DECODING HOUSES OF A TURKISH ARCHITECT:
Yilmaz Sanli

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Abstract

Houses are not only physical shelters for human beings. They are also informative formations identifying a specific culture or a lifestyle. This study attempts to analyse the spatial characteristics in the housing projects of a leading Turkish architect by means of space syntax techniques. Space Syntax is an approach for analysing spatial configurations and requires an understanding of the relational and configurational structure of the spatial system. This study suggests that by the help of the analysis techniques of Space Syntax, supported by a wide range of first-hand information on the architect and his works, abstract rules underlying spatial forms can be uncovered. The specific characteristics of these houses and the factors that have created these formations are explored. It is believed that the findings of this study can become design output for further housing development in Turkey.

Introduction

This paper focuses on an analytical and objective study rather than an intuitive approach on the housing projects of one of the most productive and leading architects of Turkey. Yilmaz Sanli (1931-2005) received his M.Arch degree from the Faculty of Architecture at the Istanbul Technical University in 1953. Following his graduation he was invited by Professor W.Tiedje to work in Stuttgart, Germany. In 1954, he was recommended by Professor Bonatz to work as a teaching assistant at the Faculty of Architecture at Istanbul Technical University. In 1958, he was appointed to work at Macka Technical School as a faculty member. In 1961-1962 Mr. Sanli worked at the executive committee of the Chamber of Architects in Turkey. He has taken part in 126 competitions and has been granted honourable mentions in 20 projects and was awarded first, second, and third prizes in more than 60 projects. Mr. Yilmaz Sanli has worked as a consultant to the municipality of Istanbul from 1984 until 1987. He has also been appointed to work as a consultant to the Turkish Prime-ministry in 1995. He has founded his own architectural office in 1959 and worked

as an independent architect until the last day of his life. Through all these years Mr. Sanli designed various outstanding projects. His works consist of residential, commercial, educational, athletic, health and industrial buildings both in Turkey and countries around the world. One of his most precious works, a restaurant complex in Istanbul has been nominated for Aga Han awards (Sanli, 2005, Sanli, 2006). The architect was deeply fascinated by housing design and residential architecture had been the most productive area throughout his professional life. He had over 200 projects in various parts of Turkey and he had designed houses for senators, artists and leading businessmen. Based on the last development in housing construction in Turkey, the leading architect and his housing designs are selected as the topic of the research.

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In the last decade, there has been a substantial increase in housing projects all over Turkey, especially in Istanbul. In the global frame this high productivity in residential construction has a very stimulating effect on Turkish economy. Some of these contemporary designs come along with smart elegant compositions contributing to the formation of the built environment whereas some of them do not exactly own the meaningful configurational properties in order to maintain the social and cultural wealth of Istanbul.

Due to this fast housing development, there has been a great increase in the research and analysis of the obvious physical forms of the residential architecture. On the other hand, the built environment embodies not only the obvious but also the non-obvious information of a system. This system actually reflects the ideals and life style in the built environment. As Hillier points out, space is a topic more difficult than physical form (Dursun, 2002). In reality, the man-made environment is composed of similar elements, such as the house, the street, the room, the hall, etc. How these elements relate to each other and the hidden meaning in their organization make the physical form unique (Dursun and Saglamer, 2003).

In a previous paper which reported a part of the author's dissertation research, a collection of 27 house plans of Yilmaz Sanli were analyzed in terms of the vocabulary elements and grammar rules. At the end of this thorough analysis of geometric and topological features, the unchanging characteristics were classified. The mutual characteristic has been the strict geometric organization of the compositions, (Sanlı, 1991). Definition of the compositional rules has been an attempt to examine what is happening formally in the Sanli houses. In this paper, a further step is taken to evaluate the spatial structure of these houses in search of the meanings carried out through design.

The Sample and the Theme

This study attempts to analyse the spatial characteristics of Yilmaz Sanli houses, with the help of Space Syntax which is a set of techniques for describing and analysing relational/configurational properties of man made environments (Hillier and Hanson, 1984, Hanson, 1998, Bafna, 2003). The study is carried out with the intention of defining answers for three questions:

1. Is it possible to uncover abstract rules underlying spatial forms, in other words genotypes in this leading architect's works?

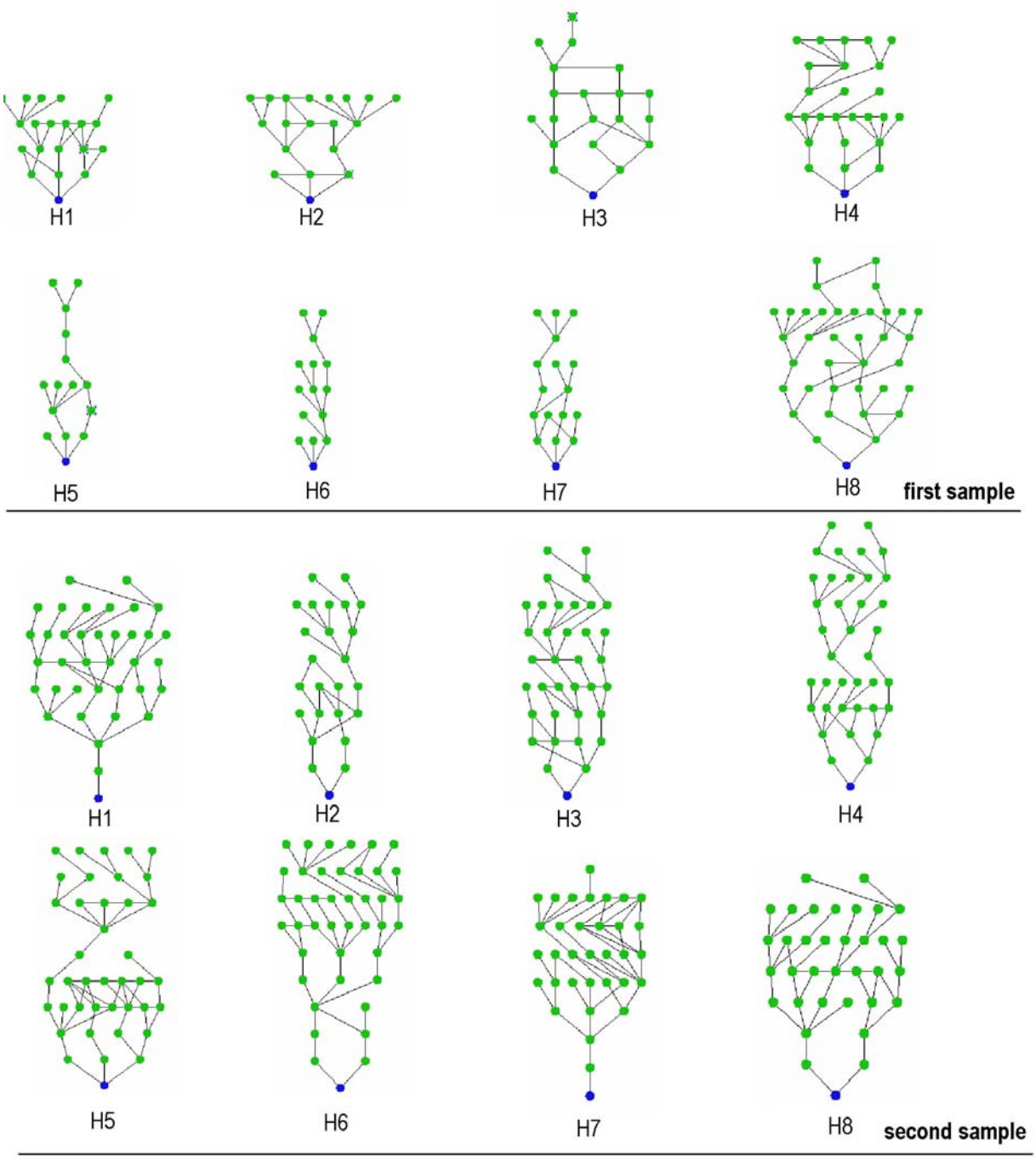
2. If it is so, what are the specific characteristics of these genotypes? Which factors have created these characteristics?

3. When the findings of this study are considered as a practitioner, how can these become design output for further housing development in Turkey?

The research conducted here consists of a comparative analysis of the spatial models of designs by the same architect. Following the investigation of eight of his early works (1960-1985), another sample of eight houses of his later works (1985-2005) is chosen to identify underlying rules generating spatial characteristics (Table 1, 2). Plans of the houses are obtained directly by the architect before he passed away. Accordingly, the study is conducted on the original plan layouts of the architect since these houses have been subject to alterations by their owners through years.

Figure 1:

Justified graphs of the houses



The first sample reflects the period (1960-1985) when the architect was under strong modernism impression. He had studied architecture at Istanbul Technical University and following his graduation he worked in Germany where he had been greatly exposed to the brutalist modern movement. The second sample is composed of his later designs between the years 1985-2004. In the first group, function

determines the form and the spatial concept is not the major concern of the architect. In the second group, however, there is a divorce of form and function, similar to Peter Eisenman Houses (Major and Sarris, 1999). The architect quits minimalist compositions and starts to concentrate in the dynamics of the houses. The plans become much more complex and rich in spatial relations, spaces hosting activities other than basic functions like living, cooking, or sleeping are included and the alternative routes are formed. The examples of the first sample reflect the expected simple spatial organizations, but the second group houses are full of surprises. In some of these houses, traces of traditional Turkish architecture are observed maybe in a post-modern attitude. In his latest works, he had also started his design with the exterior. Accordingly, in the first sample, there is an explicit modernist style whereas in the second group there is a search for different styles.

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Table 1:

First Sample

houses	Location	date	area	floors
house I	Kumburgaz Houses I, Istanbul	1964	200 sq.m.	1
house II	Kumburgaz Houses I, Istanbul	1964	180 sq.m	1
house III	Kumburgaz Houses I, Istanbul	1964	220 sq.m.	1
house IV	Ozdemiroglu Residence, Istanbul	1972	320 sq.m.	2
house V	Kiyikent Houses, Istanbul	1973	90 sq.m.	2
house VI	Polonez Houses I, Istanbul	1980	75 sq.m.	2
house VII	Polonez Houses II, Istanbul	1980	110 sq.m.	2
house VIII	Simavi Residence, Bodrum	1983	260 sq.m.	2

houses	Location	date	area	floors
house I	Hidiv Residences, Istanbul	1987	410 sq.m.	3
house II	Altinboynuz Houses, Gocek	1988	185 sq.m.	2
house III	Polonez Sanli House, Istanbul	1990	400 sq.m.	4
house IV	Celik Residence, Kas	1992	460 sq.m.	2
house V	Tepeoren I, Istanbul	1994	350 sq.m.	2
house VI	Tepeoren II, Istanbul	1994	400 sq.m.	2
house VII	Resadiye I, Istanbul	2004	350 sq.m.	4
house VIII	Resadiye II, Istanbul	2004	300 sq.m.	3

Table 2:

Second Sample

Spatial Analysis of the Samples and the Method of Analysis

Phases of Spatial Analysis of the Houses

Two phases of analysing the houses are; defining the general characteristics of the houses and physical relationships of functional spaces, plan typologies and patterns of spatial use: Here, in order to interpret the syntactic data, general characteristics of the architect's houses are described:

Most of the houses are located in Istanbul and the mean number of floors is 1.50 for the first group and 2.75 for the second group. All of the selected houses are located in gardens and they do not have direct access to the street. They open to the garden directly and their gardens are separated from the street by walls. Some of them are completely detached houses with their separate gardens whereas some of them are located in residential complexes with other single-family houses and shared gardens. In the last two decades, middle and lower-middle class population has started to afford single houses rather than flats in high-rise apartment buildings.

The spatial organization of the houses reflects impacts of the western life style meaning that all rooms are allocated for different functions and organized around sequential halls. However, some of the houses also reflect the characteristic of traditional Turkish houses with sofa defined as the central space connecting all rooms on the upper floor. This central space serves both as a circulation and social space.

In general, the allocation of functional spaces among the floors can be described as follows: Living, activity and service spaces, such as the living room, dining room, kitchen, lavatory, and the study are always located on the ground floor. There is usually a bedroom separate from the family bedrooms on the ground floor. This is used sometimes as a guest room and sometimes as the maid-room with its own bathroom. The first floor is mostly allocated for sleeping spaces, baths of the family members and sometimes for sofas which also function as a social space.

Searching for the Spatial Models of the Houses with Space Syntax Techniques

Eight houses from each period are selected and analyzed with space syntax method. In this analysis, as a first step, the justified graph for each house is drawn to represent the spatial configuration of the design. The nodes in the plans represent the convex spaces and the exterior garden through which the house is entered is used as the base. The gardens around the houses are accepted as different convex spaces because they are observed to be constant in design guidance. In all examples life inside the house is carried out to the terraces and through terraces into the gardens.

As a second step, syntactic analyses of the houses are presented without considering the functions assigned to particular spaces. The final data is tabulated in Table 2. As a third step, the houses are explored in terms of location of different functions within the whole, and their relationships are investigated, Table 3. As a final step, the search is focused on searching genotypes for each housing sample, and if so, their characteristics are indicated.

Syntactic Analysis for Comparison and Interpretations

Based on the syntactic data which is gained from justified graphs and their mathematical interpretations, common rules and tendencies for each sample can be summarized as follows:

1. Justified graphs of these houses in both samples have a tree form with many branches (Figure 1). They are differentiated from each other basing on relations of houses with their surrounding open spaces, different number of spaces and stories.

In both samples the common characteristic is that all the plans are formed around transitional spaces such as galleries, halls and corridors. In the first sample, these spaces are only used for circulation function to connect spaces allocated for different functions. In the second sample these transitional spaces are multi-functional spaces used as a TV-room or study or everyday sitting room. Accordingly, in the first sample these are defined as circulation spaces and in the second sample they are defined as circulation and living spaces.

2. The deepest spaces of the justified graphs are generally bedrooms, master-bedrooms and baths in the first sample. These spaces are followed by dressing rooms, balconies, terraces and gardens. The deepest spaces in the second sample are generally balconies and bathrooms. These are followed by bedrooms, some service spaces.

Mean value of maximum depths of the spaces in the samples are 6.63 and 8.13 respectively.

3. In the first sample most of the houses, except House IV, and in the second sample all of the houses have rings (Table 3, 4). This formation which underlies the alternative routes among the spaces reflects more sophisticated, subtle spatial models.

In both samples most of the rings connect outside spaces like the gardens, terraces, courts and the entrances. There are few rings inside connecting the entrance hall, living, dining and terraces. The rings connecting the bedrooms and the halls are quite rare in both samples and most repeated rings are on the ground floor. The difference between the two samples is the number of spaces on rings. This number is much higher in the second sample.

4. The number of spaces in the samples ranges from 14 to 36 and 24 to 41, respectively. The mean number of spaces is 20 for the first group and 33.25 in the second group (Table 3, 4).

In the second group, spaces with new functions are introduced, such as the covered pool, winter gardens, sofas, galleries used as study or sitting room, service stairs, elevators, attic rooms, circle-shaped breakfast corners, fitness rooms, offices for the kitchens, etc.

The houses in the first sample do not have multi-functional spaces, only two of them have balconies and few activity spaces. The houses in the second sample have multi-functional spaces, a rich collection of upper floor balconies and many activity spaces, and finally more than one access to the upper floors. Based on this fact the number of spaces considerably increases in the second sample.

Table 3:

Basic Syntactic Data of the First Sample with Exterior

houses	number of cells	Space/link ratio	RRA-min	RRA-max	RRA-mean	BDF
house I	21	1.363	0.743	1.558	1.078	0.89
house II	18	1.368	0.707	1.245	1.045	0.96
house III	16	1.235	0.820	1.810	1.125	0.87
house IV	25	1.385	0.663	1.551	1.128	0.87
house V	14	1.067	0.807	2.252	1.433	0.80
house VI	14	1.000	0.723	1.869	1.467	0.74
house VII	16	1.117	0.820	2.118	1.471	0.83
house VIII	36	1.139	0.961	1.754	1.298	0.93
mean values	20	1.209	0.780	1.770	1.256	0.86

Table 4:

Basic Syntactic Data of the Second Sample with Exterior

houses	number of cells	space/link ratio	RRA-min	RRA-max	RRA-mean	BDF
house I	36	1.135	0.74	2.021	1.273	0.81
house II	24	1.080	0.87	2.001.	1.445	0.86
house III	35	1.278	0.70	2.003.	1.292	0.79
house IV	37	1.105	0.93	2.324.	1.555	0.85
house V	36	1.243	1.06.	2.289.	1.612	0.93
house VI	34	1.171	0.81	2.132.	1.387	0.82
house VII	41	1.143	0.71	1.869.	1.218	0.92
house VIII	33	1.294	0.87	2.201.	1.528	0.85
mean values	33.25	1.181	0.84	2.105.	1.413	0.85

5. When the justified graphs are analyzed in terms of the main functions, the concrete numerical data that shows the similarities and differences among the examples is gathered. These main functions are cooking, dining, living, sleeping, entrance, circulation, stairs, and activities such as the study or swimming. The integration values of

these spaces show that different functions in a dwelling are assigned to spaces which integrate the complex to different degrees (Hillier, Hanson and Graham, 1986).

In the first sample, the most integrated spaces are the dinning rooms and the stairs (Table 5). Here, stairs are evaluated as separate spaces because they are one of the main features of the architect's design process. In the integration order, these spaces are followed by the entrance hall and the living spaces. The most segregated spaces are sanitary and sleeping spaces. In some cases one of the bedrooms is quite integrated with the whole. This expresses the possibility that it may be turned into a family room and function as living not sleeping.

Based on the mean values, integration order of spaces for the first sample can be summarised as follows: dining > stairs > entrance hall > living> circulation > activity > terrace > cooking > circulation /living > garden > sanitary > sleeping, (Table 5).

Table 5:

Integration Order for the First Sample

house no	spaces												
	lv	dn	kt	str	cir	cir/lv	san	mbd	bd	eh	act	tr	gr
I	0.74	0.98	1.25		0.85		1.31		1.15	0.74		1.06	1.19
II	0.85	0.91	1.33		0.74		1.22		1.12	0.71		1.03	1.14
III	0.78	0.72	1.06		0.94		1.25	1.67	1.25	0.85		0.72	1.52
IV	1.12	1.12	1.28	0.66	0.93	1.14	1.42	1.41	1.49	0.70	0.78	0.87	1.14
V	0.81		1.40	1.02	1.51		1.40		1.97	0.85		1.10	1.61
VI	0.72		1.27	0.94	1.10	1.23	1.92	2.17	1.66			1.49	1.69
VII	0.82		1.30	0.99	1.30		1.81	1.57	2.05			1.37	1.60
VIII	1.12	1.26	1.11	1.00	1.03	1.45	1.54	1.31	1.64	0.96	1.51	1.51	1.63
MEAN VALUES	0.87	0.75	1.25	0.79	1.05	1.27	1.48	1.63	1.54	0.80	1.15	1.18	1.44

lv: living, dn: dinig, kt: kitchen, str: stairs, cir: circulation, san: sanitary, mbd: master-bedroom, bd:bedroom, eh: entrance hall, act: activity, tr: terrace, gr: garden

In the second sample the most integrated spaces are stairs and circulation and living spaces (Table 6). The circulation and living spaces are mostly galleries on the upper floors with a rich view of the spaces on the ground floor. They are also used as a visual connection of the two floors. Sometimes these multifunctional transitional spaces are sofas that refer to the traditional Turkish architecture. They are used as upper floor sitting rooms where spaces directly open. The architect also adds glass covered winter-garden like central spaces which make the spatial organizations unique. In this sample the most segregated spaces are sanitary spaces and balconies. Locations of the baths are explained by the privacy requirements and the locations of the balconies are explained by the effects of the western type of plans organized around circulation spaces.

Based on the mean values, integration order of spaces for the second sample can be summarised as follows: stairs > circulation/living > entrance hall = living > circulation > dining > activity > cooking > terrace > garden > sleeping (master) > sleeping > sanitary > balcony, (Table 6).

The most striking spatial difference between the two samples is the use of transitional spaces. In the first sample, these spaces are only used for circulation function to connect spaces allocated for different functions. In the second sample these transitional spaces have additional functions.

6. The mean integration value of the first sample is 1.256; the base difference factor which expresses the differentiation between minimum, maximum and mean integration values is 0.86. These values are 1.413 and 0.85 respectively in the second sample. In both samples these values reflect the segregated spatial patterns. Based on the syntactic date related with the difference factors it can be stated that there is no major difference between the integration values of spaces with different functions.

Table 6:

Integration Order for the Second Sample

house no	spaces													
	lv	dn	kt	str	cir	cir/lv	san	mbd	bd	eh	act	ba	tr	gr
063-08 I	1.08	1.16	0.97	1.09	0.95	1.02	1.46	1.61	1.27	0.80	1.55	1.65	1.37	1.80
II	1.03	1.27	1.58	0.89	1.11	0.94	1.79	1.67	1.59	1.03	1.23	1.36	1.59	1.77
III	0.93	0.77	1.02	0.88	1.23	0.79	1.64	1.45	1.47	1.18	1.19	1.70	1.08	1.25
IV	1.10	1.36	1.52	0.91	1.18	0.92	1.45	1.83	1.87	1.10	1.26	1.96	1.34	1.85
V	1.31	1.55	1.53	1.13	1.30	1.34	1.93	1.94	2.00	1.01	1.21	1.96	1.60	1.54
VI	1.09	1.18	1.39	1.11	1.37	1.27	1.73	1.58	1.66	0.93	1.16	1.83	1.43	1.30
VII	1.27	1.45	1.04	0.72	0.89	0.99	1.41	1.17	1.33	0.82	1.08	1.64	1.53	1.38
VIII	1.31	1.21	1.24	1.39	1.40	1.39	1.91	1.40	1.91	1.17	1.45	2.04	1.61	1.50
MEAN VALUES	1.14	1.24	1.29	1.01	1.18	1.08	1.67	1.58	1.64	1.14	1.27	1.77	1.44	1.55

lv: living, dn: dinig, kt: kitchen, str: stairs, cir: circulation, san: sanitary, mbd: master-bedroom, bd: bedroom, eh: entrance hall, act: activity, tr: terrace, gr: garden

Conclusions

In this study, house designs of a leading Turkish architect are analysed to define their spatial structures according to relations of the spatial elements they are composed of. Different spatial patterns that have been formed by the architect throughout his professional life are searched. Common tendencies and different characteristics of two samples are illustrated. The findings show that the main differences lie in the formation of the design process in the architect's own mind.

Following his graduation from Istanbul Technical University, during the first twenty years, his design patterns had been quite limited under the influence of modern architecture. Function was the primary concern and form followed function. In the late 80's, he had started to open his designs to a variety of resources. One tendency had been his reference to the traditional Turkish architecture. From then on the architect started to work with the inside and the outer membrane simultaneously. The perception of the building from outside replaced the deep concern of functionalism. In addition to the functional correctness, elegant spatial relations had been explored within the house. Richer spatial organizations led to the integration of the different floors in the house. Besides the everyday living spaces, new activity spaces are introduced. Instead of a simple well-functioning composition of spaces integrated through transitional spaces, richer spatial relations are formulated. Transitional spaces are allocated to different functions besides circulation and these circulation/living spaces became the integration core of the compositions.

This kind of analysis is a rich knowledge base to interpret architectural plans. This raises the following question: Can the findings of such studies become design output for further housing development in Turkey? Explaining the architectural designs of a leading Turkish architect by pure mathematical statements may seem like undermining his professional work. It is obvious that mathematics is

and never will be sufficient enough to perceive architectural space thoroughly. However, it is demonstrated that some tendencies and rules in the organization of spaces can be revealed in a leading architect's work. These mathematical and graphical findings and concrete formulations of spatial models can be used as a tool to contribute to house design in a specific area such as Istanbul where residential construction is very active.

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