中国武漢の公園広場における太極拳の活動場所の
空間特性に関する研究

A Study on Space Characteristics of the Places for Taiji Boxing in Parks and Squares of Wuhan City, China

Fei DAI Junhua ZHANG Yoritaka TASHIRO

Abstract: Taiji Boxing, as a Chinese traditional outdoor activity, is still popular in parks and open spaces of Wuhan city nowadays. In order to make clear space characteristics of the places for Taiji Boxing, this study selects two comprehensive parks and two large-sized squares as study areas. The study surveys the total 32 Places and 276 respondents in three weeks. Through data analysis, 32 places were divided into 4 types: Type of Paths with Woods, Type of Accessible Water bodies, Type of Accessible Lawns and Type of Calm Squares. Space characteristics of each type such as location, landscape, planting style, facilities, etc. are made clear. As a result, the first type of places appears in the wide paths with woods nearby, lawns should be enhanced in the design of this kind of places. The second type of places is near large-sized and accessible water bodies, more trees are needed on sites, especially broadleaf trees to enhance shadow. The third type of places is accessible and of great lawns as the dominant landscape on sites or surrounding areas. The fourth type is calm in virtue of its separation from the main paths and woods on sites or nearby.

Keywords: Taiji Boxing, Space Characteristics, Park and Square, Wuhan City of China

キーワード: 太極拳, 空間特性, 公園広場, 中国武漢

1. Introduction

Traditional Chinese Taiji boxing, as an outdoor activity, because of its function for enhancing the health and its idea of man-nature harmony, attracts many people nowadays. Over the past twenty-year economic development, more parks and squares have appeared during urban renewal and sprawl. The people who play Taiji boxing leave their private gardens and go to public places to play in groups. Therefore, it has become the unique use of parks and squares.

The previous studies on Chinese traditional outdoor activities concentrate on residential areas (Eriko Oka, 2004; YAMAMURA, 1997)①②. The studies on the relation between physical environment and park use mainly focus on some age groups like children (Yoshiki IGARASHI, 1987)③ and the elderly (Eikichi BOKU, 1999; Mari YAMAMOTO, 1999)④⑤. However, a study on the relation between space characteristics and a certain activity like playing Taiji boxing hasn’t been done yet.

The primary aim of this study is to make clear the essential characteristics of space of different places that attract the Taiji boxers. Space components and the needed facilities are studied to show space characteristics so as to benefit to design the places for Taiji Boxing.

2. Methods

(1) Study area

By the pre-survey, it was found that comprehensive parks and squares, because of their large size and diverse spaces, attracted more Taiji Boxing groups than other categories of urban parks. In order to get more sample places, the study selected two comprehensive parks and two large-sized squares from three districts with high population density and small average park areas (Table-1). Their surrounding areas are mainly residential and commercial areas. The distance between them is more than 2 km (Figure-1).

Jiangtan Park was built in 2002 by a urban renewal project from a dock land. It is the waterfront area of Yangtze River with an extension of about 3.5 km long and 150 m wide. The total area is about 60 ha. It is the backbone of the whole city’s green space system and plays as the main landscape axis of the city.

Zhongshan Park was first transformed in 1910 from a private garden to a public park. Now its area is 32.8 ha, including 6 ha of water bodies. Mature plants cover the whole park. The south part of this park presents Chinese traditional garden style, the central part is the great lawn and the fountain pool...

Table-1 General Situation on Districts of Study Areas

<table>
<thead>
<tr>
<th>District</th>
<th>Jianghan District</th>
<th>Jiangan District</th>
<th>Qiaokou District</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Population (thousand)</td>
<td>402</td>
<td>633</td>
<td>538</td>
</tr>
<tr>
<td>2. Area (hm²)</td>
<td>33.63</td>
<td>64.24</td>
<td>46.93</td>
</tr>
<tr>
<td>3. Population Density (person/ha)</td>
<td>138.3</td>
<td>98.5</td>
<td>116.0</td>
</tr>
<tr>
<td>4. Green Space Ratio (%)</td>
<td>22.4%</td>
<td>24.5%</td>
<td>18.0%</td>
</tr>
<tr>
<td>5. Total Park Area (ha)</td>
<td>122.5</td>
<td>156.2</td>
<td>163</td>
</tr>
<tr>
<td>6. Average Park Area (m² a person)</td>
<td>2.72</td>
<td>2.82</td>
<td>6.30</td>
</tr>
</tbody>
</table>

Data 1, 2 and 3 source: Wuhan Yearbook (2002); Data 4, 5 and 6 source: Wuhan Landscape Administrative Bureau (2000).

Figure-1 Location of Study Areas

*千葉大学大学院自然科学研究科 **千葉大学芸芸学部
and the south part is a playground.

Tiantian Square is a district square that was built in 1998. The area is 4.5 ha. Because there is a small hill in the middle, the square is divided into two parts: the north with plant on it and the south with water bodies.

Qiaokou Square is a district square with an area of 2 ha that was built in 2002. The part below roads is in the center. The planting along roads is in the east and south (Figure-2).

(2) Survey methods
First the places for Taiji boxing in study areas were observed, then questionnaire survey were done to the users on sites for three weeks from Aug.29 to Sep.18, 2005. The studied objects were defined to the people who play Taiji boxing in groups. In the first week, in the morning from 6-9 am, the normal time of Taiji boxing, 2 observers put down the location of the places used by Taiji boxing groups on maps of four study areas. The total 32 places were found. Photos were taken not only of users’ activities, but also of space components on sites as well as the environment in the surrounding areas. In the next two weeks, 4 surveyors on parks and 2 surveys on squares handed out the questionnaire to the groups playing in different places. 400 questionnaires were distributed along with a small gift according to the number of places and users. Most questionnaires were completed right away and some of them were returned the next day. The 276 questionnaires were responded, and the response rate was 69%.

(3) Analysis methods
According to diverse space characteristics of Taiji boxing places, this research applies classified analysis to make clear where Taiji playing places appear, what space components and which facilities the users prefer.

First of all, 32 places were analyzed according to space components. Their characteristics were translated into qualitative data. Then, by applying multivariate analysis (HAYASI 3), qualitative data were put in, thus producing the score of 32 places in axes. Next, using these scores, the quantitative data, 32 places were classified into four types by Cluster Method. Finally, space components of every place were counted again according to the four types. At the same time, the facility’s data from the questionnaire were added in the analysis.

3. Space componental analysis
By observing the characteristics of Taiji boxing and referring to “Standards for Park Design” of China6 and “Urban Park Law” of Japan7, the following 9 space components are offered to be analyzed (Table-2):
(1) Form: By the observation, it was found that the groups playing Taiji boxing normally kept a certain form, a rectangle, a square, or others, depending on the number of people and the condition of the site.

(2) Location: The study offers three categories of location in the park: paths, squares and green areas. Green areas include lawns and naked lands.

(3) Relation with main paths: In order to measure the accessibility and quietness of places, the relation between the places and main paths is studied by three situations like no relation, next to each other or the path passing through the site.

(4) Level difference: Among these 32 observed sites, many sites are located on platforms in the different levels with surrounding area. So the study proposes the level difference over 1.5 m, which is higher than a man’s eyeglass as a rule.

(5) Landscape style: Water bodies, plants and structures are three main categories proposed in the study, referring to Japanese categories of landscape facilities in parks. The category of structure includes buildings, statues, pavilions, etc.

(6) Planting style: From Japanese categories of planting and the situation of the 32 places, woods, lawns and flowerbeds are three selected categories to describe planting style.

(7) Shadow: Trees or structures like buildings, walls, or others may cast shadows, so there are three categories.

(8) Rest facilities: The density of benches is 20-150 per hectare6, so it is judged by bench on the site or not. Pavilion appearing in sight or not is another rule.

(9) Service facilities: The service radius of a toilet is 250 m5, so the study searches it in the areas nearby the site within this radius. It is the same rule for a shop.
4. Results

At first, space components of the 32 places were analyzed into qualitative data according to the 27 categories above. Then, these qualitative data were analyzed further by Quantification Theory Type III. As a result, the contribution ratio is up to 61.92% to the fifth axes (Table-3). Next, Cluster Analysis shows the scores of 32 places of five axes. The method of clustering is Ward’s method and the measure of the interval is Chebychev. As Figure-3 shows, the 32 places were divided into four types. At last, the qualitative data of such places were counted again according to four types. From the data in Table-4 and Table-5, space characteristics of four types were concluded as the following:

1) Type 1: Type of Paths with Woods

There are 7 places in this type, No. 2, 7, 9, 12, 16, 20 and 21. All of them are located in paths and with woods nearby or in them, so they are called Type of Paths with Woods. Other space characteristics include: most playing forms are rectangular; most places have no main paths nearby; their landscapes consist only of plants, together with some structures; they are shadowed mainly by trees; only 28.6% of the places have benches, 14.3% of the places have a pavilion, and 85.7% of the places are in the service radius of toilets.

First of all, the places in paths with woods will offer shadow for the people playing Taiji boxing, such as site 7, 9, 12, 20 and 21. Site 2 is surrounded by immature trees. As site 16 has no woods on the east side, there is no shadow in the morning. These two sites are two exceptions. Secondly, the paths used as playing places need to be wide enough. Site 12 is 5.5 m wide and the other 6 places are 3 m wide. Among them, site 9 connecting a parking lot and site 16, 20 connecting the front of building reach over 6 m wide. Therefore, the width should be more than 3 m for these paths. Because the distance between two Taiji Boxers is normally over 1.5 m, the paths over 3 m wide will permit the group members to place in two rows or more. Over three-meter-wide paths usually belong to the main paths for a zone or the whole of a large park with more than 10 ha. Especially in the paths next to a parking lot or in front of building that can extend space like sites 9, 16 and 20, the playing places are easy to appear. Thirdly, according to the questionnaire, there are 43.6% of the respondents, the highest ratio in this type, choosing the lawn as the primary need, because lawn is insufficient in this type, covering only 28.6% of the places. Therefore, lawn should be enhanced in design of these places.

2) Type 2: Type of Accessible Water Bodies

8 places are in this type: No. 1, 3, 5, 6, 8, 10, 14 and 26. For 87.5% of the places with water bodies and 75% of the places have main paths nearby, this type is named Type of Accessible Water Bodies. Other space characteristics include: all playing forms are rectangular; the locations are in pavements including paths and squares; flowerbed is the main planting style; 62.5% of the places have no shadow, toilets or shops but they have benches.

First, the places in this type are near water bodies. Jiangtian Park is in the waterfront area of Yangtze River, which is over 1.5 km wide at this point. Four sites are in the side of the park close to the river, a natural and large water body landscape. The other three sites are close to pools or fountains that are the artificial and dominant water body landscape for the whole park or a zone. Large-sized water bodies can bring fresh air and amenities into the landscape, so they create favorable places for Taiji Boxing. Then, the places in this type are all accessible for Taiji Boxers. 75% of the places are next to the main paths and 25% of them approach to the main paths by stairs as site 5 and 6. Finally, shadow is regarded as required facilities by most respondents, a percentage of 57.4%. In fact, 62.5% of the places have no shadow, the lowest percentage in the four types. Therefore, we should plant more trees in the places of this type, especially broadleaf trees to enhance shadow.

3) Type 3: Type of Accessible Lawns

This type includes No. 17, 18, 19, 22, 24, 28 and 32, a total of 7 sites. 85.7% of the places have lawns on sites or nearby and 71.4% of the places have main paths passing through or next to this. This type is called Type of Accessible Lawns. Other space characteristics can be described as the following: most playing forms are square; the locations are squares or green areas; 57.1% of the places have benches; all sites are out of the service radius of toilets.

First, among the 32 sites only 4 sites are lawn areas. All of them are in this type. But for the respondents, lawns and naked lands obtained a higher ratio than paths and squares as the needed facilities of the places for Taiji boxing playing, because people believe that playing Taiji boxing in green areas brings more sense of nature. Adding another 3 places with lawns nearby, lawns become a dominant planting style for all places. Then, among 32 places there are 4 places having no main paths passing through and these 4 places are all in this type. Together with the places next to main paths, the accessible places are 71.4%. Furthermore, 3/4 entrances of squares are used for Taiji Boxing, which shows that the entrances with
lawns are favorable places for Taiji Boxing. Thirdly, because of insufficient of toilets, they are considered the necessary facility, which are included among the top three. According to the questionnaires, the average time for Taiji Boxing playing is over one hour. Therefore, toilets should be an imperative facility.

(4) Type 4: Type of Calm Squares

In this type there are 10 places: No. 4, 11, 13, 15, 23, 25, 27, 29, 30 and 31. All places are in squares, and 70% of them have no main paths passing through or nearby, so this type is named Type of Calm Squares. Other space characteristics can be described as the following: 80% of the playing forms are square; landscapes are made up of plants; planting styles are mainly woods; 60% of the places have no shadows or toilets.

First of all, the favorable places in squares are calm and without noise from main paths. 70% of the places are separated from main paths. Playing Taiji Boxing demands for absorption in mind and a calm place helps to achieve it. Secondly, these places appear in areas close to woods. Sites 25, 30 and 31 are on the square edge next to woods. Sites 11, 13 and 15 are surrounded by woods and sites 4 and 29 are in the woods. Woods not only benefit the sense of nature but also offer shadow, thus become favorite places for Taiji Boxers. Thirdly, lawn is regarded as the most necessary space with a ratio of 51.3%, which is the same as type 1. Regarding the sites in this type, lawn only appears in the surrounding areas. As lawn in this type shows the lowest ratio compared to other types, therefore, it should be enhanced in design for this type of places.

5. Conclusion

By analyzing space components of 32 Taiji Boxing playing places in 4 study areas and the perception of the 276 users towards facilities, places were divided into four types and their space characteristics were shown as the following:

(1) Places of the first type appear in the paths wider than 3 m and with woods nearby, because group members play in rows and enjoy shadow. Lawn plays an important role for these places.

(2) Places of the second type are near large-sized water bodies as the dominant landscape for a zone or the whole of parks. Places are accessible by main paths. More trees are requested to be planted, especially broadleaf trees to enhance shadow.

(3) Places of the third type are those of lawn on sites or surrounding areas and main paths pass through or next to the places. Because of insufficient toilets, they are highly required in this type.

(4) Places of this type are calm by separated from main paths. These places appear in squares close to woods. Lawn is a required facility by users and should be enhanced in design.

The characteristics above are the obvious parts of four types to describe Taiji Boxing playing places and benefit to design for these places. On the other hand, besides the diversities, there should also be the spatial relations among these four types. Further study will be developed on this field in future.

References:
8) The former-mentioned as 61, pp8
9) The former-mentioned as 61, pp8
10) Qixian HU (1990) : Simplified Taiji Boxing on Site, pp1, the People’s Physical Press, Beijing
11) The former-mentioned as 61, pp15

Table-4 Space Components of Four Types

<table>
<thead>
<tr>
<th>Form</th>
<th>Location</th>
<th>Relation with main path</th>
<th>Level difference</th>
<th>Landscape style</th>
<th>Planing style</th>
<th>Shadow</th>
<th>Rest facilities</th>
<th>Service facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1: 7 places</td>
<td>Sum</td>
<td>5.0</td>
<td>4.0</td>
<td>3.0</td>
<td>2.0</td>
<td>1.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Type 2: 8 places</td>
<td>Sum</td>
<td>5.0</td>
<td>4.0</td>
<td>3.0</td>
<td>2.0</td>
<td>1.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Type 3: 7 places</td>
<td>Sum</td>
<td>5.0</td>
<td>4.0</td>
<td>3.0</td>
<td>2.0</td>
<td>1.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Type 4: 10 places</td>
<td>Sum</td>
<td>5.0</td>
<td>4.0</td>
<td>3.0</td>
<td>2.0</td>
<td>1.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Table-5 Needed Facilities of Four Types

<table>
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<tr>
<th>Type 1</th>
<th>Type 2</th>
<th>Type 3</th>
<th>Type 4</th>
<th>Total Respondent</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>1-Square</td>
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<tr>
<td>2-Path</td>
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</tr>
<tr>
<td>3-Lawn</td>
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<tr>
<td>4-Nikaido</td>
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<tr>
<td>5-Woods</td>
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<td>14</td>
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</tr>
<tr>
<td>6-Bowerbed</td>
<td>14</td>
<td>14</td>
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<tr>
<td>7-Waterbody</td>
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<tr>
<td>8-Shadow</td>
<td>14</td>
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<tr>
<td>9-Play facilities</td>
<td>14</td>
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<tr>
<td>10-Pavilion</td>
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<tr>
<td>11-Toilet</td>
<td>14</td>
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</tr>
<tr>
<td>12-Shop</td>
<td>14</td>
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</tr>
<tr>
<td>13-Others</td>
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Total Respondent: 55