An Investigation of Seat Design Disadvantages in Neighborhood Parks by the Social Behaviors of the Elderly

Li-hui Lee*, Shih-sheng Chen**

*Graduate School of Industrial Design, Tunghai University, lihui823@go.thu.edu.tw
**Graduate School of Industrial Design, Tunghai University, s973225@gmail.com

The public has started to pay greater attention to the daily activities of the elderly because of the impact of an aging society. Although there have been many elderly researches and products, they tend to place emphasis on maintaining the basic lifestyle of the elderly, while the designs of environment facilities for social activities and healthy leisure are incomplete. This study focuses on the forms of seating in neighborhood parks and discusses the disadvantages between usability and needs of the elderly by observing their behaviors.

According to the research results, the distributed arrangement of benches cannot facilitate the activities of the elderly, who prefer to cluster together; therefore, they will place their own chairs and use the public seating as a table or foot-stool instead. This research was conducted by Observation methods to categorize sitting behaviors of the elderly into several categories and determine the different behavior characteristics that can be a reference for future seating designs of neighborhood parks.

Keywords: Elder, Chair, Neighborhood parks

1. Introduction

1.1 Research Motives and Purposes

Under the influence of an aging society, increasing importance has been attached to solving the problems of inconvenience in life for the elderly. However, the existing studies and designs for the elderly mainly focus on how to maintain basic home life, and seldom mention the social activities and facility designs of public area environments for the elderly. Consequently, some outdoor social environments are unfriendly to the elderly.

According to a survey on current status, the public social environments most frequently visited by the elderly are neighborhood parks in communities, where the elderly exercise and interact with other elderly people. Because neighborhood parks are located within the living area of community residents, they usually take a rest, chat with one another, and meet others. However, the design of neighborhood parks mainly focuses on landscape and the general public, and fails to provide elderly-friendly social environments for the elderly, who use them most frequently.

Therefore, this study focused on park chairs of neighborhood parks, which are the public facilities most frequently used by the elderly during social interactions. This study investigated the relationship between the elderly’s use of chairs and their social behaviors based on the forms and types of park chairs. The objectives of this study are:

(1) To understand the behavioral characteristics of social interactions of the elderly.
(2) To clarify the correlation between the forms and types of park chairs in public neighborhood parks and behaviors of the elderly.

(3) To propose suggestions on the design and distribution of park chairs as reference for the design and distribution of future neighborhood parks for the elderly.

1.2 Study Site

For traffic convenience, this study selected a long and narrow community neighborhood park in the east of Tunghai University as the study site. This park is located in the center of the community. Most people in the community are local residents. There are many roads surrounding the park. However, to the elderly, it is an extremely accessible area. The internal facilities of the park include various types of park chairs, children’s play facilities, and some sports equipment.

![Figure 1: Location of the Study Site](image)

2. Literature review

2.1 Relationship between Chair Forms and User Behaviors

Kuan (1994) classified chairs into three different forms, “chairs for a long break,” “chairs for a short break,” and “chairs for transition.” “Chairs for a long break” are mainly basic benches, while “chairs for a short break” are used in narrow spaces, or in spaces with a high turnover rate. There is no unique association between “chairs for transition” and functions of benches. However, “chairs for transition” happen to be able to meet the function of resting. In neighborhood parks, the elderly tend to change these three forms of chairs when sitting on them in order to engage in activities.

Rutledge (1981) and Hou (1985) classified chairs into six forms. Chair forms affect how users use them during social activities. The characteristics of various forms are described, as follows:

(1) Strip-shaped Chairs

These chairs are suitable for unsociable loners and two people who intend to talk to each other. However, they are not suitable for a group of people who intend to talk to one another, as they are an obstruction to foot traffic, and it leads to inconvenience when they stand around the chair.
(2) Round-shaped Chairs

Round-shaped chairs are usually suitable for unsociable loners or two people who intend to talk to each other. However, they are not suitable for three people who intend to talk to one another.

(3) Arc-shaped Chairs

An arc-shaped chair includes both concave and convex sides. A convex side is suitable for unsociable loners, but is not suitable for multiple people, while a concave side is suitable for two people who intend to talk and turn their faces to each other.

(4) Single Square-shaped Chairs

Single square-shaped chairs are mainly provided for two to four unsociable people, which enable them to sit back to back, thus, excluding ant interference from other people. Therefore, they are not suitable for two or multiple people who intend to talk.
(5) Single Concave-shaped Chairs

Single concave-shaped chairs are suitable for two or four people who intend to talk to each other/one another. While talking, the people sitting and those standing around the chair will not be an obstruction to traffic, due to the existence of the concave.

(6) Multiple Concave-shaped Chair

Among all the chair forms, the best chair form is a multiple concave-shaped chair, as it offers diversity to meet the needs of users. A multiple concave-shaped chair is suitable for loners, two people, and a group of people.

The two scholars mentioned above classified chairs into different forms according to the sitting behaviors of ordinary people. However, the preliminary survey found that some of the sitting behaviors of the elderly in neighborhood parks are different from those of ordinary people (e.g. the need for clustering is significant in the elderly). As a result, this study intended to investigate the behavioral characteristics of the elderly when using chairs to propose suggestions for the design of elderly-friendly chair forms for neighborhood parks.

2.2 Relationship between Chair Types and the Behavior of the Elderly

Kuo (2011) suggested that the lack of armrests will be a burden to both the young and the elderly. The use of armrest can reduce the burden on the lower limbs of users to a certain extent. The use of armrest is particularly important to the elderly, thus, importance should be attached to it, according to Lu’s (2009) experiment of the use of chairs by the elderly. The experimental results showed that, with the assistance of armrests, the movements of
“standing up” and “sitting down” of the elderly indeed improved. In addition, their subjective perceived ease of use, comfort, and safety were better. Kao (2009) suggested in a study on design suggestions for home chairs for the elderly that, if the mechanical design that can assist in the movements of standing up and sitting down is added, it can effectively help the elderly in standing up and sitting down. Higher seat surfaces enable the elderly to easily and smoothly stand up and sit down. Chairs with a backrest enable the elderly to acquire adequate rest if they are going to sit for a long period of time. Chairs with armrest at an adequate height can assist the elderly in completing the movements of standing up.

The aforementioned scholars have conducted many studies on elderly behaviors when using chairs. However, most existing studies mainly focus on the relationship between chair types and the sitting behaviors of the elderly, and fail to take into account the environment and activities when using chairs. This study selected a neighborhood park as the main study site, and investigated the sitting behaviors of the elderly in this environment in order to provide suggestions on the best chair type for the elderly in neighborhood parks.

2.3 Affordance of Public Chairs

To the elderly, the chairs in a neighborhood park are not simply used for sitting. When the elderly have to engage in certain activities, they can be used as a platform for placing personal belongings. In addition to offering the basic function of sitting, the functions of chairs in a neighborhood park are also affected by affordance.

The concept of affordance was firstly proposed by Gibson. Gibson investigated the interactive relationship between organisms and environments from a biological perspective, and explained biological behaviors through the functions and meanings provided for organisms by the physical properties of the environment. Noman (2000) applied this concept to product design to enable users to perceive the functions and uses as provided by products. Based on the above, designers should care whether users can perceive the possible uses conveyed by products.

In addition to the basic affordance of chairs for the sitting of the elderly, the design of chairs in a neighborhood park should consider whether chairs can provide the elderly with alternative affordance in different behavioral models to enable chairs to better tally with the use behaviors of the elderly.

3. Research Method and Analysis

This study mainly investigated the disadvantages of current chair forms in neighborhood parks, as based on the needs of the elderly. Therefore, this study used digital images and textual records to perform an unstructured non-participant observation and descriptive survey. In addition, this study analyzed the results of the field survey, which were performed between 4:00–5:00 PM on weekdays. There were 88 samples collected. The content of the photographs include the elderly’s behaviors when using park chairs in neighborhood parks. The photographs were taken to observe the relationship between chairs and the behaviors of the elderly. In addition to performing field surveys to investigate the needs of the elderly using chairs in the neighborhood park, this study tested and verified the results based on relevant literature analysis.

In terms of research analysis, this study preliminarily recorded the sitting behaviors of the elderly and the chair types in the neighborhood park. This study preliminarily summarized and classified the elderly’s behaviors when using chairs and the characteristics of chair types in the preliminary records, in order to cross-analyze the behaviors of the elderly and chair types. This study compared the various behaviors of the elderly with the chair
types they chose. The results help understand which characteristics of chairs in the neighborhood park better conform to various behavioral models of the elderly when in a neighborhood park.

4. Investigation Results and Analysis

Various activities and behaviors of the elderly in a neighborhood park involve the use of chairs, including clustering and chatting, sports and recreation, walking a dog, taking care of children, placing personal belongings, hanging objects, and foot rests. The behaviors observed were generally classified into three major categories: sitting behavior, watching behavior, and object placing behavior. The sitting behaviors include the elderly’s clustering and chatting with other senior persons during social interactions, as well as the resting behavior during sports in a neighborhood park. Object placing behaviors include the elderly’s temporary placing and hanging of personal belongings and the foot rest behavior of tying shoelaces.

Table.1 Classification of behaviors when using chairs in neighborhood parks

<table>
<thead>
<tr>
<th>Sitting behaviors</th>
<th>Clustering and chatting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
</tbody>
</table>

| Sports and recreation                   | ![Image](image4.png)      |
|                                        | ![Image](image5.png)      |
|                                        | ![Image](image6.png)      |

<table>
<thead>
<tr>
<th>Objects placing behaviors</th>
<th>Placing objects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="image7.png" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td><img src="image8.png" alt="Image" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Watching behaviors</th>
<th>Walking a dog</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="image9.png" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td><img src="image10.png" alt="Image" /></td>
</tr>
</tbody>
</table>
A total of 8 different types of chairs were provided for the elderly to use in this study site. The classification of the types of chairs in this study site is summarized in Table 2.

Table.2 Classification of chairs in neighborhood parks

<table>
<thead>
<tr>
<th>Chairs with backrest</th>
<th>Chairs with backrest and armrest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chairs with 2~3 seats</td>
<td>Chair with one seat</td>
</tr>
<tr>
<td>Chairs with 2~3 seats</td>
<td>Chairs with 2~3 seats</td>
</tr>
<tr>
<td>Chairs for clustering</td>
<td>Open-end chair</td>
</tr>
<tr>
<td>Single concave-shaped with multiple seats</td>
<td>Chair with 6 seats</td>
</tr>
<tr>
<td>Chair with multiple seats</td>
<td>Chairs with 2~3 seats</td>
</tr>
</tbody>
</table>

After a cross-comparison between the behaviors in Table 1 and the chair types in Table 2, the chairs used by the elderly during activities are summarized in Table 3.

Table.3 Chairs used by the elderly during activities

<table>
<thead>
<tr>
<th>Sitting behavior</th>
<th>Clustering and chatting</th>
<th>Sports and recreation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Based on the chairs used by the elderly during activities, as summarized in Table 3, this study further classified the behaviors of the elderly based on chair forms, as shown in Table 4. In addition, the conditions for the use of various chairs were recorded in a written manner. How the elderly used these chairs in the neighborhood park, and how the functions provided by chairs correspond to the behaviors and activities of the elderly, could be understood based on Table 4.

Table 4 Functions Provided by Chairs

<table>
<thead>
<tr>
<th>Clustering &amp; chatting, placing objects, hanging objects</th>
<th>Sports &amp; recreation, taking care of children and placing objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>A chair with a backrest enables the elderly to sit for a long period of time and hang objects. A chair without armrests is less frequently used by people and will be used for placing objects.</td>
<td>A chair with a backrest enables the elderly to sit for a long period of time. A chair which is closer to play facility enables the people to take care of children around it.</td>
</tr>
<tr>
<td>Clustering &amp; chatting</td>
<td>Clustering &amp; chatting, sports &amp; recreation and hanging objects</td>
</tr>
<tr>
<td>A chair with both armrest and backrest prepared by the elderly themselves. Its portability replaces the chairs with 6 seats for clustering.</td>
<td>A chair with both backrest and armrest enables the elderly to sit for a long period of time and facilitates the movements of standing up and sitting down. It is preferred by the elderly.</td>
</tr>
</tbody>
</table>
Clustering & chatting and walking a dog

A chair enables the elderly to look around. It is used by the elderly who intend to walk a dog. However, it does not offer the clustering function of its original design.

Walking a dog

A wide chair which enables the elderly to look around. It is located in the center of the park, thus, it enables the elderly to look where their dog is when walking it.

Placing objects

A chair originally designed to provide the function of clustering. Because the chair is too short to sit for a long period of time, the elderly seldom use it and it is usually used to place objects.

A chair with sports functions. However, it is less frequently used by the elderly. It is usually left unused or used to place objects.

Based on the relationship between chairs and the behaviors of the elderly, as summarized above, this study observed the relationships, as follows:

1. Among all the options of chairs, chairs with backrest and armrest were more frequently used in various behaviors.
2. Chairs without armrests would be chosen for placing objects. In addition, they were less frequently used by people and could be easily used for handing and placing objects.
3. Open-end chairs without backrest would be chosen for sitting when the elderly had to walk a dog.
4. Chairs closer to facility would be chosen when the elderly had to take care of children.
5. The chairs with 6 seats originally designed for clustering were not used by the elderly.
6. A chair with one seat, a backrest, and armrests prepared by the elderly themselves during clustering behavior replaced the chairs for clustering provided by the neighborhood park.

5. Conclusions and Suggestions

5.1 Comprehensive Discussion

Regarding the design of chairs with/without backrest and armrest, this study, like most studies, suggested that chairs with both backrest and armrest are easier for the elderly to use. The observations showed that the elderly also preferred choosing such types of chairs. However, such a design would not be used during specific behaviors (e.g. the behavior of watching pets). The observations showed that, the uses of chairs originally designed for clustering and chatting in the study site were different from those indicated in literature. Some studies have suggested that a single concave-shaped chair with multiple seats provides diversified clustering behaviors. However, the observations showed that because the chair with 6 seats for clustering was too short, it was replaced by a chair prepared by the elderly themselves. This finding is consistent with Kao (2009), who suggested that higher chairs are easier for people to stand up and sit down. In terms of the affordance provided by chairs, this study found that the elderly would use the affordance of chairs to place their personal belongings. Chairs that
more are suitable for the elderly can be designed for neighborhood parks based on the affordance for placing objects to strengthen their behavior of using the affordance of chairs.

5.2 Suggestions on the Distribution of Chairs in Neighborhood Parks based on the Needs of the Elderly.

(1) For the clustering and chatting of the elderly, in general, chairs with both armrests and a backrest should mainly be provided to enable the elderly to sit for a long period of time.

(2) For the sports and recreation of the elderly, it is preferable to provide chairs with armrests and a backrest along the routes within the park to enable the elderly to take a rest at any time.

(3) For the object placing and hanging behaviors of the elderly, the elderly will use the affordance of park chairs to place and hang their personal belongings. Chairs can be designed for them according to their behaviors of using chairs.

(4) The elderly walking a dog in a park require chairs without a backrest and armrests, which enable them to watch where their dog is at any time.

(5) The chairs used by the elderly to take care of children should be distributed nearby the play facilities to enable them to watch their children while sitting.

5.3 Follow-up Studies Extended from this Study

The research scope of this study focuses the relationship between “forms” and “types” of chairs and the behaviors of the elderly. This study did not investigate the “human” aspect (e.g. external and internal factors of emotions and quantity); therefore, relevant research scopes for follow-up studies are arranged, as follows:

(1) Relationship between the “distribution” (seat arrangement) of park chairs and the social clustering habits of the elderly.

(2) Design considerations regarding the “materials” of park chairs and sitting behaviors of the elderly.

(3) Number of the elderly engaging in clustering social behaviors and the options of chairs for such use.
6. Citations


