

Effects of the Locations of Curved Areas in the Main Living Rooms of Apartment Housing on User Perceptions

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ABSTRACT

The objective of this study was to determine the effect of curved areas located in the main rooms of apartment housing on functional and perception-behavioral quality. For this purpose, some apartment houses in Cukurambar and Cigdem districts in Ankara were studied. They were believed to be occupied by upper middle socio-economic status and each of the houses studied had differently located curvilinear forms in the main living room. The use of the space, the users' perception of the curved area, and the way it has been decorated and used have been examined with the help of a detailed questionnaire. According to the results, the use of space, its perceived quality and the user satisfaction varied depending on the location of the curved area. It was observed that in cases where curvilinear formation occurred in the main corner of the main living room, the furniture could not be positioned in accordance with the space and therefore some users either placed flowers-vases in the curvilinear volume or left it empty. If curvilinearity was in the center of main living room, then the settlement in the space was more appropriate and attractive.

Keywords: Apartment housing, Living room, Curved area, Perception, Interior design.

1. THE POSTMODERN CONDITION IN TURKEY

After the fall of the Ottoman Empire and establishment of the Republic in Turkey in 1923, there was a rapid transformation of society brought about by economic and social reforms. This period of Turkish architectural history promoted a Western and Modern life and architecture as the appropriate way of living. The 1960s were the beginning of a pluralist period in Turkey as different styles emerged and the dominance of one style in architecture came to an end. This liberalization of the Turkish economy gave entrepreneurs a chance to produce for the world market. The structure of society was also changing in Turkey, and a consumer society was created. According to Çalıřlar [1], the significant effects of popular culture became widespread after the 1980s, as if capitalism was acquitted because of the great economic success in Turkey at this time. During this period, various architectural styles started to be designed synchronously with Europe especially in apartment housing and residential structures. In this consumption process, not only were the architectural styles peculiar to Turkey used and consumed, but also the styles from other countries, mostly Western, were imported and consumed as an indicator of prestige. Kitsch modes of representation became embodied into Turkish housing architecture as an indicator of 'being different'. Some housing typologies and even architectural terminology also became objects of consumption. This new process created a totally

different lifestyle in which the themes of ethereality and fashion became the dominant motives in all consumption patterns including housing. The archetypical sheltering image of a house was replaced by with post-modern images of display and status as 'image and symbolic values' became more important than 'use value'. Almost every new house design was offered to the 'consumer' as a symbol of an 'ideal place to live'. A house used to be a place to have a comfortable and traditional life, but after the 1980s the image of 'house' became a symbol of a privileged life, i.e. an object of popular culture indicating the social status and prestige of its owner (since they don't live in a modern apartment like most people). With each new housing development and scheme, the competition was on for a better image to attract customers. Overall, the aim of postmodernism in Turkey in the 1980s was not the mass production of architecture, but a flexible production of architecture that necessitated rapid changes in today's consumption patterns and heightened the competition among the economic sectors.

Although architects seem to be not involved in this process [2], the Turkish housing market, which is essentially controlled by private construction companies, functions with the involvement of merchant builders and architects. In such a system, the state defines the regulations but private companies, architects and users, having economic power, direct the market

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and generate the rules. Popular tastes are determined by trends and fashion and develop according to these desired lifestyles [3]. Collective signs and images are introduced to society by making them consumable and popular. The exterior appearance of buildings is quite important in this market. The exterior can have symbolic value that is derived from the associations people have with the style of the building [4]. The presence of, for example, balconies and recessed alcoves, or surface treatments with heavy ornamentation and strongly projecting members, can serve to give a structure a more detailed, complex, and interesting form that offer some sense of mystery [5]. They can be overwhelmingly simple, stark, and uninteresting. Duncan [6] has demonstrated the importance of “environmental cues” in home exteriors with regard to people’s preferences for different styles of single-family homes. Symbolic associations with apartment housing are as strong, but often confusing. Adopting codes from vernacular structures on to multiple-family housing of five to ten floors might even sometimes make it difficult to associate with the original. The curved main living room of apartment housing discussed in this work is not purely generated by a designer through a creative process, but adapted from traditional Turkish culture with certain a functionality achieved that is not very much different from the past examples. On the other hand, in terms of resembling traditional Turkish housing, the curved main living room of Turkish apartment housing might actually be considered a *popular style* planned by developers for the popular market. The feature might be evaluated as novelty and, as Wohlwill [7] has suggested, novelty may play a role in preference. However, this is a real interpretation of vernacular housing and the Turkish public seems to be genuinely fond of the feature, just because it feels familiar.

1.1. Curved form apartment housing in Ankara

Within the perspective given above, this study examines the underlying power of life-style images proposed by a designer/developer and consumed by individuals. It is a social system that departs from production and enters

into the orbit of consumption. This is actually a supply and demand mechanism, i.e. the demand inevitably influences the supply. Consequently, within the past twenty years in Ankara, diverse styles of architecture have rapidly occupied the architectural agenda as priorities were re-arranged according to the values of a consumer society. In the 1990s, “orgy” [8] was no more a mere fantasy but the ultimate lifestyle. Regarding this fact, some new apartment housing with new forms, materials, and technologies were built in the newly developing suburban areas of Ankara, especially to rehabilitate and to regenerate those sites covered with squatter housing, some of which was quite close to the wealthiest part of the town. With the implementation of many small-scale construction projects, i.e. apartment housing, within ten years or so these suburban sites became upper middle density housing settlements with insufficient environmental conditions. All these areas soon became a milieu of social mixture, containing both newly-arrived upper middle class residents and an existing lower class squatter population. The transformation of these suburban areas and the resultant social mixture were some of the primary generators of the upper middle classes’ mobility towards Ankara’s peripheries.

It is possible to discuss some basic forms widely used in this apartment housing production. These can be classified as: (1) apartment buildings with straight lines and no curves or angles reflected inside, (2) apartment buildings with a curved external form but this curve is not reflected inside (generally, the balconies are curved) and (3) apartment buildings where the curved exterior form is reflected in the interior spaces (Figure 1). These last two alternatives as a life-style image have been very popular recently and are the ones commonly used in the newly-developing suburban sites of Ankara previously covered with squatter housing. With regard to commonalities, Venturi and Rauch [9] have speculated that the Colonial style meets public housing aspirations (in the East Coast of the United States). Similarly, it can be speculated that such house styles with curved forms meet certain groups’ housing aspirations too.



Corner blocks



Curved blocks where the curve is not reflected inside



Curved blocks where the curve is reflected inside

Figure 1. Widely-used apartment block housing types in Ankara

The curved form is a kind of fashion, very popular nowadays, giving the impression of “a distinct life-style” but more than that it gives a different look, different from ordinary buildings with straight rectilinear “cubic” forms. Interestingly, *commodity signs* are produced and constructed by some small construction companies believing that each apartment building must be different from the previous ones they have offered and must also be different from those in the neighborhood. As a result, some features have remained with some small revisions such as the projection of a reception room.

Among the three form types, only the last alternative, where the curved form is reflected in the interior space, has been considered in this research, where the perception and usage of the curved form in the main living room has been questioned.

1.2. The main living room in traditional and contemporary houses

Vernacular architecture, designed by small contractors and prospective owners, affords the opportunity to develop and use a set of symbols that have shared meanings within the community. In the analyses of three modern British house types, Brown and Steadman [10] have shown how a feature like a bay window in the living room was popular. Especially for the private semi-detached English house of early 20th century, the two-storey bay became a regular and indispensable attachment to the front of the suburban UK house. Similarly, in a traditional Turkish house, some rooms – particularly the reception-room – are more valuable than others according to their location and usage [11]. Bay windows are sometimes added to these rooms to provide more daylight and aeration, or to improve the shape of these rooms, where guests are entertained and the head of the house spends his time. The reception-room is different from the other rooms in terms of its upholstery, size and its usage. It has a position that expresses the respect demonstrated and the comfort offered to the guest. Traditional low sofas called ‘*sedir*’ usually surround three sides of this room, which is generally reserved as a sitting area. Another feature of such traditional Turkish reception rooms is that they are not furnished with moveable furniture. That is, heavy furniture such as tables, chairs, wardrobes, cupboards or coffee tables are not used. Instead, fixed and non-movable structures such as closets and traditional ‘*sedir*’ sofas are used. With such properties, the reception-room of the traditional house has a simple appearance which has no sign of ostentation, but at the same time is also a privileged and cared-for place.

The traditional Turkish house has changed and improved with the contribution of both users and the family structure. While in the traditional house one single room is generally used for a variety of functions, in contemporary times rooms meeting specifically-defined functions have emerged (bedroom, dining room, TV room, etc). Because the main living room of a contemporary apartment is usually located in a corner

dominating the surrounding area or looking out on busy places such as a boulevard, road or street, it has usually taken on the function of the ‘reception-room’ the traditional Turkish house [12]. The contemporary main living room, therefore, is not preferred for daily use and is usually reserved for guests only [13]. Ayata and Ayata [14] has defined the Turkish main living room (reception-room) as the place where guests who are not very close to the family are welcomed, where extremely expensive material goods are located and where people do not live on a day-to-day basis. The contemporary main living room is a place that is kept nice and clean by the woman of the house and it is accepted as an area representing how tidy she is. It may be kept away from daily usage because of the worry or possibility that the furniture may get worn and older and that mess may appear which may be noticed by guests. As Özbay [15] has observed, however, in middle-class Turkish families there is a trend to open up the main living room for daily use. A study by İnan [16], Yıldırım and Baskaya [13] has demonstrated that the active sharing of the main living room by family members emerges in the cases where room numbers are limited. In this case, the main living room can simultaneously be the sitting room or TV room of the house. To conclude, the traditional reception-room has lost most of its meaning which used to exist as the resemblance of the family life and traditional values about entertaining guests. However, even with different types of furniture and decoration, today, the living room is still the most important and cared-for space of a house, frequently also representing the socio-economic status of the family.

2. RESEARCH HYPOTHESIS

The preliminary condition for the usability of housing spaces is that the space should be designed in a manner suitable for the purpose for which it is used. For this reason, spaces should be designed in a manner appropriate to their function within the scope of the requirements which determine their aim of use. During the designing process, the architect may use various forms, while creating the volumes according to the function they will perform. By this way, it would be possible to create better-defined or specialized areas for certain activities through recessed alcoves and projections included in the plan. With the help of the construction production technology developing today and in accordance with today’s aesthetical tendencies, it is observed that curvilinear forms are commonly used in apartment housing production targeting users from upper middle socio-economic level. In some previous studies it is stated that the form of the architectural space [12,17-21] and the size of the curvilinear volumes existing in the space [22] had positive/negative effects on perception-behavioral performance of users and presented information which guided the users about the use of the space. Among these researchers, İmamoğlu [17], in his study determined that, square shaped rooms and rectangular rooms with the same floor area and furniture were perceived as different when compared to each other in terms of the factors freedom, planning and

attractiveness. Sadalla and Oxley [18] found in their study that the geometric shape of an architectural space is effective in perceiving its size as positive/negative and thus a rectangular space is perceived as more spacious when compared to a square shaped space having the same physical size. Pennartz [19] stated in his study that there is a significant relationship between the dimensions and the shape of architectural spaces and the arrangement of their environmental conditions. Krier [20] put forth in his study that architectural spaces with different geometric shapes (square, rectangle, circle, oval, triangle, octagonal and forms joined to each other) generally have different effects on the perceptive performance of users. In a study which compared the differences between the physical and qualitative dimensions of office interiors with different architectural form (with rectangular, triangular and circular forms), Alp [21] asserted that spaces with different architectural forms have different aesthetic effects, especially triangular and circular plans are preferred more when compared to traditional rectangular space organizations. Yildirim and Akalin [22] stated in their study that the size of the curvilinear volumes in housing living spaces could have a positive/negative effect on the perception-behavioral performance of users and consequently put forth that the size of curvilinear volumes in main living rooms affected the use of the space and the perception-behavioral performance of users negatively in situations where the degree of curvilinearity is small.

From the literature, it is understood that there has not yet been enough research conducted on how the curvilinear volumes located in apartment housing main living rooms are used or to what extent this curvilinearity affects the perception-behavioral quality of the space. Therefore, it is not known whether the curvilinear forms having the same size but which occur in different locations of main living rooms have a positive/negative effect on the perception-behavioral performance of users. From this point, it is considered that the determination of the positive/negative effects of the curvilinear forms existing in three different locations (on the side, in the corner and in the center) of apartment housing main living rooms on the perception-behavioral quality of the space will have a significant role in enhancing the quality of the space and increasing the standard of living in apartment houses. Accordingly;

- H1. *Users will perceive and interpret the curvilinear volumes in the main living rooms of apartment houses differently according to their locations in the space (on the side, in the corner and in the center)..*
- H2. *Users will perceive and interpret the curvilinear volumes located on the side of the exterior façade of the main living rooms of apartment houses more positively when compared to the curvilinear*

volumes located in the center or in the corner of the main living room.

In the present study, in order to test the hypothesis asserted above, the use of curvilinear forms with similar size situated in different locations (on the side, in the corner and in the center) of main living rooms of apartment houses in Cukurambar and Cigdem districts in Ankara will be examined and the effect of the space on the perception-behavioral performance of users will be determined.

3. RESEARCH METHOD

3.1. Respondents

In the current study, a “main living room evaluation questionnaire” was given to a total of 101 house users. 53% of the respondents were male, 47% were female; 74% were between 25 to 46 years old and 26% between 47 to 65 years old; 41% were high school graduates and 59% were university graduates. 28% of the respondents had experience with traditional Turkish housing life and the rest had grown up in apartments in a big city in Turkey, mostly in Ankara. An average of 84% of those surveyed owned the apartment that was surveyed.

3.2. Research setting

The research was conducted on apartment houses with curved volumes selected from Cukurambar and Cigdem districts, which are suburban sites of Ankara previously covered with squatter housing. Cukurambar and Cigdem districts are located on the axis of Konya and Eskişehir highways. Squatter housing previously existed in both of the districts. In the course of time, both of the districts became residential areas for users from upper middle socio-economic level and apartment housing production still continues to grow rapidly. The axis of Eskişehir Highway is a linear area where housing residential areas exist together with ministry buildings, some other governmental institutions, shopping centers and bank prestige buildings. Konya highway, on the other hand, is another prestige area with health buildings, head offices of political parties, industrial buildings, workplaces and hotels.

Cigdem district is located to the south-west of Kızılay, which is the center of Ankara. It is bordered to the east by Konya Highway and METU (Middle East Technical University) territory, to the west and to the south again by METU territory and to the north by 100. Yıl District (Figure 2). Cukurambar District, like Cigdem district, is located to the south-west of the center of Ankara. It is bordered to the north by Eskişehir Highway and Kızılırmak district, to the west by MTA (General Directorate of Mineral Research and Exploration), to the east by Konya Highway and Balgat and to the south by 100. Yıl District. Cukurambar, which is a squatter area since the 1960s, has undergone a transformation since the beginning of the 1990s (Figure 2).



Figure 2. Cigdem and Cukurambar districts [23]

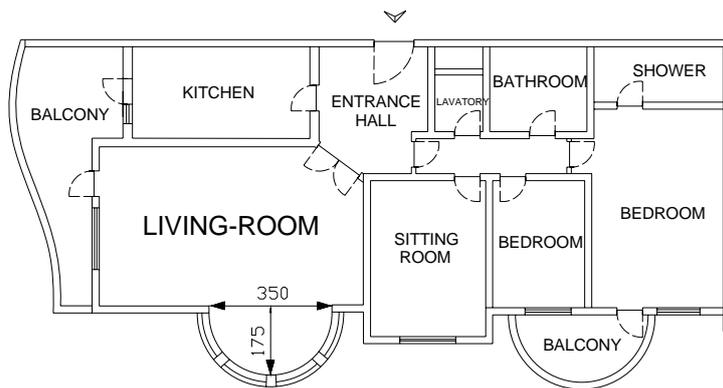
The beginning of new constructions in the area was with the arrival of financially powerful firms to the area. However, as in most of the areas which transformed from squatter areas, infrastructure services were brought to the area after the increase of newly constructed settlements. With the start of constructions, the demand to the region increased and contractors of different socio-economic levels from different regions of Ankara started housing constructions in the district. On the other hand, building producers of such variety brought the practices of the region from which they came and demanded these practices also from the architects. They especially preferred to construct the application forms which were known to be enjoyed by the customers. Another method is the direct or similar imitation of a building which was constructed previously in the region and for which a high demand

existed. Gorkem, Seymen, Menekse, Cagri and Acelya Buildings, which had main living rooms with curvilinear forms, were included within the scope of the research study.

The first apartment building researched was called Gorkem which in Cigdem districts. This building consists of ten floors and contains forty flats, i.e. four flats on each floor. Each flat is planned to include one main living room and three bedrooms. The curved projection is on the side of the main living room (Figure 3). Balconies contribute to the curved form of this apartment building. The curved projection is on the side of the main living room. The diameter of this projection is 3.50 meters and its depth is 1.75 meters. The curve in this case is not perceived separate from the main living room. On the contrary, it seems included in the space.



Figure 3. Typical flat of the Gorkem apartment building.



The second apartment building researched was called Seymen which in Cigdem districts. This building consists of eleven floors and contains forty four flats, i.e. four flats on each floor. Each flat is planned to include one main living room and three bedrooms. The curved projection is on the side of the main living room, as was the same of the previous example. Balconies contribute to the curved form of this apartment building, as was the case in the previous example. The curved projection is on the side of the main living room (Figure

4). The diameter of this projection is 3.50 meters and its depth is 1.75 meters as the previous example. The curve in this case is not perceived separate from the main living room. On the contrary, it seems included in the space. The locations and sizes of curved areas in the main living rooms of Gorkem and Seymen buildings are same features. They are performed which the Gorkem and Seymen buildings to the situation in the side of the main living rooms.

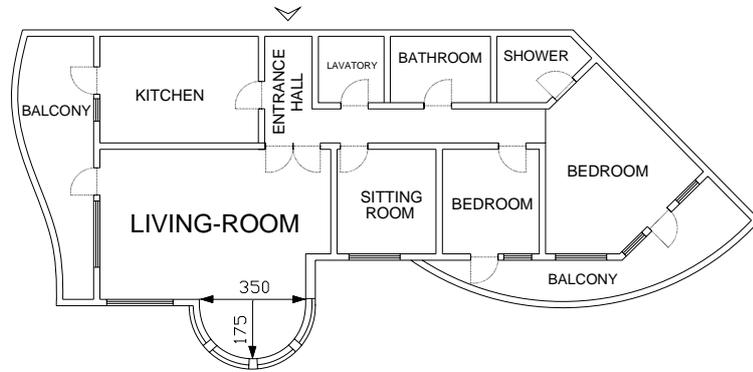


Figure 4. Typical flat of the Seymen apartment building.

The third apartment building researched was called Menekşe which in Cukurambar districts. This apartment building consists of eight floors and contains a total of thirty-two flats, i.e. four flats on each floor. The flats are planned with one main living room and four bedrooms. Curved areas exist in the corner and on both sides of the main living room (in total, there are three

curved areas). A large curved projection, the one examined in this study, is situated at the corner part of the main living room. The diameter of this projection is 3.50 meters and its depth is 2.10 meters. Due to its deep extension, the projection seems almost like a separate part from the main living room (Figure 5).

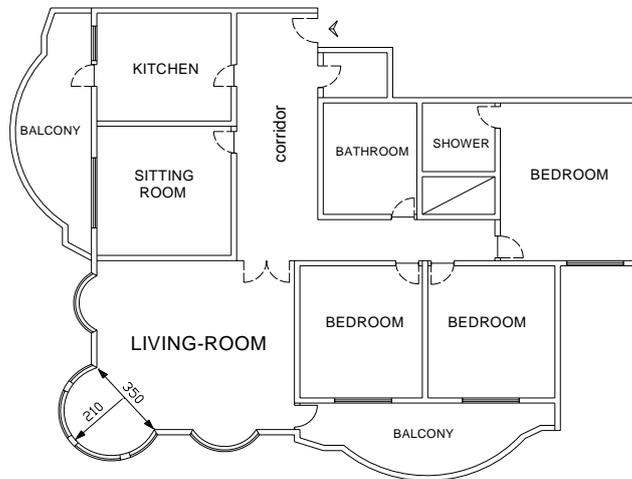


Figure 5. Typical flat of the Menekşe apartment building.

The fourth and fifth apartment buildings researched were called Cagri and Acelya. These buildings consist of seven floors and contain twenty one flats, i.e. three flats on each floor. Each flat is planned to include one main living room and three bedrooms. The curved projections are not at the corner or side parts of the

main living rooms compared to the previous examples. Instead, it is in the center of the main living rooms (Figure 6). Balconies contribute to the curved form of these apartment buildings, as was the case in the previous example.

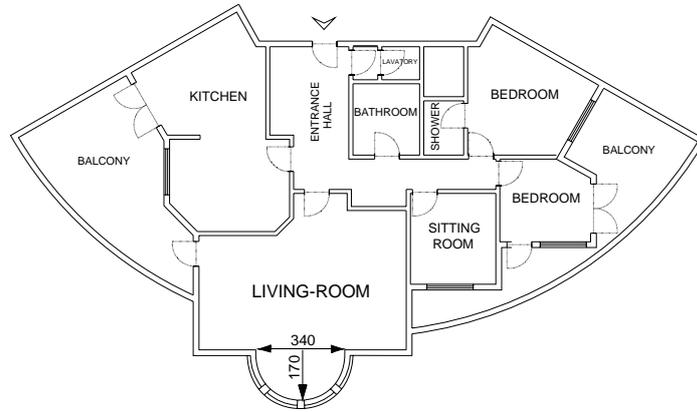


Figure 6. Typical flats of the Cagri and Acelya apartment buildings.

3.3. Questionnaire design and data analysis

In this study, the users of five apartment buildings were asked to answer a research questionnaire. 49% (41) of the respondents from the Gorkem and Seymen buildings, 93% (30) from the Menekse building and 71% (30) from the Cagri and Acelya buildings contributed and answered the questionnaire. The other users of the five buildings refused to join the study. The questionnaire data was obtained by interviews during a three-month period in 2005. The questionnaire was applied on weekdays and on the weekends and at different hours of the day. The subjects finished this questionnaire in about 20 minutes.

Research questionnaires which were found to be valid and reliable in the previous research studies conducted by Berlyne [24], İmamoğlu [17], Ertürk [25], Fiedler [26], Green [27], İmamoğlu [28], Kaya and Weber [29], Baskaya et al. [30], and Yildirim et al. [31], were referred to in designing the questionnaire. The questionnaire form was categorized in three groups. The first part of the questionnaire comprises questions designed to collect general information about the subjects. The second part is composed of questions which aim to evaluate the quality-of-use of the spaces. In this part, the subjects evaluated the quality-of-use of the spaces by responding questions related to the use of the main living room and the curvilinear volume and the position of the furniture in this area. The third part of the questionnaire comprises questions which aim to evaluate the perceptual quality of the spaces. In this part of the questionnaire, the subjects evaluated the curvilinear volumes situated in three different locations of the main living rooms (on the side, in the corner and in the center) by means of a five-point semantic differential scale comprising four adjective pairs ranging from 1 (positive) to 5 (negative). These are composed of adjective pairs: properly located / badly located, roomy / cramped, attractive / unattractive, well proportioned / badly proportioned.

In this study, the users' perceptions of the curved area in their main living rooms were accepted as "dependent variables". There are many factors affecting the space

perception of the users. Those factors concerning the data of the curved area location were accepted as "independent variables". The curved areas in the Gorkem and Seymen buildings are in the side of main living room, the one in the Menekse building is in the corner of main living room, and the one in the Cagri and Acelya buildings are in the center of main living room. The perceptual quality differences among those users who had a curved area in their main living room were tested with a one-way variance analysis (ANOVA). A Tukey HSD test was also used in order to compare the averages of the variables that were found significant in the variance analysis.

4. RESULTS

Regarding the analysis, among the 101 respondents, 37% mentioned that they were very impressed with the curved area of their main living room when they first bought or rented their apartment. Other factors in choosing this particular apartment included the importance of the socio-cultural position of the neighborhood, easy access to the city center, the use of the interior of the house, and large balconies.

4.1. Usage of the main living rooms and their curves

According to the results of the study, the main living room of the examples was not preferred for daily use and was mostly reserved only for guests (98%). In addition, most of the curved areas of the main living rooms were used and decorated as sitting places (curved side 81%, *curved corner* 67%, and *curved center* 87%). Alternatively, 27% of the residents in *curved corner* (with the curve in its main corner), 12% in *curved side*, and 7% in *curved center* put potted plants and flowers in the curved area (Figure 7). When *curved corner*, on the other hand, is compared to the other examples, it is observed that the curved area is in a more centered place and the value is increased by adding some plants and flower-pots. However, in *curved side* and *curved center*, curved areas are mostly preferred to sit and to chat. Therefore, it can be said that the differences in using of curved areas occurs than locations of them in the main living rooms.

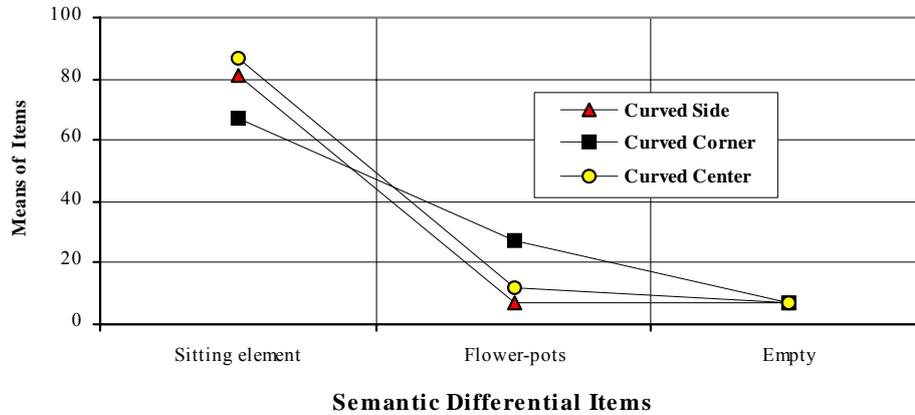


Figure 7. Usage patterns of the curved forms.

The statistical differences among the problems faced by curved area users were analyzed with one-way variance analysis (ANOVA) (Table 1). According to these results, the differences among the problems faced by curved area users were found statistically significant (at

a level of $P < 0.01$) when arranging their furniture. In other words, there are differences according to the difficulties stemming from the architectural features of the space and those differences appear while placing furniture in the curved parts of the main living rooms.

Table 1. ANOVA test of the problems faced with the curved living rooms

Problems Faced in the Curved Living rooms		Sum of Squares	df	Mean Square	F	Results
While settling the Furniture	Between Groups	7.026	2	3.513	12.506	$P < 0.001$
	Within Groups	27.528	98	0.281		
	Total	34.554	100			

Note: α : 0.001 is the level of significance.

A Tukey HSD test has been done while evaluating the difficulties for the users caused by the curved area related to the variance sources which were found significant in the variance analysis and while comparing

the mean values, standard deviations and homogeneous groups belonging to the differences among the different curved areas were determined (Table 2).

Table 2. Tukey HSD test of the problems faced in the curved living rooms

Problems Faced in the Curved Living rooms	Curved Side (Gorkem + Seymen)			Curved Corner (Menekse)			Curved Center (Cagri + Acelya)		
	M	SD	HG	M	SD	HG	M	SD	HG
While settling the Furniture	1.46 ^a	0.50	A	2.06	0.58	B	1.53	0.50	A

Note: Tukey HSD: Average differences in the homogeneity evaluation groups

M: Mean values SD: Standard Deviation HG: Homogeneity groups

a: Variable means ranged from 1 to 5, with higher numbers representing more negative responses.

In Table 2, it can be seen that the problems faced by curved area users were show differences according to locations of curved areas when arranging their furniture. According to the mean values are given in Table 2, most of the users of those flats having curved corner projection in the main living room (Menekse) have mentioned that they face difficulty in arranging their furniture. This problem decreases in the other examples (Gorkem + Seymen and Cagri + Acelya) when the

curved areas are much side and center, integrating more into the main living room area. Evaluation of each three locations of curved areas is statistically different for the dependent variables (evaluation of the encountered difficulties) and the ordering of the curved areas for those variables while arranging furniture is given below from the most positive value to the most negative one (Figure 8):

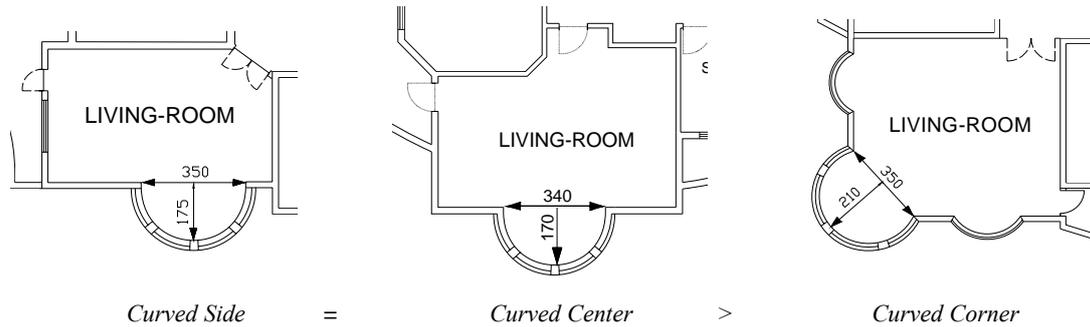


Figure 8. The problems faced while arranging furniture in the curved areas.

4.2. Perceptual quality of the curved area in main living rooms

Before the results of the analysis were determined, the reliability of the dependent variables was tested using Cronbach’s test. The Cronbach alpha coefficient for the set of four perceptual quality items of the curved areas was 0.61. Alpha coefficients of all items are above 0.60, representing good reliability according to some researchers such as Bagozzi and Yi [32], Grewal et al. [33] and Kim and Jin [34]. Therefore, these items can be considered to be reliable.

In this section, the statistical relationship between the users’ perceptual quality regarding curved areas finding three different locations of main living rooms was studied. The differences among the semantic differential items including the perceptual quality of the users were tested with ANOVA (Table 3). According to the ANOVA results given in Table 3, the differences among the semantic differential items, including the perceptual quality of the curved areas finding three different locations, were found to be statistically significant (at a level of $P < 0.01$). Consequently, it can be said that the differences among the curved areas have a significant influence on perceptual quality.

Table 3. ANOVA test of the perceptual quality of curved living rooms

Perceptual Quality of Curved Living Rooms		Sum of Squares	df	Mean Square	F	Results
properly located / badly located	Between Groups	16.064	2	8.038	9.710	$P < 0.001$
	Within Groups	81.064	98	0.827		
	Total	97.129	100			
roomy / cramped	Between Groups	17.395	2	8.698	15.354	$P < 0.001$
	Within Groups	55.515	98	0.566		
	Total	72.911	100			
attractive / unattractive	Between Groups	16.262	2	8.131	15.022	$P < 0.001$
	Within Groups	53.045	98	0.541		
	Total	69.307	100			
well proportioned / badly proportioned	Between Groups	19.147	2	9.573	11.569	$P < 0.001$
	Within Groups	81.091	98	0.827		
	Total	100.238	100			

Note: α : 0.001 is the level of significance

A Tukey HSD test was carried out in order to perceive the semantic differential items belonging to the sources that were found significant in the variance analysis. To

compare the mean values, standard deviations and homogeneous groups belonging to the differences among the various curved areas were utilized (Table 4).

Table 4. Tukey test of the perceptual quality of curved living rooms

Perceptual Quality of Curved Living Rooms	Curved Side (Gorkem + Seymen)			Curved Corner (Menekse)			Curved Center (Cagri + Acelya)		
	M	SD	HG	M	SD	HG	M	SD	HG
properly located / badly located	3.56 ^a	0.90	B	4.03	0.71	B	3.0	0.99	A
roomy / cramped	1.73	0.67	A	2.66	0.80	B	1.8	0.80	A
attractive / unattractive	3.31	0.78	B	3.73	0.69	B	2.7	0.70	A
well proportioned / badly proportioned	2.21	1.03	A	3.23	0.97	B	2.9	0.60	B

Note: Tukey HSD: Average differences in the homogeneity evaluation groups

M: Mean values SD: Standard Deviation HG: Homogeneity groups

a: Variable means ranged from 1 to 5, with higher numbers representing more negative responses.

In Table 4, the perception of the three curved areas for the dependent variables (perceptual quality) were statistically different and the ordering of the curved

areas within the properly located / badly located and attractive / unattractive variables from the most positive to the most negative value is given below (Figure 9):

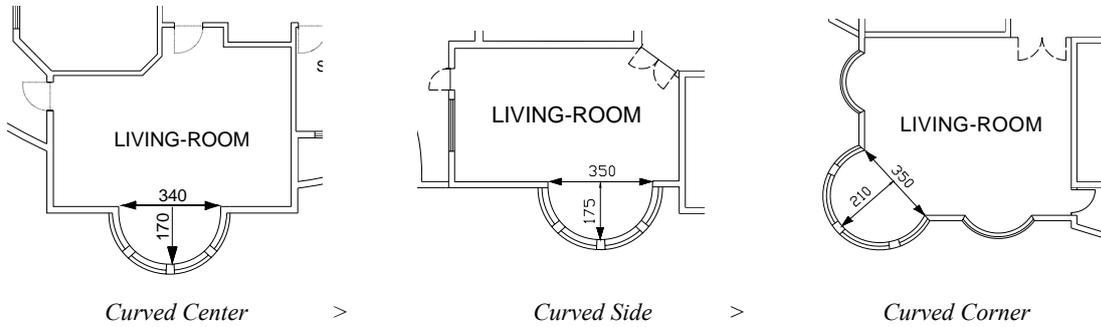


Figure 9. The perceptual quality of curved living rooms (properly located / badly located and attractive / unattractive).

Moreover, the ordering of the curved areas within the roomy / cramped and well proportioned / badly proportioned items is given below (Figure 10):

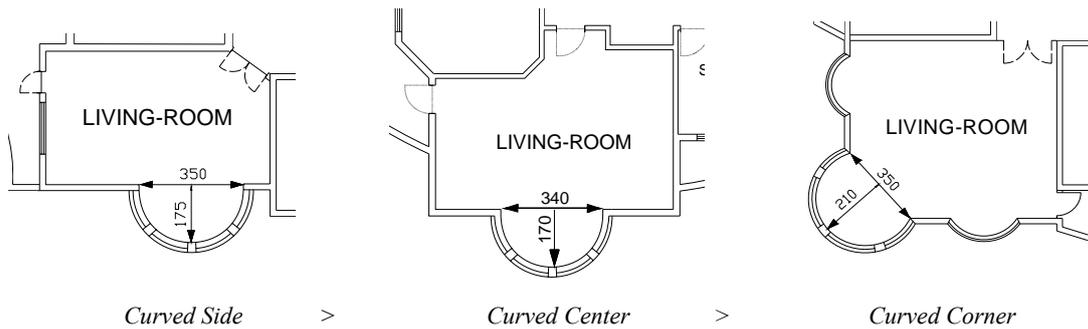
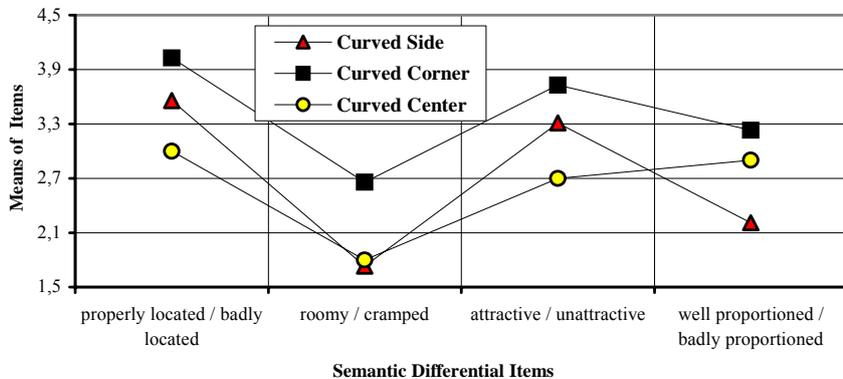


Figure 10. The perceptual quality of curved living rooms (roomy / cramped and well proportioned / badly proportioned).

Briefly, it has been found in the homogeneity test that apparently there are statistically significant differences at the level of $P < 0.01$ among the perceptual quality of the curved areas finding three different locations of main living rooms. This result in general supports the

idea that the curved side and curved center locations of main living rooms put forward in the research hypothesis will be perceived more positively compared to the curved corner (Figure 11).



Note: Variable means ranged from 1 to 5, with higher numbers representing more negative responses.

Figure 11. Perceptual quality of curved living rooms.

5. CONCLUSIONS AND SUGGESTIONS

In the present study, it was aimed to determine the effect of the location of curved areas which exist in the main living rooms of apartment housings on functional and perception-behavioral quality of the place. With this purpose, apartment houses in which curved volumes were used in spaces were determined in Cukurambar and Cigdem Districts of Ankara, which are regarded as areas targeting users from upper middle socio-economic level, and among these apartment houses, five blocks appropriate for research were included within the scope of the study. Accordingly, the results regarding the main living room spaces with curvilinear volumes are given below.

In terms of the results of the three examples studied in this work, the differences among the functional difficulties faced by those users having a variety of curved areas were found statistically significant (at a level of $P < 0.01$). Consequently, most of the users of those flats having curved corner projection in the main living room (Menekşe) have mentioned that they face difficulty in arranging their furniture. This problem decreases in the other examples (Gorkem + Seymen and Cagri + Acelya) when the curved areas are much side and center, integrating more into the main living room area.

The findings of this research have apparently explained the influence of differences in the perceptual quality of users related to the location of the curve in those flats where the curved areas were reflected in the interior space. The research has shown that there can be problems stemming from the interior space of flats that are shaped by the aesthetic concern of having a curve. Some of the users seem to organize the curved parts of their main living rooms by putting seating elements or plants and flower-pots. The usage pattern of the curved areas seemed to change according to the location of the curve. When the curve was in the main corner, some users organized their furniture as if there were not a curve because they could not find furniture suitable to the curve, so they either put plants and flower-pots in this curved area or left it bare. When the curves were in the side and center, it was organized with seats and coffee tables because the users considered this area to be part of the main living room.

The results of this work prove the dissatisfaction with curved corner projection in the main living room, both functionally and perceptually. However, this does not imply dissatisfaction with an overall established tradition. Features like projections in main living rooms can change over time due to changes in social context, economics, convention, custom, and personal preferences. At the moment, curved projections are still a member of a set of prominent forms repeatedly used by designers and developers, especially in certain areas of developing Ankara, just because the style still keeps its popularity. However, regarding the results of this work, the alternative with curved corner projection

(3.50 meters width and 2.10 meters depth) should be least preferred by designers and developers.

A house type or a detail solution might resemble an earlier example such as a tradition, or it might be an imported idea from a different culture. In either case, the popularity of a design usually depends on its functionality. As a resemblance of traditional Turkish architecture, the projection is the main part of the reception room which must please its' users both aesthetically and functionally. An aesthetically pleasing design might be valued at first sight as a *commodity sign*, but if it is found functionally deficient by its users, the designer/developer may alter the design either in location or shape or both. In some cases, the design can be completely changed or removed from consideration.

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REFERENCES

- [1] Çalışlar, A., "Ulusal Kültür ve Sanat", *Cem Yayınevi*, İstanbul (1988).
- [2] Güzer, A., "Mimarlıkta 'Kitsch'in Sınırları: 70 Sonrası Mimarlık / The Boundary of Kitsch in Architecture: Architecture After the 1970s", *Mimarlık Derneği Yayını*, Ankara, (1996).
- [3] Oktay, A., "*Türkiye'de Popüler Kültür*", Yapı Kredi Yayınları, İstanbul, (1993).
- [4] Widmar, R., "Preferences for multiple-family housing: some implications for public participation", *Journal of Architectural Planning and Research*,1:245-260 (1984).
- [5] Kaplan, S., Kaplan, R., "Cognition and environment", *Praeger*, New York, (1982).
- [6] Duncan, J.Jr., "Landscape taste as a symbol of group identity: a Westchester County village", *Geographical Review*,63:334-355 (1973).
- [7] Wohlwill, J.F., "Environmental aesthetics: the environment as a source of affect. In I. Altman and J. F. Wohlwill (eds.) New York: Plenum", *Human Behavior and Environment* ,1 (1976).
- [8] Baudrillard, J., "The Transparency of Evil: essays on extreme phenomena", *Verso*, London, New York (1993).

- [9] Venturi, R., Rauch, D., "Signs of life: symbols in the American city", *Aperture*, Washington, DC (1977).
- [10] Brown, F.E., Steadman, J.P., "The analysis and interpretation of small house plans: some contemporary examples", *Environment and Planning B: Planning and Design*,14:407-438 (1987).
- [11] Çağdaş, G.A., "Shape grammar: the language of traditional Turkish houses", *Environment and Planning B: Planning and Design*,23:443-464 (1996).
- [12] Arslan, P., "Konutta oturma ve yaşama hacimlerinin iç mekan biçimlenmesi", *Yüksek Lisans Tezi*, Hacettepe Üniversitesi Fen Bilimleri Enstitüsü, Ankara,214 (2000).
- [13] Yildirim, K., Baskaya, A., "Evaluation of main living room in housing blocks by users of different income groups", *Journal of The Faculty of Engineering and Architecture of Gazi University*,21:285-292 (2006).
- [14] Ayata, S., Ayata, A.G., "Konut, komşuluk ve kent kültürü", *Toplu Konut İdaresi Baş. Konut Araştırmaları Dizisi*,10:40-45 (1996).
- [15] Özbay, F., "Houses, wives and housewives, In E. Komut (ed.), Housing Question of the Other", *Chamber of Architects of Turkey*, Ankara (1996).
- [16] İnan, N., Kuşseven, G., Akçay, D., Baskaya, A., "Post-occupancy evaluation of two mass-housing examples with different spatial settings. In Apak, S and Ulken, G. (eds.)", *Housing Evaluation Symposium*, İstanbul: İstanbul Technical University,215-228 (2004).
- [17] İmamoğlu, V., Spaciousness of interiors. Glasgow: University of Strathclyde, *Unpublished Ph.D. Thesis* (1975).
- [18] Sadalla, E., Oxley, D., "The perception of room size: The rectangularity illusion", *Environment and Behaviour*,16:394-405 (1984).
- [19] Pennartz, P.J.J., "Atmosphere at home: A qualitative approach", *Journal of Environmental Psychology*, 6:135-153 (1986).
- [20] Krier, R., "Architecture composition", New York, *Rizzoli International Publications*, 71-78 (1988).
- [21] Alp, A.V., "An experimental study of aesthetic response to geometric configurations of architectural space", *Leonardo*, 26:149-157 (1993).
- [22] Yildirim, K., Akalin, A., "Problems related to the dimensions of curved areas in the main living rooms of apartment housing", *Journal of Architectural and Planning Research*, (Article In Press) (2007).
- [23] Kaçar, C., "1990 sonrası Ankara apartman konutlarında mimari imaj arayışları: Çiğdem, Çukurambar ve Mustafa Kemal mahalleleri", *Yüksek lisans tezi*, Gazi Üniversitesi Fen Bilimleri Enstitüsü, Ankara,38-43 (2006).
- [24] Berlyne, D.E., "Studies in the new experimental aesthetics", *Wiley*, Newyork (1974).
- [25] Ertürk, S., "Mimari mekanların algılanması üzerine deneysel bir çalışma", Karadeniz Teknik Üniversitesi, *Yayınlanmış Doktora Tezi*, Trabzon (1983).
- [26] Fiedler, F.E., "The leadership game: matching the man to the situation. In Gibson, J. W. and Hodgetts, R. M. (eds.)", *Readings and Exercises in Organizational Communication*, Orlando, FL: Academic Press, 122-130 (1985).
- [27] Green, R., "Meaning and form in community perception of town character", *Journal of Environmental Psychology*,19:311-329 (1999).
- [28] İmamoğlu, C., "Complexity, liking and familiarity: Architecture and non-architecture Turkish students' assessments of traditional and modern house facades", *Journal of Environmental Psychology* ,20:5-16 (2000).
- [29] Kaya, N., Weber, M.J., "Cross-cultural differences in the perception of crowding and privacy regulation: American and Turkish students", *Journal of Environmental Psychology*,23:301-309 (2003).
- [30] Baskaya, A., Wilson, C., Ozcan, Y.Z., Karadeniz, D.A., "Study in re-establishing the corporate identity of a post office institution with gender-related differences in perception of space" *Journal of Architectural and Planning Research*,23:43-59 (2006).
- [31] Yildirim, K., Akalin-Baskaya, A., Hidayetoglu, M.L., "Effects of indoor color on mood and cognitive performance", *Building and Environment*,42:3233-3240 (2007).

- [32] Bagozzi, R.P., Yi, Y., “On the evaluation of structural equation models”, *Journal of the Academy of Marketing Science*,16:74-94 (1988).
- [33] Grewal, D., Krishnan, R., Baker, J., Borin, N., “The effect of store name, brand name and price discounts on consumers’ evaluations and purchase intentions”, *Journal of Retailing*,74:331-352 (1998).
- [34] Kim, J.O., Jin, B., “Korean customers’ patronage of discount stores: domestic vs multinational discount store shoppers’ profiles”, *Journal of Consumer Marketing*,18:236-255 (2001).