Relation of domestic space preferences with Space Syntax parameters

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Abstract
The concept of preference criteria especially in the home environments is a critical issue, which was debated in 1970's up to 1990's. This paper explores the preference criteria of multi-family houses; considering the adjustment and adaptability of the houses to life styles and the behavioural inclinations of users. The paper aims to examine the existence and quality of relations between the behavioural preference of the user and the spatial syntax of the house, through a case study, which was conducted in Istanbul. The case study is composed of two staged interviews and syntactic analysis based on these interviews. The results of the case study expose that the houses reflect and demonstrate the relationship between the life style and the spatial preferences of the occupiers. On the other hand, the occupiers also adjust to the possibilities or restrictions provided by the houses.

Keywords
Housing Preference, Life Style, Residential Satisfaction, Spatial Behaviour, Space Syntax

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1. Introduction

Spaces are capable of affecting human behaviour and communal organisations regardless of their scales. Besides being a physical shelter, home environments are spaces possessing many symbolic, cultural and behavioural dimensions. Furthermore, houses also have an economy-based structure for the realisation of ideals. The reason of the broad context of the housing research depends on the fact that house scale is larger than the other commercial goods and as an immovable asset a house has a longer physical duration, which requires a long-term commitment (Miles et al., 1996). Contemporary living conditions and common acceptances have great effects on the house design and consequently the housing market, which is manipulating the range of choices and the house preferences in most cases. As Smith (1982) expresses, the real estate agencies provide housing vacancy information in relation to the perceived personal characteristics such as the professional status or income of the buyers. Real estate agencies are among the most important regulators of the housing market where they form socio economic data by catalysing the relationship between the contractor, producer and user (McCarthy, 1982).

The physical, social, cultural and economic characteristics of the houses can be affected by the users' preferences. Physical, social and cultural characteristics of the houses are closely related with the socio-demographic structure, life style, spatial behaviour, functional use of spaces and planned period of residency of the user. These parameters affect the user's spatial behaviour, even though the syntactic characteristics of the house remain the same. This research consequently aims to concentrate on the relation between the behavioural and physical preferences of multi-family house occupants and the spatial characteristics of the home environments.

2. Theory

The behavioural aspect of space is indicated by Canter (1977) expressing that the spaces are formed according to the relations between activities, concepts and the physical attributes. In order to understand the essence of a certain space, one has to know the physical parameters of the setting, what the behaviour in that setting is associated with, and the description or conception that people hold in relation to the behaviour performed in this physical environment.

The ecological aspect of the space is associated with Barker's behaviour setting theory. According to Barker (1968), spaces contain many differing structural or social milieu at the same time. Groups sharing common characteristics, reflect the designated common behaviour within the space. The important factor here is that the congruence of the reflected behaviour to the structural setting defined as the milieu. Michelson (1977) indicates that, people move to a new place believing that this new place suits their needs. On the other hand, the behaviour and characteristics of the movers reflect the nature of this new environment. However, the adaptation process varies according to the environment and the person.

Social and cultural aspects of spatial preferences are related with life styles and culture based necessities. As Michelson (1977) states, regarding the places they live, the spatial preferences made by people at a certain time do not necessarily indicate that they would express similar preferences under different circumstances. Rapoport (1982) indicates that environmental evaluation is a matter of latent functions and is largely affected by images and ideals. Life style refers to certain self-consciousness about ways of acting, which emphasize certain behaviour and downgrade others. It is a conscious though highly volatile choice placed on the use of resources such as time, money and energy. Although life style is changeable, it helps to solve the spatial design problems and emphasizes the varying needs of the communal groups (Michelson, 1987).

Conviser (1984) states that in modern cultured societies, people take for granted that housing should be provided by experts, and that a user's main connection with housing should be monetary rather than personal. Conviser also states that housing symbolizes our position in a competitive status order. Meanwhile, Altman and Chemers (1980) emphasize that family structure, household composition and life style affect the built environment. Family and social structure are often evident in house plans. The role of parents with each other, parent – child relationship, the presence or absence of an extended family structure, and numerous other features of family life are easily visible in the spatial formation of houses. According to Lawrence, (1988) changes in the morphology, furnishing and use of dwellings cannot be dissociated from variations in the social meaning of domestic space and household life which constitute changes in the resident's relation to home. Personalization of dwellings varies with respect to economic, social, cultural, and political factors as well as the goal-oriented behaviour that impinge upon the life style of the residents.

Regarding the Turkish context of the case study, the main problems related to multi-family houses emerge from the failure of considering human scale, such as the space, environment or the actual construction quality. It should also be emphasized that multi-family houses prevent users from attaching a sensible integrity to their home places; whereas, houses should reflect the social status, life styles and the spatial preferences of their users and also expose the relationship between these parameters.

The syntactic approach to spatial preferences is based on the space syntax methods and the phenomenon that supports them. According to Seamon's (1994) suggestion, the essence of phenomenological approach assumes that people and the world are intimately related in a way whereby each makes and reflects the other. Considering the physical structure of space and the phenomenon which lies beyond, it is possible to find some relations. For example, long, narrow streets possess convexity and may have some sense of place, but their one-dimensional axial shape more typically involves them with movement and circulation flow. On the other hand, fatter convex spaces are traditionally places that support events and occasions, such as the square where older people sit, children play or the weekly market is held. If axial spaces more often relate to the experimental exchanges and interactions among districts and neighbourhoods of the settlement as a whole, then convex spaces relate more often to the nature of these parts, particularly as they evoke a sense of place and locality.

Lang (1987) argues that the people move their whole bodies, heads and eyes in order to examine the environment and to be aware of the fine details. By experience, people can quickly and easily notice details or relations within the environment. As the person moves through the space, they can see and perceive differing visual fields. Architectural research requires systematic theories to describe regularities of form and its functions. Space should be treated as a relational system, in which the spatial patterns not only reproduce or accommodate patterns of behaviours and social relationships, but also generate them (Peponis, 2000). The essential concept of the syntactic approach assumes that the interior and exterior forms of spaces are shaped according to certain cultural considerations and these forms also affect social relations in one way or another.

Preference criteria have often been perceived and evaluated as qualitative; thus housing researchers generally avoid forming a theoretical model concerning preferences. It is generally assumed that such a model would have uncertain limitations and have a vague scope. However, evaluating the house preferences by employing a numeric based method such as space syntax; it is possible to agree upon some common features.

3. The Method and The Case Study Area

The method of research includes matching the personal characteristics of the users to the syntactic outcomes of the domestic spaces. Comparison of human related characteristics and the spatial data can be analysed through various software methods such as the Spatialist, licensed by the Georgia Institute of Technology.

The syntactic contributions to the house preferences are searched by means of a case study. According to the Turkish State Institute of Statistics, multi-family houses form more than 60% of the residential buildings in Istanbul. The research area of the case study is the Atasehir Satellite City Project that was contracted to private enterprise by the government. Atasehir is located at the Asian side of Istanbul, and is preferred by middle/ upper middle class families (Fig.1). The project of the settlement is realized in three phases, where different contractors having different house design solutions, were employed for every single urban block.

The case study is composed of two staged interviews and syntactic analysis based on these interviews. Both interviews are composed of multiple choice and open-ended questions, or quality scaled tables, which were applied to randomly selected voluntary participants. However, the findings of the interviews will only be briefly mentioned in this paper. The first stage of the interview is conducted with the randomly selected 8 real estate agencies among the 28 in Atasehir. The goal here

was to determine the rentable house types and to gather information for the second stage. The aim of this study was to determine the most preferred and the least preferred house typologies of the research area by means of the housing market.

Figure 1: Atasehir Satellite City Settlement Plan

Interview with the agencies indicated that there is a consensus related to most preferred and moderately preferred house types, however, opinions vary on the least preferred house types related to the degree of criticism. Proximity to Atasehir centre, presence of recreation areas, number of storeys per building, number of apartments per storey, areas and room numbers of apartments are among the criteria that influenced the selection of the case study house types. Selected blocks are shown in Fig.1 and Fig.2. Block number 40 refers to the most preferred house type, block number 63 refers to moderately preferred house type, and block number 71 refers to the least preferred house type.

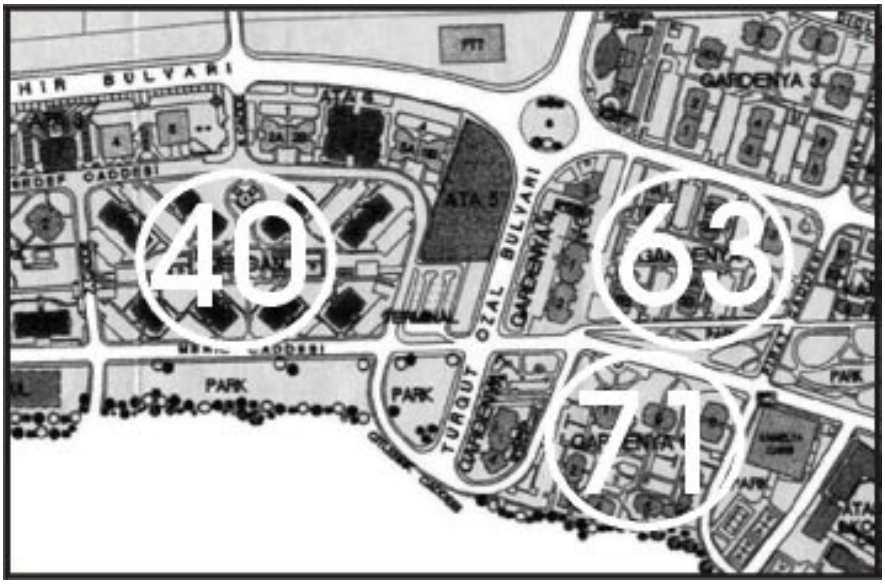

Figure 2: Selected Blocks of the Case Study

The second stage of the interviews aims to gather information about the family status, life style and spatial preferences. The interviews are conducted with the randomly selected 35 occupants at each of the selected three house types adding to a total of 105 interviews. There were no restrictions about gender, age or ownership positions of the participators. The results of this second phase of interviews provide data about the socio demographic background of the users, their life styles and spatial preferences. The data forms the structure of space syntax analyses, where the domestic space is examined as a whole. The analyses also provide information about living room usage and furniture grouping.

4. The Findings

The occupants of the blocks 40, 63 and 71 of the case study, have different life styles and spatial preferences related to their social statuses. The responses of the participants in the three blocks indicate some relations regarding social status, family structure, housing experience, neighbour relations, temporal use of domestic space, household activities, spatial preferences, reasons for moving to Atasehir and interior alterations. These relations provide clues about the users' house preferences.

Although the comparative findings of the socio-demographic background are not included in the scope of this paper, it may be useful to present a summary (see Appendix A). The general results of the interviews indicate that the house preferences are closely related with the preferences of the nuclear family. The distance of home to work place is not considered as a preference factor, unlike in many Western countries. Also unlike in the Western countries, strong family ties do not necessitate a new stage of house preference for the elderly. However, the stage of the life cycle has effects on the person's life style. Educational level is a reason to choose a certain housing environment. Education also determines the level of perception, which regulates the level of relations with neighbours, along with the adjustment of the home spaces to life style. While making a spatial preference, users also take their planned residential period into consideration. The planned period of residency at a certain place gives people the opportunity to adjust to environmental characteristics and also to make some necessary alterations. Home ownership does not provide enough reason to choose a certain home environment; however, it gives enough reason to continue living in a certain environment. The reason to rent or purchase a house is related to family structure; however, home ownership does not change the life style.

Figure 3: Normal Floor Plans of Block 40, Block 63 and Block 71

Spatial analyses of the house plans include scales ranging from overall block dimensions, normal floor elevator halls to overall apartment dimensions and partitions within. This research excludes the bedrooms and bathrooms of the house plans; furthermore, balconies are included in the spaces that they are connected to. Normal floor plans of the selected blocks are shown in Fig.3.

As the spatial dimensions of the house plans are compared, maximum overall block area pertains to block 63 with ~600 m2. Similarly comparison of elevator hall areas and overall apartment areas indicate that moderately preferred block 63, has the maximum values with ~62 m2, and ~135 m2 respectively. It is interesting to see that the most preferred house type block 40 has the smallest overall apartment area by ~125 m2, which indicates that planimetric dimensions are not the only criteria that affect spatial preferences. On the other hand, between the three, block 40 house type has the smallest kitchen and living room area while having the largest master bedroom area with ~24 m2. Majority of block 40 families have small children; this situation requires a different organisation in the living room so as to allow children's usage. In this case, parents prefer the master bedroom to be large enough to serve purposes other than sleeping, such as TV watching or studying.

The number of peripheral edges of the building shows the amount of recessed and projected surfaces. If these surfaces are large in number, then the building is perceived to have more rhythm in the third dimension. The most preferred type block 40 has the largest number of surfaces on the overall block plan and overall apartment plan. Facade movements make it possible for the buildings to have different scenes and angles of view, which can be a preference criterion.

The values for solidity (Table 1) of the buildings refer to the amount of surface area, i.e. the amount of wall surfaces. This value indicates the building's degree of visual connection to outdoor space. On the other hand, an increase in the values of solidity provides easier organization for furnishing. There is a tendency to place the bulky, high or heavy furniture especially in front of the wall surfaces. Thus the values of solidity may be one of the parameters of preferences. Block 63 has the

highest proportion of solidity of overall block plan with a value of 1068,760 m2; however, block 40 also has a similar proportion having a value of 1067,360 m2. On the other hand, the least preferred block 71 has an overall block plan solidity value of 941,920 m2.

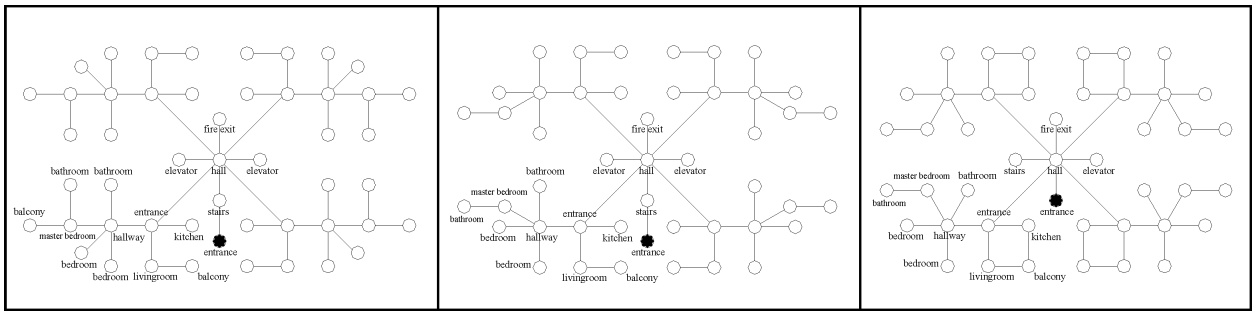

Figure 4: Normal Floor Graph Diagrams of Block 40, Block 63 and Block 71

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VALUES OF SOLIDITY (M2)

Block	Block Area	Entrance	Apart. Area	Vest./ Hallway	Living room	Kitchen	Master Bed.	Bedroom 1	Bedroom 2
Block 40	1067.360	178.500	258.580	75.880	79.240	43.400	66.920	41.440	37.800
Block 63	1068.760	170.940	266.280	75.040	85.820	49.560	48.160	42.840	40.320
Block 71	941.920	140.700	253.400	76.720	80.780	47.320	42.980	44.100	42.560

SHAPE NUMBER

Block	Block Area	Entrance	Apart. Area	Vest./ Hallway	Living room	Kitchen	Master Bed.	Bedroom 1	Bedroom 2
Block 40	2550	206	582	206	84	129	134	16	11
Block 63	2023	87	484	152	143	105	41	30	11
Block 71	1823	151	422	227	61	56	40	24	14

MEAN DEPTH VALUES

Block	Block Area	Entrance	Apart. Area	Vest./ Hallway	Living room	Kitchen	Master Bed.	Bedroom 1	Bedroom 2
Block 40	22.220	10.829	23.547	20.002	26.807	25.008	24.903	27.492	29.911
Block 63	19.353	10.400	19.749	16.469	20.579	19.690	25.834	22.500	28.265
Block 71	17.108	9.533	18.062	16.095	17.989	19.555	23.716	21.425	22.377

RELATIVE INTEGRATION VALUES

Block	Block Area	Entrance	Apart. Area	Vest./ Hallway	Living room	Kitchen	Master Bed.	Bedroom 1	Bedroom 2
Block 40	13.221	10.110	13.190	15.567	11.453	12.236	12.264	10.983	10.017
Block 63	12.909	4.630	13.283	15.931	12.536	13.110	9.727	11.248	8.901
Block 71	12.388	9.014	12.611	13.927	12.520	11.395	9.337	10.288	9.863

REAL INTEGRATION VALUES

Block	Block Area	Entrance	Apart. Area	Vest./ Hallway	Living room	Kitchen	Master Bed.	Bedroom 1	Bedroom 2
Block 40	0.324	0.517	0.302	0.356	0.262	0.280	0.281	0.251	0.229
Block 63	0.355	0.434	0.351	0.421	0.332	0.347	0.257	0.298	0.236
Block 71	0.393	0.573	0.371	0.410	0.369	0.336	0.275	0.303	0.290

CONNECTIVITY VALUES

Block	Block Area	Entrance	Apart. Area	Vest./ Hallway	Living room	Kitchen	Master Bed.	Bedroom 1	Bedroom 2
Block 40	3.388	3.262	3.402	3.558	3.071	3.527	3.425	2.813	2.727
Block 63	3.294	2.483	3.331	3.487	3.287	3.514	3.171	3.033	2.000
Block 71	3.344	3.099	3.346	3.493	3.131	3.375	3.250	2.358	2.714

Table 1: Syntactic Analyses of Block 40, Block 63 and Block 71

Space syntax analysis explains the relation of spaces with each other and with the whole system. Before examining the detailed syntactic relations of the systems, it is necessary to show the spatial depth of the block plans as graphs (Fig.4). As it is seen from these graphs block 40 and block 63 have two levels for accessing the elevator hall, whereas block 71 has a more direct entrance with a single level. In all the plan types, entrance to apartments is from a vestibule, which also serves as a transition space for accessing kitchens and living rooms. The vestibule connects to a hallway, which provides access to other parts of the dwellings. Master bedrooms and balconies or bathrooms connected to these spaces are located on the deepest parts of all the plan types. On the other hand, living rooms and kitchens of the plan types have similar depth levels while; block 71 has a different transition system having a balcony connecting kitchen and living room.

The syntactic analysis of the plan types are based on the e-partition analyses performed by "Spatialist" software. These analyses evaluate the overall block plan, normal floor elevator halls, overall apartment plan, and living rooms of the types separately. The spatial systems are examined through values of shape number, mean depth, relative integration, real integration and connectivity. Fig.5 shows the e-partition graphs of the overall block plans. Auxiliary spaces such as the bathrooms, fire exits, storerooms or shafts are excluded from the analysis.

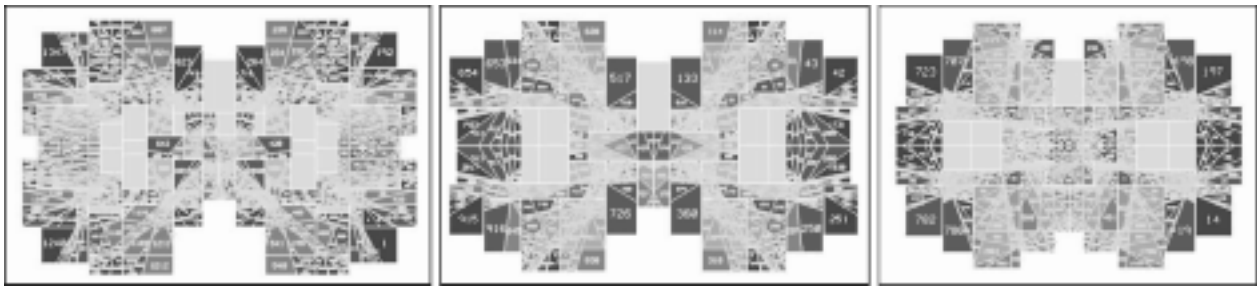

Figure 5: Normal Floor E-partition Analyses of Block 40, Block 63 and Block 71

Mean depth value indicates the depth of the certain shape, the higher the value, the harder to reach to that certain space signified by shape number. Having the largest number of peripheral edges and shape numbers and therefore having the most complicated plan type, block 40, also has the highest mean depth values concerning overall block plan and overall apartment plan. This analysis shows that the door positions affect the depth value of spaces. For example, block 40 and block 63 have similar L shaped living rooms with 26,807 and 20,579 mean depth values respectively (Table 1). The main problem here is that these spaces have entrance doors located at one end of the room, preventing the perception of the whole space. On the other hand, although the living room entrance door of block 71 is located somewhere similar to the previous blocks, the rectangular form of the space makes

it possible for an easier perception indicating a mean depth value of 17,989. As for the kitchen values, block 40 and block 63 have rectangular shaped kitchens while block 71 has a square shaped kitchen. Block 71 has the lowest mean depth value with 19,555 (Table 1). Block 40 and block 63 have kitchen entrance doors from the longer end of the spaces making an easy perception more difficult. Block 71 on the other hand, has an entrance door located at the middle making it easy for controlling the space. Findings of the interviews also support the mean depth values indicated by the e-partition analysis as among the others, the occupants of block 71 mostly prefer to eat in their kitchens with values of 77.14% for weekday dinners, 94.29% for weekday breakfasts, 71.43% for weekend dinners and 82.86% for weekend breakfasts (Appendix A).

As Ünlü et al. (2001) state, deepening the spaces decreases the social control, level of perception, and social interaction. This situation is also seen in block 40 living rooms. The interview findings suggest that at weeknights between the hours of 20.00 and 23.00, activities such as eating dinner and conversation with the household are among the least preferred by the occupants of block 40 with values of 28.57% and 62.86% respectively (Appendix A). These findings are not surprising because the shape of living rooms and the high values of mean depth, direct people to perform individual activities rather than gathering together.

Relative integration value indicates the distance to a convex shape within the system, from its neighbouring shapes. If the relative integration value of the shape is high, it means that reaching to surrounding shapes from this certain shape is relatively easy and indirect. Block 40 plan type has the most integrated overall block system having a value of 13,221; overall, however, the apartment system of block 63 has the highest integration value of 13,283 (Table 1). On the other hand, between the types, moderately preferred block 63 has the lowest relative integration value of 4,630 at the normal floor elevator hall. This result also supports the interview findings for block 63 that indicate a very low social interaction with neighbours comparing to other blocks. 65.71% of block 63 occupants do not have any social relationship with their neighbours, while this preference is 34.29% for block 40 occupants and 42.86% for block 71 occupants (Appendix A).

Real integration exposes the distance to a convex shape from all points within the system. If the real integration value of the shape is high, it means that reaching this certain shape from any point within the system is relatively easy and indirect. As Fig.5 shows, the most integrated areas of the system are the elevator halls of the overall block plans, and the vestibule-hallway areas of the overall apartment plans. Block 71 has the highest real integration values of 0.393 and 0.371 for overall block

plan and overall apartment plan respectively (Table 1). Among the reasons that increase the real integration values of the systems are the compactness of the plans rather than having extensions and the relatively small sizes of the spaces. However, as the real integration values of the spaces increase, the degree of social interaction and social control of the spaces also increase. Considering the real integration values of the living rooms, block 71 has the most integrated system with a value of 0.369; followed by block 63 with a value of 0.332, and block 40 with the value of 0.262. These results completely support the interview findings showing that living rooms are the most preferred spaces to spend time in weekdays with Atasehir total value of 57.14% (Appendix A). Furthermore, the occupants of the block 71 prefer to spend most of the time in their living rooms with a value of 71.43%, followed by the occupants of block 63 with a value of 62.86% and block 40 with a value of 37.14% with respect to the real integration values.

Connectivity values refer to number of points directly connected to a shape within the system. If the shape is located somewhere close to the centre of the system, then it means that the shape has many surrounding shapes, thus increasing its integration. On the other hand, if the shape is located somewhere close to the outermost parts of the system, its integration value decreases, increasing its mean depth value. Block 63 elevator hall has the lowest connectivity values with 2,483 (Table 1) indicating once again the weak social relations with a value of 65.71% of occupants not having any social relationship with the neighbours (Appendix A).

Interviews with the occupants also included questions related to the furniture used in the living rooms in order to examine the congruence of the plan types to the desired furnishing. Selected furniture types are said to be the couch, dining table and the TV set determined from the most preferred week-night activities of the occupants (Appendix A). Furthermore, these furniture elements are among the ones which people need to socialise. For the analysis of the furniture patterns, results of the interviews are evaluated and furniture setting for each plan type is determined. In the living room plans the location of the couch is indicated by 1, whereas the dining table is indicated by 2 and the TV set is indicated by 3. According to these setting preferences (Table 2), majority of occupants of block 40 places the couch against the wall with a value of 51.43%, dining table in the middle (82.86%) and TV set next to the door (31.43%). 48.57% of block 63 occupants place the couch against the window, dining table in the middle (77.14%) and the TV set next to the door (51.43%). Occupants of block 71 on the other hand, place the couch against the wall with a value of 68.57%, dining table in the middle (45.71%) and the TV set against the wall (54.29%). Figure 6 shows these settings along with the composite isovist graphs. However, before examining the results of isovist graphs, it is necessary to give information about the interview findings.

Livingroom Furniture Setting	Block 40		Block 63		Block 71		Atasehir	
Couch	F	%	F	%	F	%	F	%
Against the wall	18	51.43	16	45.71	24	68.57	58	55.24
Next to the door	2	5.71	0	0.00	0	0.00	2	1.90
Against the window	7	20.00	17	48.57	8	22.86	32	30.48
Middle	5	14.29	2	5.71	3	8.57	10	9.52
Not present	3	8.57	0	0.00	0	0.00	3	2.86
Total	35	100.00	35	100.00	35	100.00	105	100.00

Livingroom Furniture Setting	Block 40		Block 63		Block 71		Atasehir	
Dining table	F	%	F	%	F	%	F	%
Against the wall	0	0.00	2	5.71	3	8.57	5	4.76
Next to the door	0	0.00	0	0.00	7	20.00	7	6.67
Against the window	4	11.43	4	11.43	3	8.57	11	10.48
Middle	29	82.86	27	77.14	16	45.71	72	68.57
Not present	2	5.71	2	5.71	6	17.14	10	9.52
Total	35	100.00	35	100.00	35	100.00	105	100.00

Livingroom Furniture Setting	Block 40		Block 63		Block 71		Atasehir	
TV set	F	%	F	%	F	%	F	%
Against the wall	7	20.00	12	34.29	19	54.29	38	36.19
Next to the door	11	31.43	18	51.43	4	11.43	33	31.43
Against the window	3	8.57	4	11.43	5	14.29	12	11.43
Middle	9	25.71	0	0.00	4	11.43	13	12.38
Not present	5	14.29	1	2.86	3	8.57	9	8.57
Total	35	100.00	35	100.00	35	100.00	105	100.00

Table 2: Living room Furniture Settings

Being one of the largest items of furniture in the living rooms, the couch enables a certain degree of socialization by allowing seating for at least two people; so that its position is important. If armchairs and couch are present at the living room, the guests are usually seated at the couch because armchairs may be placed far from each other or they may be different in sizes and functions, such as an easy chair or a rocking chair. On the other hand it is necessary for someone standing at the living room door to notice that there is a stranger present. In this case, it is preferred for the couch to be placed at a point where the door can be seen. The results of the interviews support this approach by occupants' preference of placing the couch along the walls facing the entrance with a proportion of 55.24% (Table 2).

Although the majority of the case study participants prefer to have their breakfasts and dinners in their kitchens, the dining table is the largest stable furniture of the living rooms and its location is extremely important. Occupants of block 40 and block 63 place their tables in the middle of one side of their L shaped living rooms with a proportion of 82.86% and 77.14% respectively (Table 2). 11.43% of occupants in these blocks prefer to place their dining table in front of the windows, which indicates a small number in the household, because the dining table requires a gathering around it symbolising also unity and socialisation. In this case the usage of this furniture should be in the middle enabling the social control of the space. On the other hand, 45.71% of the occupants of block 71 prefer to place their tables in the middle; 20.00% prefer one side of the door while 17.14% do not even have one. Considering the plan type of block 71, not using a dining table in the living room is

justifiable because of the extensive usage of kitchens. Meanwhile, placing the table on one side of the door usually means that the table is seldom used because of the lack of service space around it.

Although the TV set can be purchased in many dimensions and its usage is not limited to a single space, it is usually present in the living rooms where it is used. Because the TV can be watched alone or in a group it is usually placed opposite to a seat such as couch. However, since its dimensions are smaller comparing to a couch or dining table, the TV set can be placed freely. Occupants of block 40 and block 63 place their TV sets next to the door with proportions of 31.43% and 51.43% respectively (Table 2). This preference is convenient for someone who also wants to control the door while watching TV. Meanwhile, regarding the rectangular form of the living room plan, 54.29% of the occupants of block 71 prefer to place their TV sets in front of one of the long walls. This preference is mainly based on the viewing distance. On the other hand, although 25.71% of block 40 occupants place the TV set in the middle of living room, occupants of block 63 with similar shaped living rooms, do not place the TV sets in this position because of electricity and cable necessities.

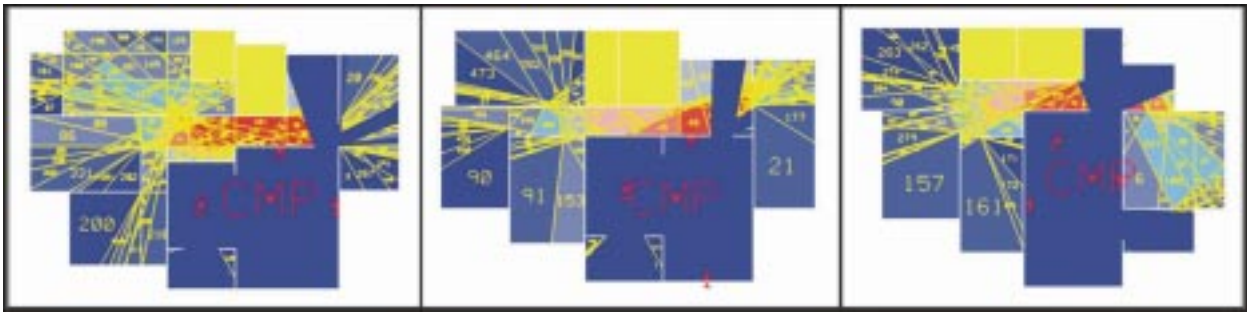

Figure 6: Living room furniture Isovist Graphs

The composite isovist graphs in Fig.6 indicate the level of social control of the living rooms and the visually accessible spaces. The composite isovist centroid point CMP also indicates the dimensions of visual area created by the furniture. Considering the setting of furniture, the couches of block 40 have the longest visual field periphery with a degree of 41.732 (Table 3). The composite isovist value of the furniture setting of this same block has also the longest visual field periphery with a value of 53.736. As stated before, block 40 has the highest mean depth values; however, the results of the furniture settings support the fact that block 40 has the most social activities during the hours between 20.00 and 23.00 (Appendix A). These results are interesting because they indicate that when it is empty, the high

Having a lower value of visual field periphery, compared to block 40, the position of the block 71 couch has the widest visual field area with a value of 39.660 thus indicating the widest social control area. The TV set of this block is positioned enabling easy viewing from most points. However, comparison with the furniture settings indicate that the CMP point of block 63 is determined to be in the most dominant position of the living room and so the house itself with a value of 46.023.

LIVINGROOM FURNITURE SETTING VISUAL FIELD PERIPHERY VALUES

Block	Couch	Dining	Tble	TV set	CMP
Block	40	41.732	35.177	32.127	53.736
Block	63	32.756	34.921	31.203	42.260
Block	71	35.945	33.021	32.279	41.904

LIVINGROOM FURNITURE SETTING VISUAL FIELD AREA VALUES

Block	Couch	Dining	Tble	TV set	CMP
Block	40	38.991	35.737	31.759	44.249
Block	63	35.409	40.327	34.674	46.023
Block	71	39.660	36.664	37.375	45.770

Table 3: Living room Furniture Setting Visual Field Analyses

5. Conclusion

The results of the research expose that the syntactic properties of the dwellings reflect and demonstrate the relationship between parameters such as the life style, spatial behaviour and the spatial preferences of the occupiers. On the other hand, the occupiers also adjust to the possibilities or restrictions provided by the dwellings.

Space syntax softwares help to figure out some clues about the functional use of domestic spaces. Façade movements and the level of illumination of the spaces affect to the user preferences more than the actual planimetric dimensions of the dwellings. The syntactic structure and the dimensions of visual field of the buildings' common spaces, such as the entrance and elevator halls, affect relations among neighbours.

As the spaces become wider and extended departing from quadratic forms, their mean depth values increase. Deepening the spaces decreases the social control, level of perception and social interaction. Increasing the depth of spaces in a dwelling, leads family members to stay apart from each other, by individualising their activities. The integration and dimensions of living room-kitchen connection and accessibility to some certain spaces from the others are given great importance by the elderly. L shaped living rooms permit an easier furniture setting compared to the quadratic forms. Furthermore, furniture setting is related to the dominant social control of the house. However, these forms increase mean depth values decreasing the level of visual field thus decreasing the desired socialisation. On the other hand, the level of

solidity of spaces also enables convenience for furniture settings. People are usually attached to their furniture; therefore, the facility of furnishing affects positively to the dwelling preferences.

The socio-demographic characteristics of the users are related to the type of dwelling they will prefer. The life styles of the users lead them to demand some certain properties in the dwelling they prefer. The design process of mass housing should include the syntactic data of both interior and exterior spaces. This data is important for it demonstrates the effects of the designed space to social and physical relations.

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Appendix A

Level of relation with the neighbours	Block 40 F	Block 40 %	Block 63 F	Block 63 %	Block 71 F	Block 71 %	Atasehir F	Atasehir %
Everyday	2	5.71	2	5.71	2	5.71	6	5.71
Once/few times a week	7	20.00	7	20.00	5	14.29	19	18.10
Once/few times a month	14	40.00	3	8.57	13	37.14	30	28.57
Very seldom / never	12	34.29	23	65.71	15	42.86	50	47.62
Total	**35**	**100.00**	**35**	**100.00**	**35**	**100.00**	**105**	**100.00**

Most preferred space on weekdays	Block 40 F	Block 40 %	Block 63 F	Block 63 %	Block 71 F	Block 71 %	Atasehir F	Atasehir %
Living room (w/dining)	13	37.14	22	62.86	25	71.43	60	57.14
Study / Den	8	22.86	4	11.43	7	20.00	19	18.10
Bedroom	7	20.00	5	14.29	2	5.71	14	13.33
Kitchen	7	20.00	4	11.43	1	2.86	12	11.43
Total	**35**	**100.00**	**35**	**100.00**	**35**	**100.00**	**105**	**100.00**

Most preferred space on weekends	Block 40 F	Block 40 %	Block 63 F	Block 63 %	Block 71 F	Block 71 %	Atasehir F	Atasehir %
Living room (w/dining)	23	65.71	24	68.57	29	82.86	76	72.38
Study / Den	8	22.86	5	14.29	6	17.14	19	18.10
Bedroom	3	8.57	5	14.29	0	0.00	8	7.62
Kitchen	1	2.86	1	2.86	0	0.00	2	1.90
Total	**35**	**100.00**	**35**	**100.00**	**35**	**100.00**	**105**	**100.00**

Dining space on weeknights	Block 40 F	Block 40 %	Block 63 F	Block 63 %	Block 71 F	Block 71 %	Atasehir F	Atasehir %
Living room (w/dining)	10	28.57	11	31.43	8	22.86	29	27.62
Kitchen	25	71.43	22	62.86	27	77.14	74	70.48
Other	0	0.00	2	5.71	0	0.00	2	1.90
Total	**35**	**100.00**	**35**	**100.00**	**35**	**100.00**	**105**	**100.00**

Breakfast space on weekdays	Block 40 F	Block 40 %	Block 63 F	Block 63 %	Block 71 F	Block 71 %	Atasehir F	Atasehir %
Living room (w/dining)	3	8.57	3	8.57	1	2.86	7	6.67
Kitchen	30	85.71	28	80.00	33	94.29	91	86.67
Other	2	5.71	4	11.43	1	2.86	7	6.67
Total	**35**	**100.00**	**35**	**100.00**	**35**	**100.00**	**105**	**100.00**

Dining space on weekends	Block 40 F	Block 40 %	Block 63 F	Block 63 %	Block 71 F	Block 71 %	Atasehir F	Atasehir %
Living room (w/dining)	14	40.00	19	54.29	10	28.57	43	40.95
Kitchen	19	54.29	14	40.00	25	71.43	58	55.24
Other	2	5.71	2	5.71	0	0.00	4	3.81
Total	**35**	**100.00**	**35**	**100.00**	**35**	**100.00**	**105**	**100.00**

Breakfast space on weekends	Block 40 F	Block 40 %	Block 63 F	Block 63 %	Block 71 F	Block 71 %	Atasehir F	Atasehir %
Living room (w/dining)	10	28.57	10	28.57	6	17.14	26	24.76
Kitchen	25	71.43	24	68.57	29	82.86	78	74.29
Other	0	0.00	1	2.86	0	0.00	1	0.95
Total	**35**	**100.00**	**35**	**100.00**	**35**	**100.00**	**105**	**100.00**

Weekdays bet. 20.00-23.00/ Convers. w/ household	Block 40 F	Block 40 %	Block 63 F	Block 63 %	Block 71 F	Block 71 %	Atasehir F	Atasehir %
1st preference	6	17.14	5	14.29	8	22.86	19	18.10
2nd preference	9	25.71	9	25.71	6	17.14	24	22.86
3rd preference	7	20.00	7	20.00	5	14.29	19	18.10
Never	13	37.14	14	40.00	16	45.71	43	40.95
Total	**35**	**100.00**	**35**	**100.00**	**35**	**100.00**	**105**	**100.00**

Weekdays bet. 20.00-23.00/ TV watching	Block 40 F	Block 40 %	Block 63 F	Block 63 %	Block 71 F	Block 71 %	Atasehir F	Atasehir %
1st preference	9	25.71	12	34.29	11	31.43	32	30.48
2nd preference	8	22.86	8	22.86	9	25.71	25	23.81
3rd preference	10	28.57	8	22.86	7	20.00	25	23.81
Never	8	22.86	7	20.00	8	22.86	23	21.90
Total	**35**	**100.00**	**35**	**100.00**	**35**	**100.00**	**105**	**100.00**

Weekdays bet. 20.00-23.00/ Dining	Block 40 F	Block 40 %	Block 63 F	Block 63 %	Block 71 F	Block 71 %	Atasehir F	Atasehir %
1st preference	3	8.57	4	11.43	9	25.71	16	15.24
2nd preference	4	11.43	4	11.43	2	5.71	10	9.52
3rd preference	3	8.57	1	2.86	2	5.71	6	5.71
Hiç	25	71.43	26	74.29	22	62.86	73	69.52
Total	**35**	**100.00**	**35**	**100.00**	**35**	**100.00**	**105**	**100.00**