

# Study on the Relationships between Behaviour Styles and Elderly Livable Space in the North Area of China

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**Keywords:** Elderly Institution, Facilities, Spatial Element, Behaviour Style.

**Abstract:** The numbers of the elderly more than 60 years old have 1.67 billion in China, accounting for 13 percent of the total population. However, only 3% of the elderly population can enjoy services of the endowment facilities. Therefore, How to improve the living environment of the elderly is still an important issue in the field of our urban and rural development. This thesis is based on the north of China. It takes some elderly institutions in the city Dalian as research objects. The research is for a pattern of a suitable living space for old people as a master line, try to find the relationship between the spatial constitution and living behaviour, elaborates the basic spatial characteristics of the research objects, then discussed the relevance of the formation and spatial composition through the analysis of questionnaire. Then in results of analysis, it proposes some spatial constitution models which are adapt to the northern area in China, provides scientific basis and perfect technical reference to design, construction, management and development of architecture for aged people.

## 1 RESEARCH BACKGROUND AND PROBLEM

The developing countries stepped into the aging society with the advances in medical and health care. According to the relevant studies, the aging has become a worldwide problem. At present, it is emerged for the first time in the history that the older population is more than the total population of infants. In the future, both of the older population and the proportion in China will be the No.1 in the world. China will face serious challenges. From the 20th century, China has stepped into the aging society (Fig.1). More and more people began to accept elderly institution as their pension place. Those Medium-sized institutions are very welcome. Elderly institution is a kind of social institution. Elderly who live in there get the financial aid from country, family or themselves. The institution can provide basic necessities and other services for elderly.

Dalian is an ideal place for pension. As it has a good geographical environment and climatic conditions. So far, there are 267 elderly facilities and 96 facilities of them are elderly institution, as shown in Fig.2. However, there is a serious fact that we can

not ignore. Most of these institutions have some problems in space utilization. So, the paper based on the behaviour of the elderly, by classifying space and analyzing the relationship between spatial elements and elderly behaviour, come to a conclusion. The conclusion can play a role in how to improve the quality of elderly persons' life.

## 2 OUTLINE OF OBJECTIVES

This thesis is based on the north of China. It takes some elderly institutions in the city of Dalian as research objects. After the status survey, it analyzed the following four dimensions around the spatial constitution and domain forming: facility types, spatial elements, the basic properties of the elderly and the living behaviour. The thesis's purpose is try to find the relationship between the spatial constitution and living behaviour, while try to provide a technical basis for the National Natural Science Foundation research project: Elderly comfortable space model in the north area of China.

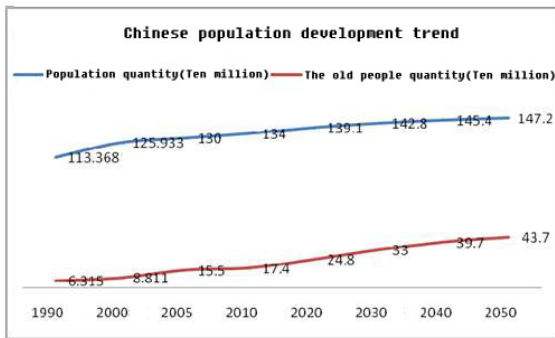


Figure 1: Chinese population development trend.

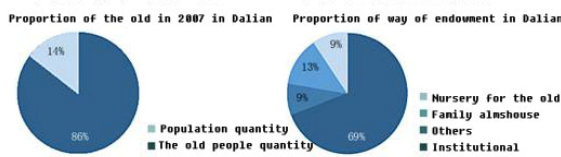


Figure 2: Aged people quantity and way of endowment.

Table 1: Survey method and content.

1	The basic situation of the investigation	The basic condition of respondents' facilities, year of build, type of construction, the year of set up, living condition, reconstruction, and so on.
2	The interview survey	Operator's attributes, establishment of motivation, management mode Business methods, the elderly condition, and so on.
3	Actual measurement	Drawing plan, picture of furniture and display detailed arrangement, taking pictures, and so on.
4	Investigate	Observing action content of indoor and outdoor and the use of space condition for the old according to time slot during one day.
5	Questionnaire survey	The old man personal attributes, health, family status, stay causes, life behaviour, use of the place, space satisfaction, needs and expectations, and so on.
6	Additional investigation	Reconfirm on contents of investigation 1, 2, 3, 4, and 5.

### 3 STATE OF THE ART

This paper is supported by National Natural Science Foundation of China (50778031). Based on checking of existing research results, we have not found related research about space composition model and the specific spatial form of aged people facility,

which is the starting point of this article. Innovation of this research has the following several aspects:

- Summarizing the basic plane constitute mode of the endowment facilities in north China.
- Combined with the related research in the field of environmental behaviour, analysis of the relations between aged people's behaviour and architectural space.

## 4 METHODOLOGY

The objects of this article are selected according to their operational nature/scale and architectural form. Since 2007, we have done the general survey, interview surveys, mapping construction plan and so on. After the initial data compilation, though the observation survey, questionnaires, we get more systematic data. Then, based on the sorting, classification, analysis, statistics, induction and other methods on those data get some valuable conclusions. (Table 1)

## 5 EXPECTED OUTCOME

Different building forms have different indoor spaces. Different indoor spaces have different living behaviour. Different living behaviours should be treated in different design ways.

### 5.1 Spatial Classification and Spatial Elements

Construction space is a complex. It is not only a manifestation of building structures, but also rich in many elements, such as spatial form, orientation, scale, the relationship between furniture and entrance and so on.

According to the openness of space usage, the interior space can be divided into the following three types: private space, semi-open space and open space, as shown in Fig.3. This paper will take the activity room and hall space as examples to discuss the relationship between spatial elements and elderly behaviours.

### 5.2 Elderly Behaviour Classification

There are four types of behaviour in this paper: intimate communication, spontaneous communication, social communication and necessary communication. Spatial quality of these four

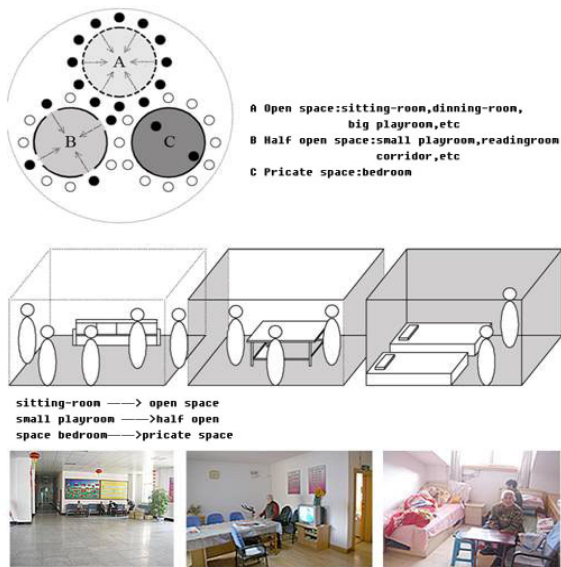


Figure 3: Types of space.

behaviour is decreasing in turn. Meanwhile, the spatial quality is also proportional to the number of behaviour (Fig.4).

- Intimate communication: it appears in the communication between friends and relatives. It is the most closely communicative action.
- Spontaneous communication: it appears where the environmental conditions are suitable and the spatial forms are attractive.
- Social communication: affected few by physical space form, it can appear in any time

and any where.

- Necessary communication: it appears in public space, such as say hello and so on. It is affected by the people around.

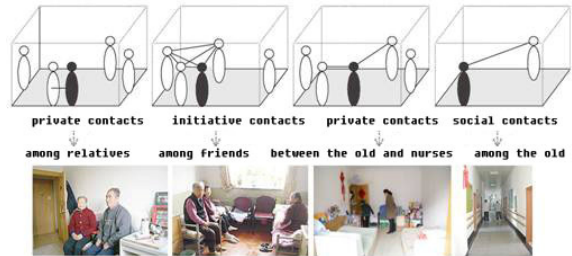


Figure 4: Types of the old people's behavior.

## 6 STAGE OF THE RESEARCH

The relationships between the elderly behaviour and the lobby hall and activity room are shown in Fig.5.

(1) ZSIn.: as it is located in a residential building, so there is no lobby hall and activity room. Only the living room can be used as a public place. In other words, its function is equivalent to the other hall and activity room. Its spatial form is just a simple cube space. The interior furnishings are a table, a TV and several chairs. Some fitness equipments piled up in the balcony. Because of the lack of some functional space, there are not enough activities for elderly to choose. In the course of the investigation, we found

Zhongshan institution	The 1st institution	The 2nd institution																																																												
<p>Elements of space                      Areas:23.5m<sup>2</sup>                      Aspect:south                      Furniture:desk, chair,TV</p> <p>Sitting-room</p>	<p>Elements of space                      Areas:155m<sup>2</sup>                      Aspect:corridor faces the south and the north                      Furniture:sofa, table                      Location:nearby entrance</p> <p>Sitting-room</p>	<p>Elements of space                      Areas:109m<sup>2</sup>                      Aspect:corridor faces the south and the north                      Furniture:sofa, table,bookshelf                      Location:nearby south entrance</p> <p>Sitting-room</p>																																																												
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<p>Forms of behaviour:                      A.private contacts                      B.initiative contacts                      C.necessity contacts                      D.social contacts</p> <p>The sitting-room and activity room are sapce of hall in Zhongshan institution.</p>	<p>Elements of space                      Areas:35m<sup>2</sup>                      Aspect:north                      Furniture:desk, chair</p> <p>Activity-room</p>	<p>Elements of space                      Areas:17m<sup>2</sup>                      Aspect:north                      Furniture:desk, chair</p> <p>Activity-room</p>																																																												
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Figure 5: Relation between elements of space and behavior.

that most of the behaviour occurred between elderly are social communication and necessary communication. However, elderly person's life behaviour also changed the original use of space. For examples, the balcony became into a fitness room. It is a good phenomenon if not shielding the main sunlight.

(2) DL-1In.: it is a functional organization. It has separate activities rooms and lobby hall. During the observation survey, we found the following points.

Lobby hall: The hall divided into two parts by the middle aisle, as shown in Fig.7. The A part is more popular than B. During nearly 6 hours observation, we could see some elderly went to there to have a rest or just take a walk, but no one went to B part. The reason is that there is no any furniture in B part. So we can say the spatial elements influence elderly person's life behaviour .

Activity room: each floor's north rooms are activity rooms in this institution. Their average area is 35 m<sup>2</sup>. But we can see from these photos that there are only few facilities and furniture. So these rooms' utilization rate is very low. If a large space with no more division and design, it is not good for elderly communication.

(3) DL-2In.: It is a classic elderly apartment building with completely functions.

Lobby hall: The hall is also divided into two parts (C and D), as is shown in Fig.7. In the south part, there are only several chairs and reception desk. Compared with C part, part D is a carefully designed area. There is some good furniture, such as sofa, tea table, book shelves and so on. But only few elderly went there to stay a while. Why? Though some interviews and analysis, we get the following points: (a) the floor is raised 30 cm from the ground, it is very hard for elderly up and down, although it is a wooden floor. (b) it is not only far away from the entrance, but also surrounded by some partitions, so the sight is not very good. Elderly can't see what happened in other space when they set here.

Compared with DL-1In., we can see that both of part A and D are south lobby hall. Although D has comfortable furniture, A is more popular than D. The reason is that A is near by the main entrance, it is very convenient, as shown in Fig.8.

Activity room: there are big size and small size activity rooms in each floor. Although all of them are north room, those small size rooms are very popular in elderly persons. The reason is that the small size room is very suit for 4 to 6 people to use.

The main life activity of elderly is play cards and one group is 4 to 6 people. This size of space and this size group is very good for elderly to make sense of field. So most of the behaviour occurred in this place is spontaneous communication.

In addition, not only the size of space can influence elderly persons' behaviour , but also the form of space. For example, the space near by the window is very interesting in this institution, so elderly like to stay there than any other place in one room. Although we can't exclude any other elements, we can also come to the following conclusion: interested forms of space and the appropriate spatial scale can promote elderly persons' life behaviors.

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APPENDIX



Figure 6: Distribution of aged people facility in Dalian of China.

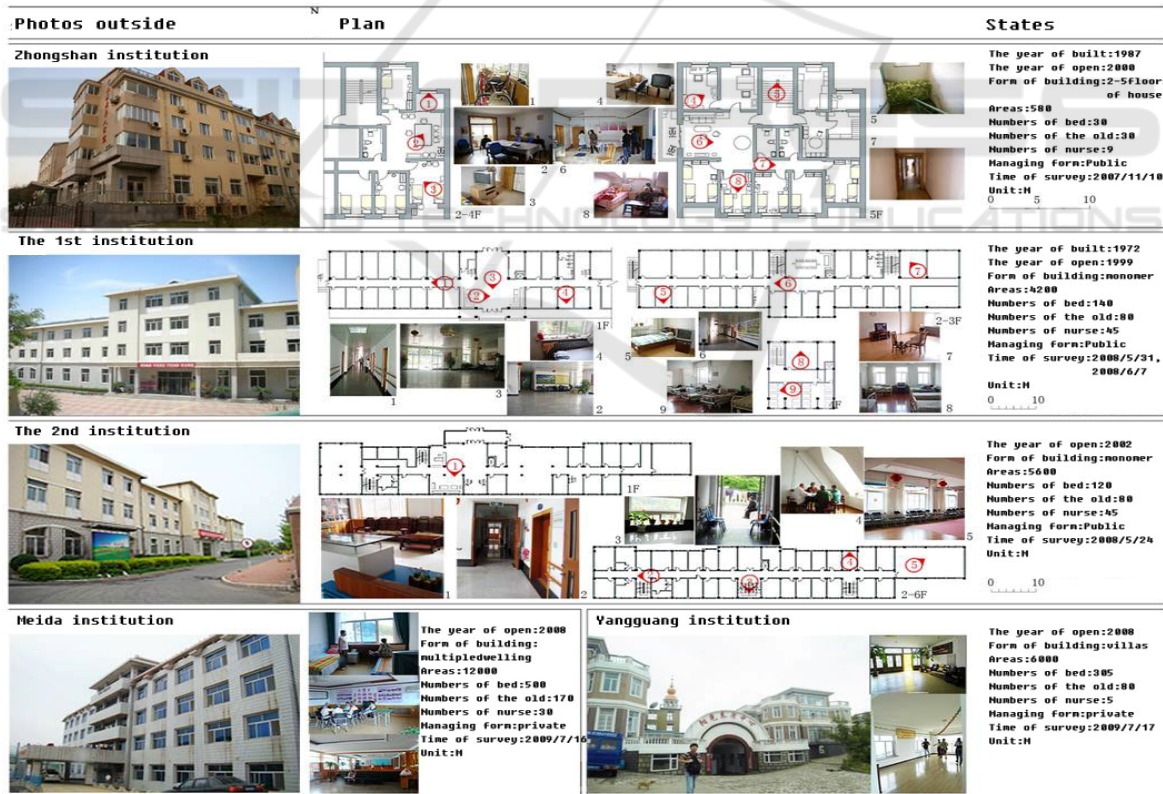


Figure 7: Summary of respondents.