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## Analysis on the factors affecting function pattern design of congregate housing in a city

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### ABSTRACT

: Function pattern design of congregate housing is a very vital part of the overall design of congregate housing in a city. The interior function pattern design is related to the experience of using the congregate housing. This paper analyzes and evaluates the factors that affect the function pattern design of congregate housing in the hope of finding a way to make the best out of the function pattern design.

### KEYWORDS

Congregate housing; City; Function pattern; Affecting factors.



## INTRODUCTION

In China, we have a large population while the land is limited. Consequently, the main pattern of urban residential can only be congregate. At present, there is a conflict between the needs of diversity from our people and the monotony and uniformity of housing, which needs to be resolved. This paper studies the main factors that influence the function pattern design of congregate housing, and tries to find a function pattern design that is suitable for the contemporary urban residential in China and makes a proper judgment on the function requirements of contemporary urban residential.

Housing designers' affirmation, understanding and assurance on the factors affecting residential function pattern have basically decided the residential function factor. After years of field surveys and engineering practice, I believe that the factors influencing function pattern include the following five aspects: housing needs, family structure, household lifestyle, impact of social custom and residential replacement cycle. These five factors together have an impact on the function pattern design of congregate housing in a city. Changes in any factor will impose the impact on the rest factors and thus lead to the changes in the interior function pattern.

## HOUSING NEEDS

Changing in housing needs can change the function pattern of a house directly. Among other factors that have connection with residential function pattern, the connection existed between housing needs and function pattern is the most direct one. The residential function pattern is in fact the exterior manifestation of housing needs. Therefore, the study on residential function pattern should start from the study on housing needs.

### The basic needs of residents

In her book *Living Environment*, Danish psychologist Ingrid Gehl divided the survival needs of human into three parts which are physiological needs, safety needs and psychological needs. There are some things in these needs that have related to residential construction, which are sleeping, resting, sanitation, air, sun, general residential security, defense, noise control, communication, privacy, activities, playing, building, rectification of name and beauty. They can be summarized into the following five aspects: physiological needs of living, needs of territory, privacy needs, the needs of neighborhood association, and self-actualization need

### Variation of housing needs

American humanistic psychologist Abraham Maslow put forward in his theory on growth motivation five levels of needs: Safety Need, Safety Need, Love Need, Esteem Need and Self-actualization need, which may correspond to the previous three basic needs. He believes that these five levels of needs can be seen as a ladder and that after the pursuit of low-level need is reasonably satisfied, the relatively higher-level need shall begin to emerge and become the dominant need (see figure 1). Different levels of needs are likely to play a role together, but there is always a need taking the dominate role. According to the environmental conditions (such as economic base and cultural environment and politics) of residents, the dominate need varies.

The current housing needs of urban residents are being through changes from needs in quantity to needs in quality. These changes are the external manifestations of this rule, which can be shown in the following examples: the desire to increase the residential area and perfect the house, the focus on outdoor environment and landscape, and increasing emphasis on residential security and environmental protection. Currently, society, economy, science and technology and the system are undergoing a series changes, these changes in turn impose a profound impact on the living needs and demand the completed houses to cope with these changes. Compared with basic needs for living, living need is a relatively higher-level need, which is worth pursuing. As Mo Zi once said: one has to feed himself before thinking of beauty, one has to have clothes to wear first before he wants to wear something gorgeous, and one has to live in safety before he pursues happiness. After associating this theory with the construction of urban congregate housing, we can know that the first and second level of needs is the basics, which is having a place to live in and basic material needs being met; while the third level, fourth level and the fifth level of needs should be measured from the spiritual perspective, which is to say that owner of the house betters it and it in turn satisfies the owner's spiritual needs. Therefore, it requires architects to reinforce the investigation and analysis on market, users' consumption habits and lifestyle and lead the new trend of housing development through creating new residential patterns to guide and improve the lifestyle of residents.

## FAMILY STRUCTURE

Family structure refers to the form of family members and a state of interaction and reciprocal influence as well as a relatively stable contact pattern formed from the state. Family structure includes two basic aspects: family size and family mode. Family size includes the number of family members and the household size, family mode includes the ways of members connecting with each other and the family mode caused by these ways. The family structure in a society has a strong association with the main interior spatial pattern in urban housing.

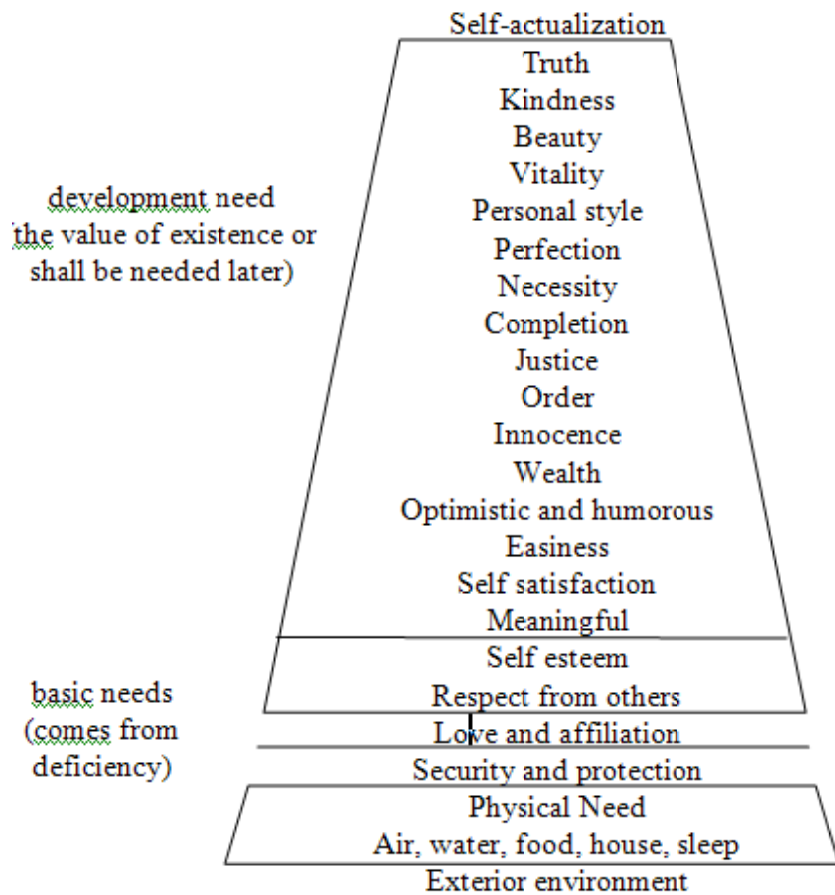


Figure 1: levels of needs

Source: Abraham Maslow, editor: Ming Cheng, Jiuzhou Press, p52

**Basic needs of residents**

Family structure in different countries has different forms, but the change is consistent. That is in one family, from its formation to disappearance, the largest change is the growing period of the children and the period after growing old. From figure 2, we can see the changes of family structure. Currently, family structures in China are mainly single family, Dink family, nuclear family, trunk family and joint family and nuclear family is the primary one. Nowadays, mobility of population is increasing and many “singles” emerge in some immigrant cities. Although they stay single for a short period of time, usually 1 to five years, their needs in housing types cannot be ignored. In late 1970s, the one-child policy has been put into practice and these children have reached marriage and childbearing age. At the same time, the government has implemented the policy of having a second child. And couples who are the only child in their families are having or preparing to have a second child, which will definitely affect the pattern of current housing units.

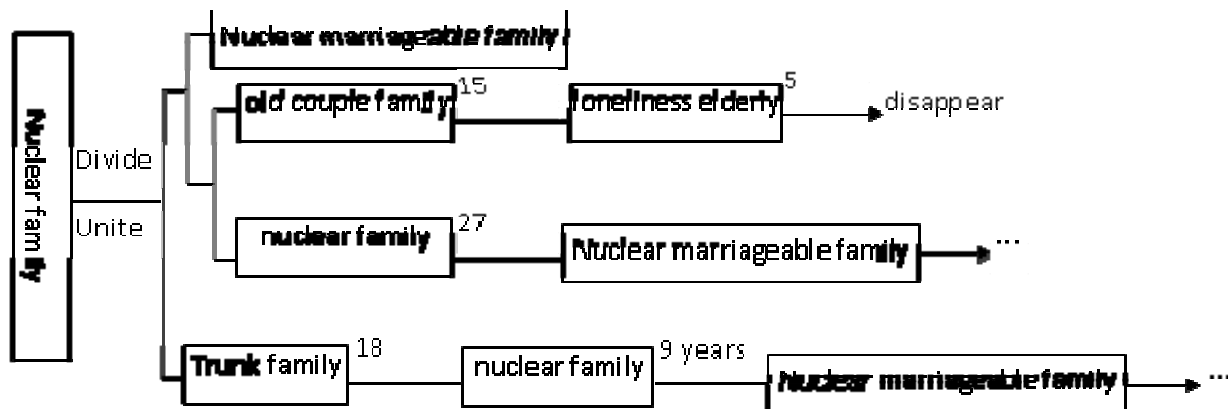


Figure 2 : Family structure and periodic change

**Variation tendency of family structure**

Family size refers to the number of family members. As the economy keeps advancing, urbanization is accelerating; population mobility increases, and divorce rate and unmarried rate of people in marriage age increases, all of this will make the family size decline. Because of the existing family planning policy and the strengthening of core tendency in family structure, the average number per family has decreased from 3.38 in 2004 to 2.9 in 2012. That is to say, the average family size in China is almost the same with western countries (such as the US and Canada, where the average family size is about three). From TABLE 1 and TABLE 2, we can see that the proportion of small-scale family (which means there are 1 to 3 people) in all households shows a slight growth trend nationwide, while the proportion of medium-sized household in all households (of people about 4 to 6) decreases continuously. Henan province has the same trend.

Affected by the national adjustments of family planning, selective two-child policy and open two-child policy in the future shall impose some influence on the newborn population. It can be forecasted over the next few decades, the total number of small-scale family shall maintain the upward trend nationwide, and the medium-sized household shall show a rapid growth trend.

**TABLE 1: Number of different family sizes in the country**

Year	Total number	one-people family	Two-people family	Three-people family	Four-people family	Five-people family	family with six people or more
2011	360447	50488	93719	99854	60977	33903	21505
	100%	14.01%	26%	27.7%	16.92%	9.41%	5.97%
2012	356954	50261	94323	98432	59938	32830	21170
	100%	14.08%	26.42%	27.58%	16.79%	9.2%	5.93%

**TABLE 2 : Number of different family sizes in Henan province**

Year	Total number	one-people family	Two-people family	Three-people family	Four-people family	Five-people family	family with six people or more
2011	22882	2211	4543	5608	5167	2818	1998
	100%	9.67%	19.85%	24.51%	22.58%	12.32%	8.73%
2012	23092	2357	5233	5562	5015	2665	2037
	100%	10.21%	22.66%	24.09%	21.72%	11.54%	8.82%

**Note: figures in TABLE 1 and TABLE 2 are from [www.itongji.cn](http://www.itongji.cn)**

**HOUSEHOLD LIFESTYLE**

Household lifestyle can be interpreted as indoor behavior pattern, which includes indoor unit and combination among units. The designer’s correct understanding towards indoor behavior pattern and user’s high correspondence to behavior pattern are the final goal of the design of indoor functional pattern.

**Changes in Characteristics of Family Ethics**

**Reduction in Economic Dependence**

With the rapid growth of China’s economy, the socialized mass production has replaced the previous small production. Employment system, social welfare system and social security system were established and are being improved, which result in the reduction in economic dependence between family members. This reduction increases the awareness of privacy and independence when the family members are about to divide the living space.

**Reduction in living dependence**

Further development in society, culture and education has been achieved. Phenomenon of generations living together, consuming together and parenting together in traditional households has simplified into consuming together. That is to say living dependence between family members has been reduced. Especially as the urbanization keeps advancing, and the policy on population mobility has been strengthened, the separation and division of rural families have been exacerbated. Yong migrant workers went to town and became urban residents. When they acquired an independent living space, most of them chose to abandon the traditional living pattern of two or three generations living under the same roof. Their demand of buying houses becomes the rigid demand. Meanwhile, affected by the traditional conception, fellow-villagers or relatives prefer to purchase houses in the same area and live closely with each other.

### Exacerbation of conflicts of values

Conflicts of values on one hand shows the differences existed in knowledge and education between generations result in the gap of lifestyle, social ideas and value orientation. That is because younger generation pursues freedom, equality and independence and most of them are willing to live separately from their parents especially after they are married. On the other hand, it indicates that the previous joint family (formed by two or more nuclear families which are connected with one another by the marriage of their children) is less and less and dink family and never-marry group is becoming more and more since the economic rationality enters into households.

### Changes in Family Life

Since the reform and opening-up, people's concepts on market economy, competition, efficiency, talent and information has gradually come into form over the last three decade. People now no longer simply want enough food and clothing, they now live in a well-off society and the family life has changed from self-sufficient type to market economy type, from focusing on material to focusing on culture, from a standard type to a diversified type, from being closed to open. These changes can be shown in the following four aspects:

(1) People start to pay attention to the integrity and comfort of houses, as well as the individuality of interior decoration. With the sustained development in economy and society, people's income has greatly increased, they now have the ability to purchase their favorite houses. In the past, people had the impression that a house with a separate bathroom, kitchen is a house with complete function. But now, people are asking more, they want to live in a more intelligent and personalized space that has separate dining room, meeting room and study room where can be decorated as owners like.

(2) There emerged a large number of freelancers who mix their family life with work life. We need constantly updated knowledge to bring forth the information and achieve personal improvement. And as the information age approaches, the proportion of time used for study, work, book-reading and newspaper-reading rises, and the rapid spread of internet makes workplace smaller, which results in the possibility of working at home. Therefore, freelance-writer, designers and workers in science and technology have become in vogue.

(3) Idea of privacy territory in a family grows stronger. Although there is a rise in the frequency of social interaction, the frequency of receiving guests in house is decreasing. As social service is booming and the pace of life is accelerating, receiving guests in the house seems to be on a downward trend. According to the data provided by the Information Office of Beijing Urban Construction Research Center, the current family structure is getting younger and younger (See figure 3), people between 21 to 40 years old accounts for the 63% of total house-purchasers in Beijing, and among them, people of age between 21 to 30 occupies the highest percentage. Young people has much more activities outside the home, for instance in a bar, bookstore or a coffee house, and they take the home as a private space. As a group of age over 30 years old, due to the work pressure and the increase of burden from housework, they rather take home as a place for family members and resting and take their social events and gatherings in a public place like restaurant and coffee house.

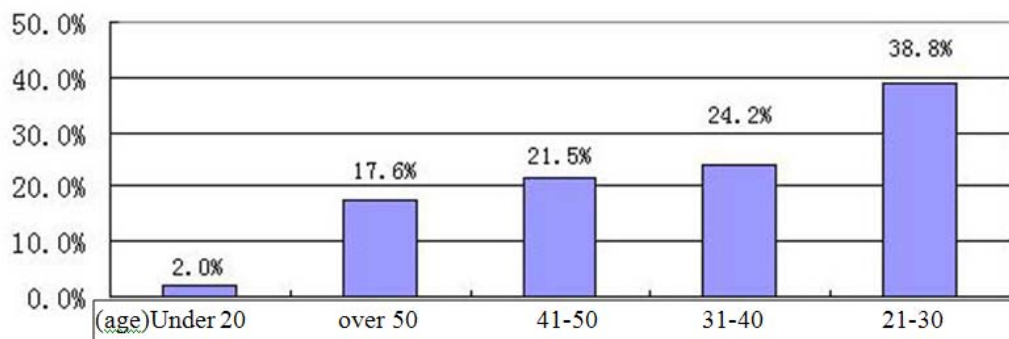


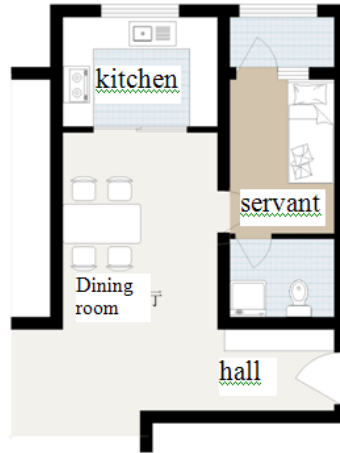
Figure 3 : Age ration of Housing Purchasers in Beijing

### Figure from the Information Office of Beijing Urban Construction Research Center

The tradition function of family kitchen that is designed for cooking is growing weaker. Even ordinary people have access to a large quantity of modern household equipment, such as soybean milk maker, juicer, air fryer, automatic cooking machine and baby machine. Household chores are now handled by electric appliances other than by hand, and these electric appliances have become indispensable to modern kitchen and changed the traditional cooking methods. As the income increases, especially young people now choose to eat out or eat takeout or fast food or some semi-finished products, and kitchen equipment are becoming more and are simple to use, all this together makes the kitchen become a place to cook and a place for family members to bond.

The further development of the domestic service sector had prompted domestic activities carried out in the house gradually shifted to paid service for the society. Therefore, dry cleaners and shops for processing semi-finished products have emerged, as well as confinement nurses, hourly workers and cleaning company. Employment service now enters the field of household.

This change has altered the housing type and makes the housing equipped with relatively independent space for domestic service. Thus, there are housekeeping service room, servant's room and nanny room in some larger apartments. (Figure 4)



**Figure 4: servant's room with bathroom**

**Source: A type of housing from Zhujiang Green-bank, Beijing with an area of 169.14 square meters**

### SOCIAL CUSTOM

Social custom refers to the daily habit and custom of people. Habit is a kind of behavior or tendency which is developed in a long time and cannot be changed easily. Custom is used to refer those habitual manners and courtesy. Social custom is a special kind of culture, contains a wide range of content, such as basic necessities of life, production, transportation, festival, religion and taboo. It reflects people's thoughts and life needs and also has a negligible impact on people's daily lives. For example, although residents in China has accepted the western culinary methods using the induction cooker, oven and microwave oven to cook, the traditional dietary habit requires the kitchen should be set up near the exterior wall to ensure the lampblack can be discharged, which results in the fewer limitation on kitchen than western countries and no need of opening windows (see figure 5). Because of the climate, houses in the northern part of China usually face north or south, and the main space and auxiliary space are set in the south and the north. The function exchange cannot be achieved due to the space constraints.



**Figure 5 Western kitchen far from the exterior wall**

**Source of picture: Modern Building Integration – Integrated Residence, Liaoning Science and Technology Publishing House, P<sub>84</sub>**



## RESIDENTIAL REPLACEMENT CYCLE

After the composition of a family, it usually lasts 30 to 60 years until it disappears. The owners either seek a replacement for this house or transform this house in order to live comfortably. For replacing a house, the average number for people in Hong Kong entering into the secondary market is 7 and 20 percent of households in the US move to other places. However, for mainland families, replacing a house usually happens in a period when there is a big change in this family. The replacement cycle has a strong relation with economic development level in this area, per capital disposable income and the pace of urban development, and the family income is the major factor affecting the replacement. The second-hand housing market started earlier in a developed area, thus, the replacement cycle is obviously shorter than the underdeveloped area. For example, replacement cycle in Guangzhou and Beijing is about 9 to 10 years and that in Chongqing is about 10 to 14 years (second home-buyers with different motivation included). As the economy keeps developing and the second-hand housing market is increasing, and when people are guided actively with the proper housing consumption idea and the traditional idea of "One house for a life" is altered, many people will have more chance of getting into the secondary market. Their requirements for variability of houses will become weaker and the requirements for functional diversity will be stronger.

## CONCLUSION

After being satisfied with the number of houses, residential users will become more and more particular about the housing design. Buyer's market has come into being, and it demonstrates that while people live a life, they are paying attention to the quality of their houses. Developers and planners should attach more importance to the housing quality, and we should guide and increase developers' and planners' and users' understanding and recognition on residential function pattern design. Only through in-depth analysis on and evaluation of the factors affecting interior function pattern design, can developers provide houses with more features to meet the different lifestyles of owners and make the houses adaptable to the users in a certain period. Planners should follow these factors and balance the relation among society, developers and owners, and they need to provide functional space that truly meets the needs of society and owners without being driven by the economic interest. In this way, owner-oriented design can be achieved in every house, and functional spaces can be connected with each other conveniently and still maintain their independence and can be saved for future spatial development.

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