeter, Integration, and Mean Depth.

Based on the Syntax 2D and isovist area, by defining the border of the plans to be analyzed and the walls inside it, the area to be analyzed was determined and the relations within the scope of this area were searched (Figure 11).

The program working with a grid system, after determining a grid towards this influence area, was connected with identical field of view and the grid separations, calculating the physical space relations within the borders selected for analysis (Şalgamcıoğlu,

2013). The Isovist Area is; the value that gives the surface area of the isovist area.

The perimeter values of the isovist area, differ from the Isovist Area, and do not provide the surface value of 360 degrees of the Isovist area on separate points but instead the calculation of the perimeter value of a two-dimensional polygon. This situation demonstrates about whether the sizes of the space perceived from each point are thin, long or not. When being discussed on the basis of the institution, it also reveals the differences between convex spaces having close sizes and convex space geometrics have different size values. The Perimeter of the Isovist Area and the size of the perceived space from the chosen point is show to be long or short. The Integration value comes first among the syntactic values, having the property of giving information. It enables interpretation of the information on which spaces are deep or shallow in overall general relation with the integration analysis. It is interpreted, that the mean depth value is contradictive of the integration value. In those spaces, this value is related with an accumulation amount in stage wise engagement within each other as shown in the Space Syntax Analysis

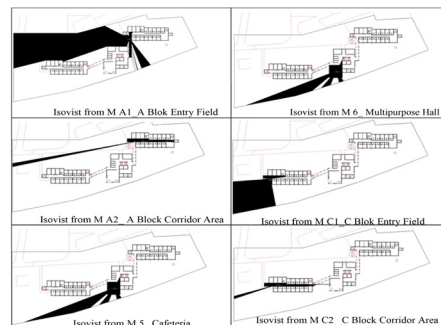


Figure 11. Visual field area from observation points with the garden.

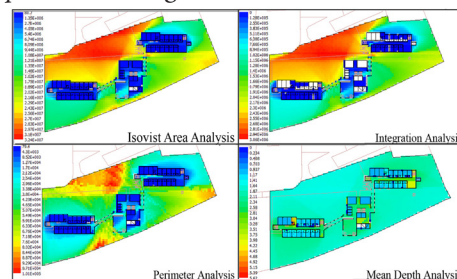


Figure 12. Syntactic analyses of isovist area, isovist perimeter integration and mean depth with the garden.

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in Figure 12. Where the garden was included, the Isovist Area of the front garden, Isovist Perimeter and Integration value came out to be highest. In this connection, the A block entrance faces the front garden, and although MA1 is a narrow space, it had the highest integration value (Figure 12).

The aim of this study was to attempt to find the spatial behavioral responses towards spatial configuration in an elderly institution.

For this reason, the syntactic data values were calculated separately for two plans, including the values of sectors differentiated as “with the garden”, “without the garden” to read adaptive and maladaptive behavioral responses on the spatial configuration.

The mean syntactic values were obtained for the four concepts listed by dividing the total data value of institution plans on its own grid count (Table2; Table 3).

The names applied for each data group for which a value was obtained are listed below;

- Integration
- Mean Depth
- Isovist Area
- Isovist Perimeter

In the Space Syntax Analysis made; with the isovist fields, the space that users could see a complete 360 degrees, was scanned. A user sitting by the window could easily perceive both the outside and inside and hold the isovist area at the highest level. As a result when observed, these spaces had the characteristic of being the most preferred.

When the plan without the garden was taken into account, the isovist area graphs from the observed points are as follows (Figure 13).

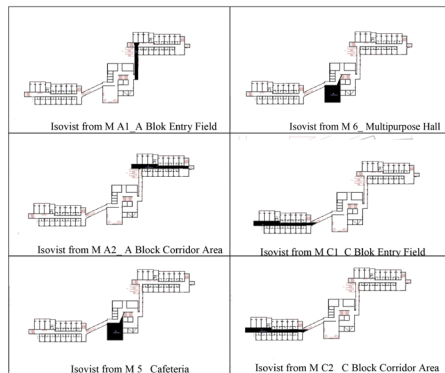
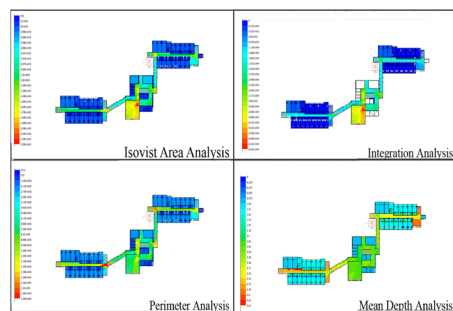
When we look at configuration of the elderly institution without a garden, as the colors of living units are indicated by deep and dark blue colors, corridors, multipurpose hall and cafeteria are green and yellows color in a complimentary manner (Figure 14).

3.4. Correlations

Finally, the statistical relationship of the different phases was also be evaluated, and the addressed comparisons examined using the “SPSS”. This was the comparison of Usage Frequency

Table 2. Space syntax values with the garden.

SPACES	SPACE SYNTAX VALUES			
	ISOVIST AREA	ISOVIST PERIMETER	INTEGRATION	MEAN DEPTH
M A1 (A Block Entry Field)	32226642	51210	4977347	1,74
M A2 (A Block Corridor Area On The Ground Floor)	2479086	32139	278231	2,2
M A3 (A Block Corridor Area On The First Floor)	2608088	27342	181608	2,33
MA 4 (A Blok Day Resting Room)	21609831	60606	1975202	1,85
M C1 (C Block Entry Field)	9659796	24699	1126038	2,28
M C2 (C Block Corridor Area On The Ground)	1832321	19931	173346	2,4
M C3 (C Block Corridor Area On The First Floor)	1254736	12378	51665	2,68
M C4 (C Block- Social Block Connection Area)	18664697	41169	1738030	1,86
M 1 (Cafeteria)	4864848	20902	514467	2,3
M 2 (Multi-Purpose Hall)	5878802	30147	414171	2,24

**Figure 13.** Visual field area from observation points without the garden.**Figure 14.** Syntactic analyses of isovist area, isovist perimeter, integration and mean depth without the garden.

and Syntactic Values.

The case study attempts to ascertain the effect of space configuration on elderly users' responses. Four relationships were examined in the network in the use of the parameters of the spatial frequency range.

- Frequency- Integration
- Frequency- Mean Depth
- Frequency- Isovist Area
- Frequency- Isovist Perimeter

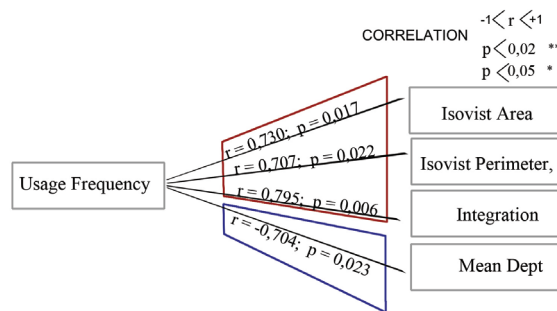
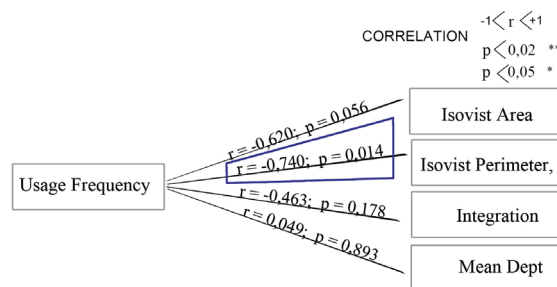
When we consider Syntactic Values with a garden and the Usage Frequency correlation; Usage Frequency- Integration ($r = 0,730$; $p = 0,017$), Usage Frequency-Isovist Area ($r = 0,707$; $p = 0,022$) and Usage Frequency- Isovist Area Perimeter ($r = 0,795$; $p = 0,006$) correlations are positively related, Usage Frequency- Mean Depth ($r = -0,704$; $p = 0,023$) correlation turned out to be negative (Figure 15).

Elderly users preferred to settle in those spaces with a higher integration value, isovist area and perimeter.

When we take into account the Syntactic Values and Usage Frequency correlation, without considering the

Table 3. Space syntax values without the garden.

SPACES	SPACE SYNTAX VALUES			
	ISOVIST AREA	ISOVIST PERIMETER	INTEGRATION	MEAN DEPTH
M A1 (A Block Entry Field)	708210	6638	12911	3,24
M A2 (A Block Corridor Area On The Ground Floor)W	1129119	9413	16112	3,83
M A3 (A Block Corridor Area On The First Floor)	1129108	9412	21950	1,55
MA 4 (A Blok Day Resting Room)	572034	6528	7317	1,95
M C1 (C Block Entry Field)	1174176	10237	13811	4,31
M C2 (C Block Corridor Area On The Ground)	827673	8168	8576	5,21
M C3 (C Block Corridor Area On The First Floor)	1156290	10071	17088	2,88
M C4 (C Block- Social Block Connection Area)	741519	7416	17711	2,3
M 1 (Cafeteria)	2201933	12834	68053	1,81
M 2 (Multi-Purpose Hall)	1664376	8106	38425	2,78

**Figure 15.** Correlation analyses of usage frequency and syntactic values with the garden plan.**Figure 16.** Correlation analyses of usage frequency and syntactic values without the garden plan.

garden; Usage Frequency is not related with an integration value ($r = -0,463$; $p = 0,178$). The Usage Frequency and the Isovist Area correlation is ($r = -0,620$; $p = 0,056$) nearly negatively related. Usage Frequency and the Isovist Perimeter correlation is also negatively related ($r = -0,740$; $p = 0,014$). However, the Usage Frequency and Mean Depth correlation is not related one another ($r = 0,049$; $p = 0,893$) (Figure 16).

The garden as seen in the analysis of correlation between the external environment with the use of spatial frequencies ranges close to negative values without any visual interaction however a significant relationship was found in that elderly users did not move along with the spatial construction.

3.5. Results and discussion

The methodology of this study was set forth and examined within the concept relation between the spatial configuration in the elderly care institutions with the elderly users' behavioral moods and patterns at perceptual and behavioral levels syntactically.

Behavioral responses of the elderly regarding spatial configuration: An elderly care institution case study

With reference to this context, the case study conducted in MECRI focused on how much spatial configurations affected the spatial behaviors of elderly users, and how elderly people responded towards the configuration, as well as the mutual interaction and conversion between the spatial configuration in the elderly care institution and elderly users spatial behaviors.

Within the scope of the case study conducted with the Observation Method, it was determined that elderly users are against spatial configuration instead localizing and interacting within spaces which were not the intended function. It was determined that the mostly used spaces in the institutions were the A Block entrance, connection corridors and the heads of corridors instead of the configured social interaction area. Although there was a weak interaction inside the linear order, elderly users moved social spaces to shallow regions. As Ünlü et.al (2001) stated, the average depth value of the spaces show that the social interaction is weak. The fact that the spaces such as the multi-purpose hall and cafeteria in the general spatial configuration, overlooking the backyard where the social interaction can be formed, by not being able to meet the sensory and affective needs of the elderly people, lowered their usage frequency.

When the focusing on the correlation which was obtained with the "SPSS"; the Syntactic values such as Isovist Area, Isovist Perimeter, Integration and Mean Depth values, which have been obtained from the architectural plan and Usage Frequency from Observation in the MECRI were overlapped; the values found with the garden correlation analyses are as follows: $r = 0,730$; $p = 0,017$, $r = 0,707$; $p = 0,022$, $r = 0,795$; $p = 0,006$, $r = -0,704$; $p = 0,023$. Through these values, it is seen that the Usage Frequency forms a positive correlation with the Isovist Area, Isovist Perimeter and Integration values coming from Space Syntax. Also, there is a negative correlation between Usage Frequency and Mean Depth. These correlations demonstrate that the elderly users preferred shallow and integrated spaces that, included movement, high isovist field and sun-

shine.

Isovist Area, Isovist Perimeter, Integration and Mean Depth Syntactic values found without the garden along with the Usage Frequency correlation analyses were as follows: $r = -0,620$; $p = 0,056$, $r = -0,740$; $p = 0,014$, $r = -0,463$; $p = 0,178$, $r = -0,049$; $p = 0,893$. These correlation results demonstrate that the Usage Frequency and Space Syntax values did not have any correlation. Elderly users used social interaction spaces available that were not included in the planned layout of the garden. Rather they localized in the places having high integration and connectivity values as the social integration area in the general configuration.

Configurations have adaptive and maladaptive varied effects within the scope of the elderly users' sensory and affective capabilities on their spatial behavior responses. While the users also show maladaptive behaviors towards the configured space in the MECRI, they behaving improperly against the spatial configuration, perform the expected spatial behavior.

The social areas are fictionalized in the architectural design of the socio-pedal areas and it is seen that they became socio-fugal areas as a result of behavioral responses. Simultaneously, areas design as socio-fugal areas were turned into socio-pedal areas using external functions of the elderly users' response.

4. Conclusion

Within the scope of the case study; spatial syntax properties and the effects of these properties on the elderly user's spatial behaviors and the responses were examined. In the institution being discussed, the presence of the relation between the elderly user's own behavior and the syntax values of the space and its quality, were set forth by means of the observation method, case study, and acquiring the space syntax values providing the combined analyses.

When the correlation between Syntactic Values and Usage Frequency is considered the elderly people begin to behave rather adaptively to space configuration with the garden, whereas they begin to behave rather adversely developing maladaptive behavior to

space configuration without the garden.

The elderly users reacted quiet uninterestedly in the space configuration without the garden. Additionally, they did not use the presently configured multi-purpose hall and cafeteria. Elderly users in the MECRI did not use those spaces or rarely used and responded behaviorally in an adversely effecting manner, which were built as social inaction area and configured into inactive spaces, or corridors needed to be walked or even those blocks reached through entrance from administration buildings.

In conclusion of evaluation regarding this case study, it is put forth that the elderly care institutions in a country where new investments are made, should consider the physical and psycho-social and psycho-spatial features of this specific age group and contribute those features into future architectural designs of elderly care institutions, while simultaneously building a detailed database so as to develop a parameter within the architectural design process as a conceptual framework.

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Yaşlıların davranışsal tepkilerinin mekansal kurgu üzerinden okunması; yaşlılık kurumu örneği

Yaşlı birey ile çevresi arasında ki etkileşimde; kullanıcıda yaşlılık kurumunun mimari tasarımına bağlı olarak mekansal kurguya karşı uyumlu ya da uyumsuz davranışsal tepkiler oluşmaktadır. Makale; yaşlı kullanıcıların mekansal davranışları yoluyla yaşlılık kurumunun mekansal kurgusuna karşı geliştirdikleri tepkilerin varlığını ve niceliğini ortaya koymaya yönelik çalışmaları ve sonuçlarını içermektedir. Bu makalede sunulan çalışmalar ile yaşlılık kurumu tasarımı ve yaşlı kullanıcı davranışsal tepkileri arasındaki ilişki “Çevre Davranış Çalışmaları” ana çerçevesi içinde “Mekansal Dizim Yöntemi” ile ele alınmaktadır.

Alan çalışması ile mekansal kurgunun, yaşlı kullanıcı davranışları üzerindeki etkileri incelenerek farklılaşan mekansal davranış tepkileri saptanmış ve mekanların dizimsel değerleri çıkartılmıştır. Lineer mekan kurgusuna sahip Maltepe Yaşlı Bakım ve Rehabilitasyon Kurumunda yapılan alan çalışması sırasında Gözlem Tekniği ile kullanıcıların hangi mekanları hangi sıklıkta kullandıkları periyodlar halinde gözlemlenerek yoğun ve düşük etkileşimli sosyal alanlar belirlenmiştir. Space Syntax Yöntemi kullanılarak ta mekanların Eşgörüş Alanı, Eşgörüş Alanı Çevresi, Bütünleşme ve Derinlik değerleri elde edilmiştir. Bu bağlamdan hareketle; yaşlılık kurumunun tasarım performansı, mekansal dizim değerleri ile yaşlı kullanıcıların davranışsal tepkileri çakıştırılarak tartışılmaktadır.

Sonuçta; yaşlı kullanıcıların mimari tasarımdan gelen mekansal kurguya karşı davranışsal tepkiler geliştirdikleri ortaya konulmaktadır. Yaşlılık kurumu tasarımı yaşlı kullanıcıların duyuşsal ve davranışsal ihtiyaçlarına cevap verip vermemesine göre uyumlu ya da uyumsuz davranışsal tepkilere sebep olmaktadır. Lineer kurguya

sahip yaşlılık kurumunda davranışsal tepki artarak uyum azalmakta, yüksek etkileşim (socio-pedal) düzeyi düşmekte, bireysel düşük etkileşimli (socio-fugal) ilişki düzeyi artmaktadır. Maltepe Yaşlı Bakım ve Rehabilitasyon Kurumunda yaşlıların mekansal kurgu üzerinde sosyal etkileşim alanları olarak tasarlanmış Çok Amaçlı Salon ve Kafeterya gibi alanları kullanmadığı gözlemlenmiştir. Tasarımın sosyal mekan çözümünde bu yaş kuşağına yönelik olarak yeterli olmadığı sosyal alanların az ya da hiç kullanılmadığı görülmektedir. Bu durumun başlıca nedenleri; bu mekanların hareketi görmeyen, arka bahçeye bakan, uzun bir yol yürüyerek ulaşabilecekleri ya da idari bloktan geçilerek gidilebilen alanlarda kurgulanmış olmalarıdır. Yaşlılar hareketi gören, kolay ulaşabildikleri, idari bölümle ilişkisiz olan A Blok girişi, bağlantı holleri, koridor başları gibi sirkülasyon alanlarını fonksiyonları dışı değiştirip dönüştürerek sosyal etkileşim alanları gibi kullanmaktadırlar. Bu yolla yaşlı kullanıcılar duyuşsal ve davranışsal ihtiyaçlarına cevap verip vermemesine göre mekanın fonksiyonunu değiştirmekte, kullanarak ya da kullanmayarak tepki oluşturmaktadırlar. Mimari tasarımda sosyal etkileşim alanları olarak kurgulanan mekanlara, davranışsal tepkileri sonucu gitmeyecek düşük sosyal etkileşimli mekanlar haline dönüştürebildikleri gibi bunun tersini de yapabilmektedirler.

Bu noktada yaşlı kullanıcı davranışsal tepkisi ile mekan kurgusu arasında nasıl bir ilişki kurulabileceği sorusu önem kazanmaktadır. Çalışma kapsamında mekansal kurgunun kullanıcı davranışına uyumu ya da uyumsuzluğu Gözlem Tekniği ve Mekansal Dizim Yöntemi arasındaki korelasyonlar ile ortaya konulmaktadır. Mekansal Dizim Yöntemi ile Bütünleşme, Derinlik, Eş Görüş Alanı ve Eş Görüş Alanı Çevresi Analizleri yoluyla mekansal kurgu üzerinde belirlenen noktaların dizimsel

değerleri ayrı ayrı çıkartılmıştır. Bahçe dahil edilerek ve edilmeyerek yapılan iki farklı dizimsel analiz sonuçlarına göre yaşlı kullanıcının mekan kullanımında dış mekanla kurduğu görsel ilişki önemli bir parametre olarak öne çıkmaktadır. Kullanıcı görsel etkenlere bağlı olarak mevcut sosyal alanları kullanmak yerine kendi sosyal alanlarını kurgudan bağımsız, dış ortamı gören blok girişlerine, koridor başlarına ve bağlantı koridorlarına taşımaktadır.

Mekansal Dizim Yöntemi ile elde edilen dizimsel değerler ve gözlemlerden çıkartılan kullanım frekansı arasındaki korelasyonlar ile davranışsal tepkinin varlığı ve niteliği yorumlanmaktadır. Bahçeli ve bahçesiz korelasyon değerleri göstermektedir ki yaşlı kullanıcı lineer kurguya göre hareket etmeyerek davranışsal tepki vermektedir. Kurumun mevcut kurgu düzeni; uzun yol yürümeyi gerektirerek sosyal alanlara ulaşımı zorlaştırdığından ve hareketi görme ihtiyacına yönelik dış

ortamla görsel ilişkiyi azalttığından dolayı yaşlı kullanıcının duyuşsal ve davranışsal ihtiyaçlarına cevap verememektedir.

Kullanıcı dış ortamla görsel ilişki kurduğu bahçeli plan kurgusunda; Eş Görüş Alanı, Eş Görüş Alanı Çevresi ve Bütünleşme değerleri yüksek olan yerleri fonksiyonu dışı değiştirip dönüştürerek sosyal etkileşim alanları olarak kullanmayı tercih etmektedir.

Çalışmayla birlikte örnek yaşlılık kurumunun tasarımının yaşlı kullanıcıların mekansal davranışlarıyla ne kadar uyumlu oldukları irdelenerek davranışsal tepkileri ortaya konulmaya çalışılmaktadır. Bu suretle gelecekteki yaşlılık kurumları tasarımlarında bu yaş grubunun duyuşsal ve davranışsal ihtiyaçlarının da dikkate alınarak mimari program kapsamına bir parametre olarak sokulmasının gerekliliği ileri sürülerek kavramsal bir çerçeve oluşturulmaktadır.