



Research on Urban Square Design from the Perspective of Environmental Behavior

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Abstract. Based on the theory of environmental behavior, taking Zhongshan Square in Shenyang as an example, the use of the square was investigated and analyzed by using environmental behavior analysis, direct observation, questionnaire survey, and horizontal comparison methods. It mainly includes the square area and surrounding environmental facilities, time elements of the activity, different groups, activity places, activity purposes and activities. Through the comparative study of other squares, the satisfaction of the use of Zhongshan Square was investigated, and the existing problems in the square were summarized, and further suggestions for improvement, so as to create a comfortable public activity space for Zhongshan Square in Shenyang.

Keywords: Environmental Behavior; City square; Shenyang Zhongshan Square; Service condition;

1 Introduction

1.1 Environmental behavior

Environmental behavior is a discipline that deeply studies the relationship between people's internal activities and their surroundings. Among them, human behavior is human experience and behavior, and the environment includes material environment, social environment and humanistic environment. Environmental behavior is a part of environmental psychology, its scope is much smaller than psychology, it is mainly from the concept, method and theory of environmental psychology, the study of people's behavior in the city and architecture and the reaction to the environment, so as to achieve the purpose of improving and improving people's living environment^[1].

Environmental behavior is to explore the relationship between people, behavior and environment. The most commonly used research method is the observation method, through which people's behavior can be understood and preliminary opinions can be made on the problems studied. For example, people's activities in the square: walking, stopping, just sitting and so on; People's activities: walking, exercise, taking photos and so on^[2].

1.2 Human behavior and activities

Human activities can be summarized into three categories: necessary activities, spontaneous activities and social activities; Static activity and dynamic activity; Positive behavior versus negative behavior. In the square, the most common behaviors of users are: walking, stopping, and taking small seats. Walking is a dynamic activity, which is the most important form of activity in the square. Standing is a relatively minor activity between walking and sitting. Small seat belongs to the static activity, is the main way for people to rest^[3].

2 Research method

Environmental behavior analysis, direct observation, questionnaire, horizontal comparison and so on are used in the survey of square use behavior. Environmental behavior analysis adopts the "5W" method, and the specific contents of behavior observation are When, Who, Where, Why and What, respectively observing what time, what person, what place, for what purpose and what activity they are engaged in^[4]. Direct observation means that researchers use their senses, GPS, drones and other instruments and means to analyze the use of behavior in the square, so that they can directly observe the changes of people in the square and find the problems in the environment. Questionnaire survey method is to understand the situation of users through a unified design of questionnaires, and to collect statistics and summary of the data^[5]. The horizontal comparison method is to analyze the current problems of Zhongshan Square for different squares and put forward suggestions for improvement. The research method is shown in Figure 1.

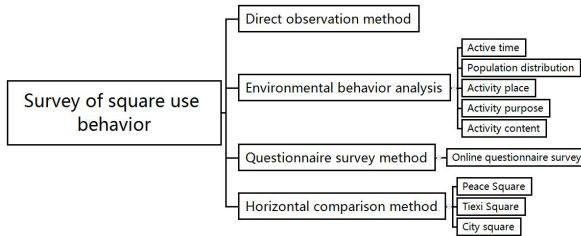


Fig. 1. Research method

3 Overview of square environment

Zhongshan Square is located at the intersection of Zhongshan Road, Nanjing Street and Beisi Road, Heping District, Shenyang City, Liaoning Province. It is a very famous cultural square in Shenyang. The surrounding environment of Zhongshan Square includes landscape pieces, public facilities, surrounding buildings, etc.

3.1 Landscape sketch

As an important part of the city square, the landscape pieces are often small in size and play the role of decoration. In the rich cultural background, the living facilities include garbage cans, flower buckets, flower boxes, etc., and there are no tables and chairs in the square. The road facilities of Zhongshan Square include road guide signs, street lights, publicity boards, signboards, protective guardrail and so on^[6].

3.2 Surrounding buildings

Zhongshan Square is a memorial and traffic square, and the center of the square is the roundabout route, extending six main roads, which integrate and penetrate with other Spaces and architectural forms in the city. The surrounding buildings include Liaoning Hotel, Zhongshan Square Branch of Industrial and Commercial Bank of China, Shenyang Public Security Bureau, Zhongshan Road Branch of China Merchants Bank, Zhongshan Road Branch of Huaxia Bank, Shengjing Bank, Shenyang Railway Bureau Public Security Department, and China Medical University First Hospital^[7].

4 Using behavioral research analysis

4.1 Activity time element

This research selects different time periods for observation and makes statistical analysis of users' activity time. In terms of time distance, four time periods of 10 to 12, 12 to 14, 14 to 16 and 17 to 20 are selected respectively, and five numerical points of < 10km, 10-20km, 20-30km, 30-40km and > 40km are used as reference. The analysis of users' stay time and number of people in the square shows that most of them stay at two time nodes from 10 to 12 and from 14 to 16 in Figure 2 and 3; The travel time of users is mostly concentrated in 15-30min in Figure 4, and the travel distance is within 10km. From the perspective of people's choice of means of transportation, private cars and buses are the main means of travel, and walking is the auxiliary means^[8].

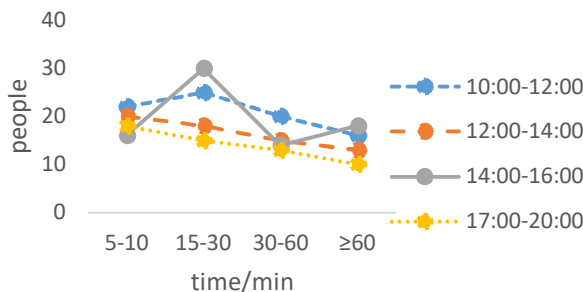


Fig. 2. Statistics of stay time on the square

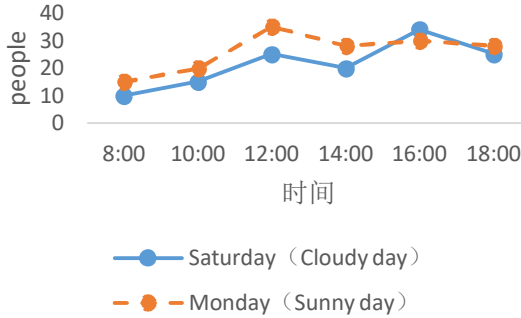


Fig. 3. Statistics on changes in the number of people staying on the square

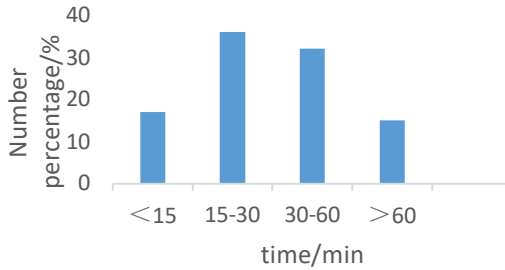


Fig. 4. User travel time statistics

4.2 Distribution characteristics of different populations

Divided by age, the square activities have the following five age groups of users, including 0-6 years old children, 7-17 years old teenagers, 18-40 years old youth, 41-65 years old middle-aged people, 66 years old and above. According to the age distribution of the users, young people account for 40% and middle-aged people account for 25%.

Different age groups have different activity content, the characteristics of the elderly activities are usually rest and chat, walking, walking, talking, rest and waiting. The activity characteristics of middle-aged people are rest, chatting, walking, exercise, rest and waiting, etc. Compared with the elderly people, they pay more attention to exercise; Young people are better at taking photos, punching in, roller skating, etc. Teenagers are playing, running, jumping, etc.; Children mostly sleep and play.

4.3 Distribution characteristics of activity places

The main ways of using crowds are walking, stopping and sitting. Walking is the main activity in the square, is a kind of necessary activity, belongs to the dynamic activity, generally accounting for 45-55% of the total time of the square activity; Standing, that

is, standing for a short time, is a secondary action between walking and sitting. Seating is a static activity, which is a way for people to rest in the square, accounting for 30-40% of the total time of the activity.

4.4 Activity purpose

Users in Zhongshan Square on the types of activities are very rich, the main purpose of activities include: cultural and recreational activities, sports activities, leisure activities and other activities. Among them, the cultural entertainment activities are the activities with culture and entertainment as the main content, which are mostly manifested as reading books in Zhongshan Square; The purpose of sports activities is to strengthen the body and relax the body and mind, such as exercise, morning exercise, roller skating, kite flying, etc. Leisure activities refer to interesting and meaningful activities, including rest, chatting, talking, walking, taking pictures and watching, etc^[9].

4.5 Activity content composition

According to the survey of the landscape characteristics and activity content of each area of the square, it is concluded that there are round block roads to prevent vehicles from entering the entrance area of the square, and it is observed that there are 6 intersections at each entrance and exit of the square to facilitate people to enter and exit. The open space around the square has a good view and can be passed, and people are very rich in activities here. Flower areas and green areas are rich in planting, good flowers and plants, and small areas can shade and rest^[10].

5 Conclusion

First of all, the activity time of users is mostly distributed in two periods: 10:00-12:00 and 14:00-16:00, and the stay time is mostly 15-30 minutes. People choose private cars, buses as the main mode of transportation, walking as a supplement. Secondly, the crowd used in the square is: children, teenagers, youth, middle-aged, elderly, etc. Through direct observation, analysis showed that the youth aged 18-40 and the middle-aged aged 41-65 accounted for the majority. Thirdly, the activity places in the square are: the entrance area, the central sculpture area, the surrounding open space, the flower viewing area, the leisure area and the green area. Most of the users' activities in the square are walking and small seating, followed by stopping. Secondary, the activity purpose includes cultural and recreational activities, sports activities, leisure activities, other activities, etc. Finally, Zhongshan Square is a commemorative square, so the purpose of the people who come to the square is to take photos; Users are more satisfied with their environmental facilities and landscape effects, while some users believe that there are still some problems in the square: (1) Insufficient leisure seats, no space for rest. (2) Lack of shade facilities in summer. (3) This is the road around the island, which brings inconvenience to parking.

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