

Residents' Behaviour  
in Community Outdoor Spaces in Shanghai

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## **Abstract**

### Residents' Behaviour in Community Outdoor Spaces in Shanghai

Huafang Chen

For about 30 years since the founding of the Communist People's Republic of China, state-owned work units take responsibility for the housing for their staff as part of their welfare benefits in urban areas. After the market economy was introduced, urban housing moved toward a market-oriented approach and the real-estate sector was opened to commercial developers. Since then, the commercial market housing community has flourished in Chinese urban areas. The designs of commercial market housing communities are distinct from those of state-sponsored housing. So far, there is little literature on the influence of the new community environments on residents' behaviour within their community. This study explores whether residents have different behaviour patterns in the commercial housing communities than in state-housing and to identify the factors that influence the use of outdoor spaces in communities. Six communities are selected as case studies in the urban area of Shanghai. Quantitative as well as qualitative methods are adopted to examine the relationship between residents' behaviour and community environments. Different behaviour patterns are found. Physical environments, social and demographical factors are found to attribute to the different behaviours. Recommendations are also offered based on the findings of the study.

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# Table of Content

Abstract.....	iii
Acknowledgment.....	iv
Table of Contents.....	v
1. Introduction.....	1
1.1 Background.....	1
1.2 The study.....	2
2 Literature Review.....	5
2.1 Research Project.....	5
2.2 Theoretical Background.....	7
2.3 Chinese Context.....	9
2.4 Different Factors Influencing People’s Behaviour in Public Spaces.....	13
2.5 Social-economic Factors in Chinese Context.....	17
2.6 Conclusion.....	19
3 Methodology.....	20
3.1 Observation Methods.....	20
3.1.1 Distance vs. Presence.....	21
3.1.2 Categories of activities.....	22
3.2 Survey to Interview.....	22
3.3 Selected Communities.....	25
3.3.1 Case Studies in Shanghai.....	25
3.3.2 Case selection.....	26
3.3.3 Selected Case Studies.....	30
4 Quantitative Results.....	37
4.1 Presence.....	37
4.2 Participation in Activities.....	37

4.3	Presence and Attributes of Spaces .....	38
4.3.1	Types of Spaces vs. Presence .....	39
4.3.2	Distance and Presence .....	40
5	Qualitative Results .....	42
5:1	Observation in the six study sites .....	42
5.1.1	Occupying Outdoor Spaces for Individual Household Tasks .....	42
5.1.2	Use of Exercise Equipment .....	43
5.1.3	Children’s Activities .....	44
5.1.4	Sitting .....	45
5.1.5	Other outdoor spaces .....	46
5.1.6	Use of other furniture .....	47
5.2	Results from interviews .....	48
5.2.1	Influence of the history .....	48
5.2.2	Influence of the Physical Environment .....	49
5.2.3	Influence of the change in living conditions .....	51
6	Conclusion .....	53
6.1	Different presence ratio in the spaces .....	53
6.2	Different behaviour patterns .....	54
6.3	Respondents’ view of reasons for the changes .....	55
6.3.1	Changes in physical environments .....	56
6.3.2	Change of living conditions and lifestyles .....	56
6.4	Appropriation of space and association with neighbours .....	57
7	Discussion .....	60
7.1	Residents’ perception of community spaces and behaviour in communities .....	60
7.2	What the lost communication leads to .....	62
7.3	Who Decides on the Design of Community Environments .....	63
7.4	Recommendations on Design of Community Spaces .....	64

8	References.....	68
9	Appendices.....	71
9.1	Figures.....	71
9.2	Images .....	75
9.3	Tables .....	83

## List of Figures

Figure 1: Sites Distribution in Shanghai Urban Area.....	71
Figure 2: Changyi Community plan.....	71
Figure 3: Ercun Community Plan .....	72
Figure 4: Sicun Community Plan.....	72
Figure 5: Jinshanghai Community Plan .....	73
Figure 6: Jialu Community Plan .....	73
Figure 7: Xiandai Community Plan .....	74
Figure 8: Grid Division of Changyi .....	74



## List of Tables

Table 1: T-Test of Higher Presence .....	83
Table 2: T-test of Higher Participation in Walking in SHCs .....	83
Table 3: T-test of Higher Participation in Talking in SHCs.....	84
Table 4: T-test of Higher Participation in Standing in SHCs.....	84
Table 5: T-test of Higher Participation in Children Playing in CHCs .....	85
Table 6: Correlation Between Distance and Presence.....	85
Table 7: Correlation Between Distance and Presence Excluding Furnished Areas .....	85
Table 8: T-Test of Presence in AA lower than AF .....	86
Table 9: T-Test of Presence in AA lower than F.....	86
Table 10: T-Test of Presence in AA lower than ET .....	87
Table 11: T-Test of Presence in AA lower than AW .....	87
Table 12: T-Test of Presence in LL lower than LW.....	88
Table 13: T-Test of Presence in LL lower than LW.....	88
Table 14: T-Test of Presence in FB higher than LW .....	89
Table 15: T-Test of Presence in FB higher than LL .....	89
Table 16: T-Test of Presence in F higher than LW .....	90
Table 17: T-Test of Presence in F higher than LL .....	90
Table 18: T-Test of Presence in F higher than FB .....	91
Table 19: T-Test of Presence in ET higher than LW .....	91
Table 20: T-Test of Presence in ET higher than LL.....	92
Table 21: T-Test of Presence in ET higher than FB.....	92
Table 22: T-Test of Presence in ET Lower than F .....	93
Table 23: T-Test of Presence in AW lower LL .....	93
Table 24: T-Test of Presence in AW lower than FB .....	94
Table 25: T-Test of Presence in AW Lower than F.....	94

Table 26: T-Test of Presence in AW lower than ET .....	95
Table 27: T-Test of Presence in AF lower than AW .....	95
Table 28: T-Test of Presence in AA higher than AW.....	96
Table 29: T-Test of Presence in AA lower than FB .....	96

# **1. Introduction**

## ***1.1 Background***

After 30 years of lagging development under the planned economy, the People's Republic of China introduced economic reforms and open policies in 1978. After the reforms, the country gradually adopted market-oriented operations in almost all economic sectors, including the real estate sector. Before the reform, work units usually offered housing as part of workers' welfare from the 1950s to the late 1980s (Wang & Murie, 1999). Since then, most of the work units gradually offloaded the burden of providing housing for their staff. Housing system in Chinese urban areas is transferred to a market-oriented approach. The real-estate domain is opened to the commercial market. Private, collective, or other joint funded companies take the role and invest in the real-estate domain and develop commercial housing projects. The commercialized developments of housing projects serve people's ever-increasing demand for better housing conditions, usually at much higher prices.

Most of the commercial housing projects enjoy a distinctive style of design and planning. The new style is remote from the historical Chinese housing styles and the projects sponsored by the state-owned work units (Gaubatz, 1999). The dominant influence would be the examples from the Western industrial countries. While US cities tend to follow the design of Italian plazas for their public spaces (Miao, 2001), Chinese commercial housing developers tend to place such designs in open spaces communities. The emerging style is

creating new urban forms in most Chinese cities and new environments for urban residents.

Having been a resident in Shanghai urban areas for most of my life, I have been an eyewitness to the ongoing transformation of the physical environments and people's dynamic with each other with the new generation of commercial housing development. From direct and indirect experience, I sense that there is some difference in residents' behaviour and less communications among residents in outdoor spaces in commercial housing communities (referred to as CHCs hereafter). At the same time, I also have the perception that the behaviours in the outdoor spaces are different for the two types of communities. However, my perception needs evidence to examine its validity. In Chinese urban areas, CHCs are making up a more and more importance part of the housing systems. If we ignore the emerging problems in the flourishing CHCs, they will develop into more substantial social problems in the future. If residents do have different behaviour and decreased interaction in CHCs, we need to find out the factors for these changes and try to improve the design of CHCs to encourage activities.

## ***1.2 The study***

This study explores the behaviour patterns in state-housing communities (referred to as SHCs hereafter) and commercial housing communities. In Chinese, the areas within housing compounds are usually referred to as 'Xiaoqu'. In this article, I use the term 'community' to indicate the area within the physical boundaries, walls and gates, of a housing project. State-housing refers to the housing developed by work units, or

'Danwei', and allocated to the staff during the period from the 1950s to the late 1980s. These housing units were initially rented at a subsidized price to workers, and most of them became private properties when workers paid to obtain the ownership after 1978 (Li, 2003). Commercial housing refers to housing projects developed for the commercial real-estate market and purchased by private households after the opening up of the real-estate market, also referred to as "commodity housing".

Researches show that layout of the environment influence on people's interaction (Festinger et al, 1950). How do the flourishing new communities affect residents' social life in community outdoor spaces? The design of environments has significant influence on behaviours in that it can largely facilitate or discourage interaction among users (Canter, 1970). What influence does the design of the commercial housing projects have on residents in present China? Do the new environments generate different behaviour patterns in the community outdoor spaces? Do residents have more or less communication and interaction in commercial housing outdoor spaces than in state-housing outdoor spaces? If there are differences in behaviour patterns, what can be the cause of the differentiated patterns? Is it because of the different physical layout and designs of the community? Or, do the residents' social-economical status and life styles determine the change of behaviour in community outdoor spaces? What can we learn from the existing housing projects and design communities that facilitate vibrant dynamic among residents? Not much literature addresses these issues.

My research questions boil down to:

- whether the residents have different behaviour patterns in the two types of communities with different physical designs;
- What are the physical, social or demographic factors that influence the use of outdoor spaces in communities?

In this thesis I first introduce the literature body concerning my topic of interest. The literature includes theories and empirical studies about the interaction between human behaviour and environments, different factors that influence the dynamic and related issues in the Chinese context. Then I talk about the methodology for a comparative field study conducted in Shanghai. After that, I give the detailed information about how I collected the data. The next chapter is dwelling on the analysis of the empirical data, in particular, the presence of residents, the activities and the number of residents engaging in different activities in the outdoor spaces. The last chapters summarise the differences found in the study and provides suggestions as to what is better planning for outdoor spaces in Chinese community. Also, I provide suggestions for the design of CHC open spaces.

## 2 Literature Review

### 2.1 *Research Project*

A rich literature dwells on relationships between environment and behaviour. The dynamic between environment and people is not always stable because both sides are subject to change. The understanding of the relationship between environments and behaviour is central to urban planning. Communities, as the environments people live in, relate directly to people's daily life. In my study, I focus on residents' behaviour in community outdoor spaces.

Chinese commercial housing development debuted in the 1990s (Wang & Murie, 1999). With the introduction of a market economy in China, the Chinese government opened the real estate market. Housing units are built and sold in the open market at a price determined by market conditions (Li, 2003). This is what is often referred to as "commodity housing" in China. A growing number of individuals in urban areas are becoming owners of commercial housing. Most of the commercial housing developments include high-rise towers in communities with organic layout and formal decorative landscaping. These forms are obviously distinct from the existing Chinese built environments. Traditionally, Chinese urban dwellings consisted of courtyard houses of various layouts and building forms fit into a hierarchical alley network. After the founding of the communist China, state-housing was the dominating the Chinese urban housing system. State-housing communities have similar physical forms: low-medium

rise apartment buildings in grid layouts. Chinese traditional urban dwelling and state-housing forms consisted of the built environment in China up to the mid 1990s. After that, commercial housing projects flourished. At the same time, the emerging middle class in China formed the main purchasers for the projects. Like the middle class in other cultures and regions, this population view housing not only a habitat, but also a representation of their quality of life and social-economic status (Ley, 1986). Commercial housing projects in Chinese urban areas exhibit a distinctive style of design and planning, to appeal to this new cohort. This novel design and planning does not reflect historical Chinese city forms. The new style is creating new urban forms in most Chinese cities: However, new urban forms flourish with few tests of their effectiveness on their fit with people's lifestyles. Whether the new forms serve residents better or not remains a question.

The objectives of my study are to find out how people behave in the outdoor spaces in state-housing and commercial housing and to relate these behaviours to design. As most housing projects in Chinese urban areas are walled and designated as a 'cluster', I refer to the space within the boundaries of the housing projects as communities. There are indoor and outdoor spaces in communities. This study focuses on the outdoor space environments. Most residents in commercial housing communities moved originally from state-housing communities and have the experience of former forms of community environments. The relationship between the community outdoor environment and residents' behaviour makes my inquiry. My research questions are whether there are different patterns of behaviour in the two types of communities: state-housing and commercial housing. If so, what are the factors that influence residents' behaviour in the



community outdoor spaces?

I also want to determine what leads to these changes of behaviour. The residents in commercial housing used to live in traditional housing or state-housing. My question is whether the new housing environments might lead to the change of residents' perception of community, lifestyle and hence behaviour in community outdoor spaces?

## ***2.2 Theoretical Background***

Numerous studies cover the relations between environments and behaviour. This topic touches the domain of urban studies, anthropology, and psychology (Whyte, 1988; Rapoport, 1984; Rapoport, 2004). Rapoport (2001) contributes substantially on the conceptual and methodological approach to environment-behaviour studies. He argues that people interact differently with the built environment under certain conditions. Culture conditions the two variables. In order to explain diverse interactions among the variables, he deconstructs environments and culture. He argues that the elements in environment can be conceptually categorized into traditional (local) and modern (global or any other) environments. The same categorization also applies in deconstructing culture. Traditional elements are also regarded as local aspects, and modern ones as global. These elements play a great role in the interaction between human beings and the built environment (Rapoport, 2004).

On the base of deconstructed elements, Rapoport raises the following fundamental questions in the domain of environment-behaviour studies:

- “What characteristics of human beings influence which characteristics of the built environment?
- What effects do which aspects of which environment have on which groups of people, under what circumstances and why?
- Given these two-way interactions between people and environment, there must be mechanisms linking them; what are these mechanisms?”

(Rapoport, 2001)

Rapoport’s theories build up substantial theoretical foundation of environment-behaviour studies. Other studies reveal more findings of different aspects of how people behave in certain environments.

Kevin Lynch and William Whyte are among the pioneers in this area. Lynch (1983) states that there are five performance dimensions in creating a liveable city: ‘a healthy environment, human scale, accessibility, good administration, and the ability to accommodate individuals’ lifestyles’. My study also aims at finding out whether the urban community environments in question qualify as liveable and whether they accommodate residents’ lifestyle.

Whyte made substantial observation on the environments of public spaces and describes different patterns of behaviours. Some of his findings are: a public place needs to have a certain level of patronage to attract people; people like to stay within crowds, so called “in self-congestion” concept (Whyte, 1988); the success of a public place depends on

factors such as people, furniture, landscape, and amenities, and these factors need to be co-present and interactive (Whyte, 1980). These findings help structure the elements of the environments in environment-behavioural studies. I also include aspects such as residents' presence, supply of furniture and landscaping in my study.

Housing is the intimate environment of human beings. People's behaviour around their housing settlements, more specifically behaviour in public spaces in communities is the focus of my study. Based on Lynch's and Whyte's studies and Rapoport's theory of dismantling the environment and culture, I study my subject in these aspects:

- Do layout and furniture influence residents' behaviour in the state and commercial housing?
- Is there any change in the residents' life style and perception of the community after they moved into commercial housing that lead to their change of behaviour?
- What explains local behaviours in the housing areas?

### ***2.3 Chinese Context***

Chinese residential housing has experienced tremendous changes in the past several decades. Traditionally in Chinese urban neighbourhoods, well connected street networks and major architecture are arranged according to Chinese geomancy with walls as the boundaries. Residential housing is usually one- and two-storey high of rammed earth, brick and wood structures (Miao, 2003; Gaubatz, 1999). Chinese urban housing changed after the take-over of the Chinese communist party in 1949. The aim of urban planning

then was to create a new decentralised and self-sufficient urban form, and the work-unit-based housing components, namely, 'superblocks', were ideally the self-sufficient communities in cities (Gaubatz, 1999). In the communities, three- to seven-storey rectangular buildings were well aligned. This complies with the planning scheme to allocate equality in distribution of housing and other services with strong influence from USSR plan concepts (Gaubatz, 1999; Sit, 1996). Then a form easy to standardise began to thrive: five to seven- storey apartment buildings within a grid system (Gaubatz, 1995). At that time, working units built residential quarters of such kind and their employees got housing as part of welfare.

In the late 1980s, China started to move from a planned economy to a market economy. The welfare housing system, without a reasonable financial scheme, began to shrink due to the long-term lack of funding. Work units thus gradually unburdened themselves of the duty of housing. The emerging affluent private sector entered the real estate market (Wang & Murie, 1999). Meanwhile, urban rehabilitation began in China. Old rundown housing in downtown areas was renovated or rebuilt (Meng, 2000). In the 1990s, the central government decided to allow local governments to lease the land to public or private real-estate corporations as a part of fiscal decentralization measures (Han, 2000). In this way, local authorities were able to gain profits from the rents on their land. Later on, the central government established policies to promote the privatization of housing triggering the debut of the vibrant Chinese inner city redevelopment (Han, 2000). The redevelopment was quickly transformed into massive displacement and demolition in inner cities, in some cases without considerations of local residents and preservation of

historical buildings; thus arose much controversy (Zhang & Fang, 2004).

Since the mid 1990s, private households have become the mainstream purchasers in the Chinese real estate market (Wang & Murie, 1999). New housing projects in inner areas feature towers and organic layouts. This form is very remote from the existing built environments where state-housing with grid layout and low-medium rise prevails.

Original residents in these areas have to leave their valuable locations due to the fact that most of the previous residents do not have the means to purchase an apartment in the new projects. They are displaced to less centralized areas where real estate costs less. Families of affluence purchase the new well-located dwellings.

Scholars and observers acknowledge the changing situation in the Chinese housing system. Some of them bring up some concerns about existing and emerging problems. Local governments may abuse the right of land-leasing and only expect financial returns, ignoring the well-being of inhabitants. Cities and developers may destroy valuable historical buildings or areas in spite of the value of heritage and the displacement of residents (Meng, 2000). Some designs of new housing projects do not take local customs into consideration. In old housing communities, children would bring their friends from other communities to the play ground and share the spaces with their friends; passers-by use the pathways in the community as shortcuts; residents interact with each other in community outdoor spaces. Yet these phenomena are rarely seen in new commercial housing communities. The commercial housing inhibits residents from carrying on their routines as they did in previous state or traditional housing (Miao, 2003). The

privatization of housing also triggered housing price inflation, distorted transactions and the problem of an unsound mortgage-finance system appeared (Zhang, 1999). Scholars also point out other problems present in China concerning legislation systems, urban planning process, housing project development process and commercial housing market management, which need to be solved in due course (Wang & Murie, 1999).

With the massive transformation of urban forms in China, changes of behavioural patterns emerged. Traditionally, Chinese residents had vibrant activities in community public places and had close contact with their neighbours (Dong et al., 2004; Xue, 2001). In comparison, residents in new commercial housing projects have less presence, activities and communications. Data collected from a questionnaire survey shows that people in traditional residential quarters have substantial knowledge about their neighbours and often communicate, socialize with each other; people in commercial developments seldom know neighbours' names, rarely talk to their neighbours and hardly help or visit each other (Xue, 2001). In recent developments, the open spaces and even some of the surrounding streets are underused while these spaces in the state-housing communities there are usually much more activities going on (Miao, 2003).

Researchers reveal some of the causes for the decreased communication in communities. Some argue that the change of administrative control in urban areas changed people's behaviour. Since the beginning of Communist China, administration in urban areas is through work units. Residents living in the same communities are under the same administrative authority, the work unit. This creates a close knit among the residents.

These years, municipal administration is transferred into a system based on communities, where residents are usually not workers in the same work units. This transformation leads to less connection among residents (Xue, 2001). Some state that the change of the physical design of housing discourages residents' communication. In traditional housing residents usually have courtyards as an extension of their private space and have a lot of interaction in the courtyards (Ying & Gen, 2004). In commercial housing, most residents do not have courtyards anymore. At the same time, the vertical expansion to accommodate higher density is different from the traditional housing layouts with low-rise buildings and horizontal connection. These transformations of the physical environments in communities create distance among residents (Dong et al., 2004). Some others blame on the gating approach to the communities. After the opening up in 1978, most communities are built with walls and gates. Such approach to reduce accessibility is applied also to existing communities. The gates create psychological barrier to residents and discourage activities (Miao, 2003).

#### ***2.4 Different Factors Influencing People's Behaviour in Public Spaces***

Studies on cases around the world show different factors influencing the interaction between human beings and public spaces. These findings have helpful implications for my study. Physical features of public spaces are significant in the dynamic between the environments and behaviour. Spaces with better accessibility are more popular and host more vibrant activities (Ying & Gen, 2004). Certain public spaces in Famagusta, Cyprus, enjoy more popularity among the local people than some others in the same area; this is because they are closer to public transportation nodes (Pasaogullari & Doratli, 2004).

Facilities, furniture, such as benches and tables, and special events are also important in encouraging patronage in public spaces (Pasaogullari & Doratli, 2004; Xu, 2004). These attributes of the physical environment are among the independent variables that influence human social interaction (Zhang, 2004). While no study tested these principles in the Chinese community context, they still hold consideration for my research questions.

Different players participate in the design process of public spaces and thus projects are designed in different parties' interests. Governments or authorities usually have direct instruction on the designs. Brasilia's municipal government aimed at establishing a modernized city for its image as new capital of Brazil several decades ago. The city thus turns out full of vast modernist projects (Cornish, 1991). Yet the thorough application of modernist planning leads to vacant public spaces and meets with many critiques; for example, Holston (1989). In China, the Beijing government started to reinforce its control over residential environment in late 1970s. It was believed that sealing up residential quarters in the urban area would help with their goal of enhancing control. They thus had residential quarters walled up and gated (Gaubatz, 1995). This administrative attempt alters the role of outdoor spaces in the communities and thus results in different patterns of behaviours. As China has rigorously structured administrative control, governments and authorities can have great influence on design processes of public spaces (Han, 2000; Zhang & Fang, 2004).

The input from the users of public spaces in the design processes will also lead to different patronage of the spaces. The residents in Via Julia, Barcelona, actively voiced



their opinions throughout the entire planning process of the public space in their community. This project turned out to be a success, and residents now enjoy the space designed for their needs (García-Ramon et al., 2004). Since different ethnic and religious groups in Singapore are actively practicing their customs, in order to avoid conflicts the government considered their needs and advocates plans that cater to a multi-cultural society (Robbie, 2001). The high level of state control in China and Singapore has constrained civilians' participation in design processes. With increasing number of advocates of democracy as well as real progress in this area, Chinese people are enjoying more access in community decision making.

The interaction between environment and behaviour is also subject to people's characteristics. Studies show that different age groups lead to certain patterns of behaviour in public spaces. Retired people may use community public spaces more often during weekdays since younger generations would be at school or work (García-Ramon et al., 2004). Children have their own behaviours according to their understanding and perception of danger and other security issues in the environment (Nayak, 2003). People of these age groups take similar social roles in Chinese society, thus these factors may have implication on the Chinese.

Gender differences also affect activities and behaviour in public spaces. A study on different public spaces in the Unites States shows that females feel more vulnerable. To provide better security and support, group events are organized for these areas. This way a woman can partake in exercise or leisure activities with other females and feel stronger

within a group environment (Krenichyn, 2004). The vulnerability of females is universal, thus these findings also shed light on Chinese contexts. There is little literature reporting female residents' vulnerable situation in community public spaces.

Family structures and social-cultural norms attribute different responsibilities to both genders. In some cultures, women are supposed to take the burden of preparing meal and taking care of housework while men are not expected to engage in domestic tasks. In Via Julia, a working class community in Barcelona, Spain, significantly more male retired residents use community public spaces in the morning since the females are preparing for meals of the day and doing housework. In the afternoon, females have more free time and use the spaces more (García-Ramon et al., 2004). As Chinese culture emphasizes close family knits and support, these social roles may also have great effect on people's behaviour. As the Communist government advocated liberation of women, the social role of Chinese women in urban areas is not as restricted as before. We still need studies to explore people's perception of what kind of role females should have in Chinese urban areas.

Other subjective factors also contribute to different behavioural patterns. In order to hold ritual or ceremonial events for their religious or ethnic groups, people are actively using and even modifying public spaces to their needs (Robbie, 2001). Traditional environments contribute to the local elements in people's cultural bearings; modern environments, usually with input from other regions, contribute to global elements. These different cultural elements reversely affect people's use of and behaviour in public spaces

(Rapoport, 2004).

## *2.5 Social-economic Factors in Chinese Context*

In over 30 years, work units owned most of the urban housing in Chinese cities. At that time, residents in one community were usually from the same or related work units, and a lot of administration was carried out through these work units. Since the commercialization of the housing market, more and more individual households have become the owners of their housing. People in the same community are no longer from the same lines of employment or the same work unit, making it impossible to conduct the administration for a community through work units. The administrative system is gradually changing into a community-based one (Xue, 2001). These changes in the housing and social systems can ripple widely in transforming people's perception and behaviour.

Unlike people from most other cultures, the Chinese have a vague perception of the boundary of private and public spaces in communities. This comes from the traditional Chinese culture. Chinese culture has been characterised as less adversarial, less individualistic yet more with the ethic of reverence, unlike its Western counterpart (Jenkins, 2002). These traditions disperse into daily life practices in terms of how Chinese interact in environments (Tuan, 1968). An obedient culture has high tolerance of intervention in private regimes. Traditionally in state-housing communities, spaces in private household were often invaded by others. People have access to the most private places, the spaces within other families' dwellings. It seemed that residents could walk in

their neighbour's room as if stepping in a public space. Chinese people regard the interference to private spaces comfortable and secure (Yuan, 2002). On the other hand, people also occupy public spaces for private use: In both traditional housing and modified new courtyard housing, residents use public courtyards as an extension of their private spaces by putting their personal articles in public spaces (Ying & Gen, 2004). Due to the large population of China, Chinese urban housing is usually crowded. High density and insufficient private spaces can also explain the spontaneous extension of private spaces in China (Miao, 2003).

With commercial housing, private spaces are guarded and protected. Outdoor spaces in those communities are also gated. Privatization sprawls into outdoor spaces. People have much more private room but feel insecure and isolated (Yuan, 2002). Residents are reluctant to use certain outdoor spaces in communities as they perceive those domains as an extension of private spaces (Li, 2003). Miao's (2003) research shows that gates in communities create psychological barriers, and some residents claim that "being inside of the gate" is a powerful symbol for protection and isolation.

Social-economic changes in China also affect people's behaviour in public spaces. The previously common Chinese following of Confucianism was replaced by the pursuit of Communism and with a thriving Chinese market economy there is now an increasing obsession with material wealth. Popular beliefs lose worshippers while no new ideals have emerged (Miao, 2003). In such a value vacuum, people get anxious and upset (Visser, 2003). Without confidence about the larger social environment, people thus choose to

keep themselves from others for a sense of security. This might also lead to a decline of patronage in public spaces.

The high-end housing projects emerging in downtown areas displace the less affluent original residents to inner or even farther suburbs. Meanwhile, rich people move in and enjoy the better locations. This turns out to be the Chinese gentrification process. Unlike in the Western world, no suburbanization precedes gentrification in Chinese cities (Meng, 2000). That is to say, with the “rehabilitation”, more and more poor people are forced to move to the outskirts while wealthy families occupy central locations. Although there is not enough evidence to impute the different attitudes and behaviours on social-economic distinctions, one can easily correlate the two.

## ***2.6 Conclusion***

The dynamic between human behaviour and environment involves many factors. Some relationship between the factors and the dependent outcomes vary from case to case. My study is to determine how the attributes of community outdoor spaces in the Chinese context “collaborate” with Chinese urban residents and what kind of spaces work best for them.

### **3 Methodology**

Quantitative and qualitative methods are adopted in the study. General observation is used to produce behaviour maps to record residents' behaviour in community outdoor spaces. Also, different types of behaviours are pre-coded based on pioneer studies as mentioned below. Questionnaire surveys are conducted to gather residents' opinions on their behaviour in community outdoor spaces. Because of the difficulties I had in the surveys, I discontinued this method and use telephone interviews as a supplementary instrument.

#### ***3.1 Observation Methods***

The observations are carried out between 4 to 6 pm in May 2005, May 2006 and June 2006. The months of May and June are in late spring and early summer in Shanghai. Weather is usually warm and mild, which makes outdoor environments pleasant I use the same method of observation for each time for every community. For each round of observation, I walk into the community, trying my best to pretend that I am just another resident. I take a walk throughout the community outdoor space. The whole outdoor spaces of studied communities are observed. 'How many people are doing what and where' is recorded on maps of the communities. Maps of the community are not accessible to the public, yet every community has a board of plan on a display board offering orientation in the community. I take pictures of the plans on display and trace over the pictures to produce rough maps of the studied communities. Every community

was visited six times to produce behaviour maps.

Throughout the time of observation I try to appear to be a resident or a visitor to the community and avoid acting obviously as an observer. Some residents saw me taking down notes on maps but few asked me about that. This ensures that the behaviours I recorded are mostly not interrupted by me.

### **3.1.1 Distance vs. Presence**

I want to find out whether residents' presence in an outdoor space is related to its distance to the environments outside of the communities. It has been long suggested and shown that layout of the environments influences behaviour (Festinger et al, 1950; Whyte, 1988). According to the theories of space syntax, distance is perceived based on the depth between the two spaces, which is counted through number of turns along a path (Bafna, 2003). More depths are thus perceived as longer distances. The question to be tested is whether greater distance affects residents' behaviour and lead to different behaviour patterns. In this study, the distance from a space to an entrance is measured as depth from the entrance to the space. Along the path connecting an entrance to a grid of space, every time the path covers a grid, it adds one depth to the distance. I use the total numbers of grids covered along the path as the number of depth. Testing the depth of a space against presence allows us to examine the coefficient correlation between the two.

### **3.1.2 Categories of activities**

I classified the activities present in the outdoor spaces in the communities. The categories are: walking, standing, sitting, talking, exercising, taking care of children, cycling, walking pets, doing housework, reading, watching, eating and playing board games. The categories are usual activities based on my observation in the study sites and the residents' responses in trial surveys. A lot of the categorized activities are recognized as important elements to make outdoor spaces attractive and meaningful (Gehl, 1987). The ratio of residents, defined as the number of presence per 100 residents, engaging in each activity is calculated difference in behaviour patterns is tested.

### **3.2 *Survey to Interview***

I planned to conduct questionnaire surveys in selected communities. In May 2005, I did some trial surveys. I went to some selected community and approached residents who were present in the outdoor spaces. It turned out that residents were very reluctant in responding to the survey. Some of the residents got unfriendly and offended shortly after I started the conversation about my project and the survey. They questioned the validity of my study. They also felt that my questions intrude their privacy and were sceptical about my intention behind the study. I approached at least 200 residents, yet only 40 people agreed to do the survey. Among the 40 surveys, most of them were not complete.

The planned questionnaire survey in the communities discontinued. Nevertheless, the trial survey does help me understand my respondents better. The trial survey also helps in adjusting the research methods and setting up categories behaviour and activities in



outdoor spaces for later data analyses stage.

Since the attempt of conducting questionnaire survey was not accomplished, I redesigned the study and changed the questionnaire survey to telephone interview. It was found out in previous survey trials that most respondents feel uncomfortable in responding to questions about their daily life to a stranger. I conduct the interviews first with friends and acquaintances, and then use snowball method to obtain more respondents. In this way, all of the respondents have reference and feel more confident in answering my questions.

The phone interviews are semi-structured. At the beginning of each interview, I explain that the interview is for my individual study and their identity will always be kept anonymous; they can also discontinue the interview anytime when they feel like to.

I raise the questions to encourage the interviewees to make comments and expand the topic. Main questions I ask in the interview about residents' behaviour in communities are listed below. Questions may not be asked in the same order in the interviews. Some questions may not be raised as they are not applicable to some cases. Additional questions may be raised according to the context of the interview conversation. In the following list, the questions are the translated into English.

- What is your community like now? Are the residential buildings low-, medium- or high- rise? What is the network of alley ways like? Do you have a central open green space? Do you have landscaping/furniture in the open spaces such as

benches or fountains etc.?

- When did you move here?
- What was the community you lived in like before you moved here? For how long did you live there?
- Do you take a walk in your previous community and/or in your present neighbourhood? Why (not)? What about chatting with neighbours, having a rest, doing housework, taking care of kids, playing board games/cards, exercising, etc.?

While the interview is undergoing on the phone, I record the conversation. After the interviews, I replay the conversations that I record and write down the interview transcripts for analysis stage.

In total, I conduct 19 phone interviews. The basic demographic information on the respondents is listed in List 1. This information is obtained through references and thus is approximate.

### ***3.3 Selected Communities***

Housing projects are selected for both SHCs and CHCs, three in each category. Among the three projects in the same category, the major similarity is that they were all built in the same period of time: between around 1950s and early 1990s for state-housings and

after 1990s for commercial housing. Communities in the same category also have some varieties among them: the scale of the community, number of households, layout of the community, furniture present on premises, etc.

**List 1: List of Respondents of Phone Interviews**

No.	Sex	Age	Occupation	Type of Community	Whether lived
1	Female	21-25	Middle School	Commercial	Yes
2	Female	51-55	Factory Sales	Commercial	Yes
3	Male	51-55	Senior Engineer	Commercial	Yes
4	Female	76-80	Retired	Commercial	Yes
5	Female	21-25	Teacher	Commercial	Yes
6	Female	51-55	Senior Government	Commercial	Yes
7	Male	51-55	Government	Commercial	Yes
8	Female	11-15	Student	Commercial	No
9	Female	41-45	Journalist	Commercial	Yes
10	Male	41-45	Engineer	Commercial	Yes
11	Female	26-30	Teacher	Commercial	Yes
12	Male	36-40	Doctor	Commercial	No
13	Male	61-65	Retired	Commercial	Yes
14	Female	56-60	Retired Accountant	Commercial	Yes
15	Female	21-25	Video Producer	Commercial	Yes
16	Female	56-60	Retired	Commercial	Yes
17	Male	56-60	Manager	Commercial	Yes
18	Male	61-65	Retired Engineer	Commercial	Yes
19	Female	56-60	Retired	Commercial	Yes

### 3.3.1 Case Studies in Shanghai

All of my study cases are located in the urban area of Shanghai. There are several reasons

for choosing Shanghai as the city to conduct my studies. Shanghai has the largest special economic zone in China and takes the role of stimulating a new economic leap in the Yangtze River Region, the most vibrant economy in China (Huang, 1991; Report of the 14<sup>th</sup> Chinese Communist Party Congress, 1992). Shanghai is also one of the first cities in China where commercial housings were introduced and practiced after the era of state-housing in planned economy. Shanghai, as one of the most vibrant economies in China, also has a very active commercial housing market. As one of the major cities in China, Shanghai is usually the examples other cities learn from. The other reason why I chose to study cases there is that Shanghai is my hometown. I have family and friends living in Shanghai. As doing research in China sometimes need a lot of networking. My family and friends in Shanghai may be helpful resources in the process of my study.

### **3.3.2 Case selection**

My case studies are located in three districts in Shanghai urban area. These districts are: Putuo, Hongkou and Yangpu. These districts are representative of the typical demographic attributes in Shanghai urban area. There are residential, commercial, administrative and some industrial activities in the districts. The selected communities are located in mainly residential areas, with facilities such as shops and schools in the surroundings. The population of the selected sites have average social-economic status and represent a large proportion of the population in Shanghai urban area. Figure 1 shows the distribution of the study sites.

During the exploring stage of my study, I tried entering various communities. As most of

communities in Shanghai are gated and guarded, whether I can easily enter the communities largely depends on the level of surveillance. I was expelled from some CHCs as I was not a resident neither was I invited by a resident of the communities. I saw other people being expelled from some other CHCs and was intimidated to go again. After rounds of trials, I was able to identify a list of communities that can be reasonably revisited and decided on the six cases for this study. They are: for SHCs: Changyi, Ercun, Sicun and for CHCs: Xiandai, Jinshanghai and Jialu.

As mentioned earlier, I made the plan of each community myself as it is not accessible. I take pictures of the plans on display in the communities and trace over the pictures to produce rough plans of the studied communities. On the plans, I indicate the community boundaries, gates, alley ways, buildings, green spaces and facilities on the ground.

There are some difference in the physical environments in SHCs and CHCs.

### **Benches**

There are few benches in SHCs, which are usually made of stone. Some single stools can also be found in SHCs usually with a table as a set of furniture in designed green spaces. In the CHCs, benches are usually made of wood with metal frames. The metal frames usually have certain decorative style such as Victorian. Most benches installed in the communities can seat two adults comfortably. See Image 1, Image 2 and Image 3.

### **Layout of Alleyways**

In SHCs, outdoor spaces are usually designed in orthogonal-fashioned grids. Alleyways in the communities usually go straight horizontally or vertically. These local streets make up most of the outdoor spaces. In CHCs, paths and buildings usually laid out in an organic fashion. There is usually a central open space in the middle of the group of residential buildings in the community with pathways leading to it from the surrounding.

### **Vegetation and Green Spaces**

In both types of communities, there is usually vegetation surrounding the buildings and alleyways. In the SHCs, the green areas are usually planted with shrubberies and lined with tall trees offering shades and providing some enclosure of the people in the outdoor spaces. In commercial housing projects, the green spaces are usually covered by grass on the ground and some trees along the pathways. Most of the trees either are young or do not have big tops, thus they usually do not offer shades on the ground. At the same time, the outdoor spaces and people hanging out in the central spaces in CHCs are largely exposed in the environments. See Image 4.

### **Boundaries of Green Areas**

The green areas in the SHCs are always fenced off. The fences are generally one foot high. They are usually designed in a way that it is almost impossible for people to sit on them in spite of their ideal height as a seat. The plantation in the green areas is not easy to step on or walk through. Although the fences are easy to step over, residents won't cut through the green areas. See Image 5. In CHCs, some green areas with careful landscaping are well defined by the design; others are usually paved with grass without

fence-off barriers. There are sometimes paved paths cutting through the green areas. Most green areas are accessible to residents. See Image 6.

### **Scales of outdoor green spaces**

In SHCs, open green spaces are relatively of a smaller scale, usually occupying a unit of the grid layouts. In CHCs, there are usually relatively larger outdoor spaces with quite formal landscaping in the entrance or centre of the communities: some are equipped with sparkling fountains, sculptures, or arches. Landscaping and the central green area is usually the highlight in the marketing campaign of the commercial communities. See Image 3.

### **Children's Playground**

In SHCs, there is usually no designated playground for children, while there is usually a children's playground in each CHN. Facilities are installed on the playground such as slides, seesaws, and jungle gyms or play structures. The ground surface is usually rubber floor and a sandbox. There are some benches around the playground where adults can sit and watch children play. See Image 7.

### **Residential Buildings**

Buildings in SHCs are usually low to medium rises, normally ranging from 2 to 7 storeys. There are usually multiple families, varying from around 4 up to more than 10, on each floor sharing one stair ways at one civil number. In some older state-housing household facilities such as washrooms and kitchens are shared by several households; in others,

each household enjoys these facilities of their own, which is the case with all the selected CHCs in this study. Buildings in CHCs may be medium rise or high rises. Normally there are two households on each floor at one civil number.

### 3.3.3 Selected Case Studies

List 2 is the list of studied communities. In the list, I state the names of the communities, housing type of each community: state-housing or commercial housing, street type within the communities: grid-like or organic, number of storeys of the apartment buildings in the communities, and year of completion for each community. List 3 shows information about approximate household size, number of households on each floor sharing the same entrance/stairways/elevators and total number of households in each community

List 2: List of Studied Communities

Community	Housing Type	Alleyway Type	No. of Storeys	Year of Completion
Changyi	State-housing	Grid-like	6,7	1984
Ercun	State-housing	Grid-like	6	1982
Sicun	State-housing	Grid-like	6	1983
Jinshanghai	Commercial Housing	Organic	14,15,29	2003
Xiandai	Commercial Housing	Organic	8,9,12,15,16,17,18	2002
Jialu	Commercial Housing	Organic	7,9,10,11,12	2004



**List 3: Additional Information on Studied Communities**

<b>Community</b>	<b>Household Size (app.)</b>	<b>No. of Household per Floor</b>	<b>Total Household</b>
Changyi	3	4	1112
Ercun	3	4	1056
Sicun	3	4	912
Jinshanghai	3	2,3	537
Xiandai	3	2	1034
Jialu	3	2	386*
*The total number of household is 554, however, in 2005 when observations were			

The three SHCs in my study are Changyi, Ercun and Sicun. The following is some extra comments and description on these sites. Figure2-7 are the plans of the studied communities.

### **Changyi**

This site is located at the corner of two busy streets: Jinshajianglu and Zaoyanglu in Putuo district. There are mainly residential compounds in its adjacent area with small variety shops and restaurants along the streets next to the site. Within around 100 meters to its north east, there is a public high school. This site is very accessible by public transportation: within 5 minute's walk to bus stops for more than 10 different major bus lines, and within 15 minute's walk to a metro station.

This community does not only contain residential buildings. As this community situates on the corner of two busy streets, there are some commercial and institutional facilities

inside of the community. There is a small printing house in the south-east end of the boundary, a small post office, some home-based small business in the buildings in the front row and accesses to the backdoors of some restaurants. In my observation, I recognize some clients of the post office and the small business and a couple of staff of the restaurants in the premises. They are not counted in my counts of the present residents. According to my observation, majority of the present people from my observations are residents of the community, thus those non-residents do not affect my observation a lot in my observation period, 4pm to 6pm.

There is one green space furnished with exercising equipment. This area is relatively smaller compared to the ones in the other two state-housing projects. There are still exercise equipment yet other than that, there is not a lot of room for other activities.

### **Ercun**

This site is located in Putuo district, facing a major street, Jinshanjianglu. In its adjacent area are mainly residential communities with some commercial activities. There are retail shops lined up along the streets outside of the boundaries of this site. A police station situates among the shops. A 6-storey shopping mall is right across the street from this site. There are bus stops right outside of the community with around 10 major bus lines. The closest metro station is around 20 minutes' walk from this site or 1-2 bus stops away.

There is a little garden right inside of entrance in the south. Zigzagging paved pathways and stone benches are designed to enhance its ambiance. The central green space is in the

middle of the community. There are exercise equipment. There is a round stone table with 4 stone stools around it. People can play chess and sit and chat around the table. Inside of the entrance in the west, there are some newspaper-posting boards. Up-to-date newspapers are displayed in the display case. The display boards are locked and maintained by property management staff.

### **Sicun**

Also located in Putuo district, this site is surrounded by Nujianglu and Daduhelu. Outside of its boundaries are mainly patches of municipal green spaces. A grocery store is right outside of one of its gates; a shopping mall is within 5 minutes' walk from it. There is a hotel to its north east end, a primary school across the street and a city park within 2 minutes' walk from the site. There are more than 10 major bus lines passing by the site with stops within 5 minutes from it. There is a regional bus station around 20 minutes walk from it. A metro station is also accessible from this site, 1-2 bus stops away.

There is a green space directly connected to the entrance in the east. A part of it consists of a stone round table with four stone stools around it. The other part of the spaces is well enclosed with trees with a small playground that can be used as badminton and some stone benches.

There is another green space with exercising equipment in the community. This place does not directly connect to any of the entrances and seems hiding behind of one of the apartment buildings.

The three CHCs in my study are Xiandai, Jialu and Jinshanghai. The following is some extra comments and description on these sites.

### **Xiandai**

This site is located at the corner of a major road, Zhoujiazuilu, and Jiangpulu in Yangpu district. Across the street of Jiangpulu from one side of the community is the second phase of this commercial housing development. There are other housing communities around this site. On Zhoujiazuilu there are some small shops near the site. There is a large commercial area, a metro station and a large hospital located several bus stops from the site. A couple of major bus lines pass the two streets and the bus stops are within 5 minutes' walk from the site.

This community covers a relatively larger area. All of the buildings are high-rise, over 12 storeys. Ground-floor apartments have open backyard with fences around them. There are green spaces around each high-rise with a variety of plantation. There is a man-made lake with some small bridges, big palm trees and benches around it. That makes the most formal and largest landscaping in the community. There is a rooftop garden with plantation and some benches. In one area of the outdoor spaces, exercising equipment for adults and children are installed continuously followed by rows of benches. There are some other rows of benches installed right facing the entrance in the south. On the other corner of the open space inside of that entrance, there are a couple of long stone benches.

## **Jialu**

This site situates at the corner of Huoshanlu and Tongbeilu in Hongkou district. On both streets there are small shops and grocery stores. There are some traditional housing communities in its adjacent area. One block away is an old factory. There are kindergartens and primary schools within 15 minutes' walk from there. A major commercial area, some major bus lines are also accessible within 15 minutes' walk.

This community is relatively small. Each ground-floor apartment has a backyard with fences around it. The central open space consists of a green area with grass ground, benches, exercise equipment, and a children's playground side by side. On one side of the central area is an above-ground fountain with stone poles shaping an arch surrounding it, facing the entrance in the north.

## **Jinshanghai**

This site is located on Kunminglu, corner of Guihualu in Yangpu district. There are some commercial housing communities as well as some traditional housing communities in the surroundings. Grocery stores and daily variety shops are within 5 minutes' walk from the site. There are a couple of local bus lines in the surroundings. Within around 20 minutes' walk, one can find schools, hospital, and shopping malls and major bus lines.

The central open space consists of an open playground covered with grass and an area of exercising furnished with equipment. There is a children's playground on the edge of the central green space, next to where the exercising equipment is. There is a wide path

connecting the central green area with the main entrance with decorative ground lights and tiny water ponds.

## **4 Quantitative Results**

### ***4.1 Presence***

General presence ratio in SHCs and CHCs is compared. The numbers of observed residents are counted based on the behaviour maps. I counted the number of household in each residential building and calculated the total number of household in the community. Hypothetically, the average size of families is 3 persons per family. The total number of residents in each community is the number of households multiplied by 3. Presence ratio is calculated by dividing the number of presence by total number of residents in each community.

To find out whether the presence ratio in SHCs is different than CHCs, I use T-test to see whether there is statistically significant difference between the average presence ratios in the two kinds of communities. The analysis is shown in Table 1. The total presence of residents in SHCs is higher than CHCs ( $t=2.28$ ,  $P<0.05$ ).

### ***4.2 Participation in Activities***

The residents are engaged in a range of activities in the outdoor spaces. In the preliminary survey, respondents were asked to name the activities they do in the community outdoor spaces. Based on the activities named by the residents and my observation, I summarized the activities into categories. The categories are: walking, children playing, walking pets,

sitting, talking, biking, exercising, standing, and in some special cases doing housework, reading and playing board games. In the case of walking, sitting, and standing, the observed subjects can also be engaged in talking.

I use T-test to see whether there is difference among the presence ratio of each activity in the two kinds of communities. There is significant evidence that the percentage of residents walking in the SHC outdoor spaces is higher than the CHCs ( $t=3.39$ ,  $p<0.01$ ). The presence of residents talking and standing in SHCs is higher than the commercial ones ( $t=3.38$ ,  $p<0.01$ ;  $t=2.48$ ,  $p<0.01$ ). More children are observed in the commercial communities than the state-housing ones ( $t=-2.18$ ,  $p<0.05$ ). Table 2-5 show the T-Tests of the difference among the participation in activities. There is no significant evidence of difference in the number of residents walking pets, sitting, biking or exercising between the two types of communities.

### ***4.3 Presence and Attributes of Spaces***

With the observation results, I also test what factors affect on residents' presence and participation in activities in community outdoor spaces. According to the observations, residents' presence and activities are distributed unevenly in the outdoor spaces. At the same time, there are sub-areas or grids of spaces with different features such as different surfaces or facilities. Some spaces are with special pavement or grass and/or furniture. These spaces are usually central green spaces, exercise area, playground or designated areas with landscaping. Other outdoor spaces are usually paved with cement and without lots of furniture. These areas are usually the local alley ways. Although these spaces are



not very different in the physical attributes, they tend to have different levels of presence according to their relative position in the community. The presence ratio here is the presence per mille. It is the number of presence divided by the estimated total number of residents in each community and then multiplied by 1000.

#### **4.3.1 Types of Spaces vs. Presence**

To explore in details the relation between the characteristics of spaces and residents' behaviour, I need to separate the outdoor spaces into grids of areas in a certain fashion.

I define grids in communities not based on equal size but on the boundary of buildings, alley ways and barriers according to their physical features and relative position in the environments of residential buildings, alley ways, and furnished / landscaped areas. I categorize the grids of spaces in this study into the following types: grids between two alley ways (referred to as AA hereafter); grids connecting an alley way and a furnished area (referred to as AF hereafter); grids between an alley way and the community wall; entrances to the communities (referred to as ET hereafter); furnished area (referred to as F hereafter), grids in front of the façade of a building (referred to as FB hereafter); grids between the lateral sides of two buildings (referred to as LL hereafter ); grids between a lateral side of a building and the community wall (referred to as LW hereafter).

Comparison on these grids against residents' presence shows whether types of spaces in communities influence behaviour. Figure 7-8 show the grid division in studied communities.

The question here is whether the attributes of a space are related to the patronage. I compare the residents' presence level in different types of grids by using T-test. Based on the percentage of residents' presence, I find significant difference in level of presence in the different categories of spaces. The furnished spaces (F) have significantly higher presence than spaces of other categories, the largest  $p < 0.01$ . The entrance spaces (ET) have less presence than furnished areas but higher presence than spaces in any other categories, the largest  $p < 0.01$ . The next level of patronage is in spaces connecting alleyways and furnished (AF) areas and spaces in front of building façades (FB), the largest  $p < 0.05$ . There is no significant difference between AF and FB. Following AF and FB are spaces connecting two alleyways (AA) and spaces between two lateral sides of buildings (LL), largest  $p < 0.05$ . There is no significant difference between LL and AA. The lowest patronage appears in spaces between the alleyways and the community walls (AW) and the ones between the lateral sides of a building and the walls (LW). There is no sufficient evidence of any difference between AW and LW. The detailed calculations are shown in tables 8-29.

#### **4.3.2 Distance and Presence**

I also test the relationship between the distance from outside and residents' presence. Each community has two to several entrances, usually on different sides of the community borders, thus a grid of outdoor space may have different numbers of depth in relation to different entrances. According to my observation, there is no obvious difference between the entry volumes of residents from the entrances. I choose the smallest depth for each grid as the shortest distance from the space to outside. Simple

linear regression is used to test the correlation between the step of each grid and the presence percentage. There is no significant evidence that step of a grid is correlated to the presence of residents ( $r^2=0.02$ ). In my observation, grids with furniture usually attract a lot more residents compared to other grids without furniture. In the other correlation test, I exclude the furnished grids. There is still no significant evidence of correlation of steps of a grid and presence ( $r^2=0.03$ ). Table 6 and Table 7 show the calculation.

## **5 Qualitative Results**

The quantitative analyses allow me to test the features in the physical environment in relation to residents' presence and behaviour. However, mere numbers and ratios do not provide enough information if I want to explore in detail what residents are doing and why they do certain activities but not others. Qualitative results meet with this need and complement the quantitative results. My observations of the study sites and telephone interviews with residents give me the opportunity to record and analyse the different behaviours and how the physical or social environments in communities influence on residents' behaviour.

### ***5.1 Observation in the six study sites***

Certain activities will be described based on my observations in the six study sites. These are typical activities and are frequently seen in the community outdoor spaces.

#### **5.1.1 Occupying Outdoor Spaces for Individual Household Tasks**

In SHCs, residents sometimes leave of their apartments and enter the outdoor space to do housework. Those spaces are concrete-paved pathways for local traffic. Some households on the ground floor have a water tap and sink in the open space in front of the building, right outside of their apartments (in Changyi, SHC). People prepare food, wash clothes and do other housework using the extra tap and sink. In some other cases, residents

occupy a small area in front of their apartment building and conduct various domestic tasks. Those tasks include preparing food, doing laundry, fixing bicycles, cleaning household articles and so on.

In CHCs, one can hardly see anyone doing housework in the outdoor spaces. No one takes his chair out to the outdoor space either. I record one peculiar case in one of the CHCs in my observation, Xiandai. There are a young couple washing vegetables and doing laundry using a water tap extended into the outdoor space. After a closer look, I identify them as the underground garage keepers. I assume that they are from some other area and live in the underground garage and work as the guard. They probably do not have sufficient room or facilities in their underground home and need to use the extended tap.

### **5.1.2 Use of Exercise Equipment**

The use of exercise equipment is popular during my observation periods. In SHCs, a large portion of the central green spaces are designated for exercise equipment, so the central green spaces usually seem vibrant. Many elderly people gather around exercise equipment in Changyi and Changer. Some engage in exercises using the facilities; some exercise without the equipment; some others just sit on the edge of the parterres or their own chairs socializing. In Changer, I also see children in the spaces. They are taken care of by their grandparents during that time of the day. In the other SHC site, Sicun, some residents use the equipment, but there are not many people staying around and socializing. See Image 8 and Image 9.

In CHCs, exercise equipment take only one part of the large central green space. There are always people using the exercising equipment and thus bring liveliness to this part of the central space, see Image 10. In some communities, such as Xiandai and Jialu, adult exercise equipment is installed next to children's playground. There are not only adult residents using the exercise equipment. Some other adults are taking care of their children and socializing among the equipment or in the pathway cutting through this ground. In Xiandai, some children are playing with the adult exercise equipment, see Image 11.

### **5.1.3 Children's Activities**

There is no designated children's playground in SHCs yet there are still children and adolescents playing in the outdoor spaces. Some observed activities for adolescents include playing soccer, hanging around with friends, walking and biking. There are also younger children and toddlers. Younger children are seen walking with adults' company. Toddlers are usually held in arms by adults, presumably their parents or grandparents, while adults are walking or, in some rare cases, sitting on chairs that they bring to the outdoor spaces. See Image 12.

In each CHC, there is usually one programmed children's playground. Some children's playgrounds are located next to adult exercise equipment and benches as in Xiandai and Jialu. Such spaces seem to attract a lot of residents. Not only are there children present in the playground, but adults as well. Some of the adults are watching young children play while socializing. Some others stand holding infants in their arms and chatting with

others. See Image 13.

In CHCs, in general, there are more children and adolescents present. Adolescents are engaged in activities such as playing soccer, basketball or badminton in the alleyways or on the grass. Young children use the children's' playground a lot. Some toddlers walk and tumble on grass. Others are sometimes held by adults when adults are talking, walking and sitting on the benches chatting with others.

#### **5.1.4 Sitting**

In SHCs, other than the stone stools around the round stone table installed in central green spaces, there is hardly any furnished bench. This, however, does not prevent residents from sitting in the outdoor space. Residents take their chairs out to the outdoor space to sit and socialize with others. Some of them occupy an area of the cement alleyways (as in Changyi and Sicun) while some others sit in the central green area next to the exercising crowds (as in Changer). See Image 14 and Image 8.

CHCs are usually furnished with plenty of benches for sitting. However, some of the benches are always popular while others are largely underused. The benches next to exercise equipment or children's playground usually attract a lot of people as in Xiandai and Jialu. Some people sit and chat with others; some sit and casually watch. Some of them also sit with young children in arms and socialize.

Some other benches are far less popular. Some of those are benches as part of the formal

landscape. Around a man-made lake and the waterfront landscaping in Xiandai, a couple of people sit on the benches on the waterfront. In Jialu and Jinshanghai, there are in total several people sitting on the benches around the fountain and the arches in my observation.

Some benches situated somewhat away from other facilities are also underused in the studied CHCs. Some long curving stone benches are situated next to the entrance in the south in Xiandai. These benches are usually fully seated, gathering a group of around 10 people socialising. There are some other rows of benches a little bit away from the stone bench and the entrance. These benches are not really used. Not far from the under-used benches, some residents sit on some rocks on the side of the alley way. In the rooftop green area in Xiandai that seems separated from other facilities, only a few people use the benches. See Image 15.

### **5.1.5 Other outdoor spaces**

In SHCs, there is not much accessible green space other than the central ones. The other green spaces are usually not vibrant. The little garden right inside of one entrance in Changer does not have a lot of patronage. I see a few residents walking through and for once someone sitting on the bench and eating some snacks he gets from the street. The green space connecting to the entrance in the east in Sicun is not often visited. Although there is a round stone table, I never see anyone playing chess or chatting around the table. On the playground nearby, people sometimes play badminton in groups. They come with their own badminton net, set the net up and play there. At times there is more than one



group of people playing badminton. They wait on the side and take turns to play.

In CHCs, central open areas usually have large open grass land. On the grass, people do sports such as playing soccer and Qigong; some others play with their dogs (in Jinshanghai). The paths cutting through the central outdoor space are also used by residents walking, socializing or walking dogs. Compared to the crowd around the exercising area, the rest of the central outdoor space in this community seems very quiet. Not a lot of residents appear in the pathways. Some residents play badminton, Qigong or other sports in the outdoor space right in front of or next their apartment building (in Xiandai).

#### **5.1.6 Use of other furniture**

In the SHCs, there are round stone tables installed in central green spaces with matching stools around them. These tables are usually intended for chess playing. In my observation, the tables are used by residents to play chess. The games taking place on the table usually attract quite a crowd. Some people come to watch and comment on the game. Some others just hang around the table and socialise. In the commercial communities no such table is found and no resident plays chess in the outdoor spaces.

There are some newspaper-posting boards inside of one entrance in Changer. These display boards are usually popular during my observation. People stop in front of the board and stand there to browse the news. Some stay there for more than a couple of minutes to read the newspapers. The newspaper readers tend to be mostly middle-aged or

older males.

## ***5.2 Results from interviews***

### **5.2.1 Influence of the history**

According to the observation, there are more residents are in the outdoor spaces in SHCs than CHCs. In the phone interviews, respondents also mention some points that support this observation. A lot of respondents mention that they know more about their neighbours in SHCs. Some say that it is because the housing was allocated through their work unit thus their neighbours are their colleagues at work. Some others mention that they live in the same SHC for a long time, easily over 10 years or even more, and thus know their neighbours well.

Respondents claim that in most CHCs people are from all over the city or even country. They purchase property and move into the same community. As the commercial communities are relatively new, the neighbours haven't had long enough time to get familiar with each other.

Some respondents pointed out some special cases in the CHC where residents have stronger connection. Some say that the CHC they live in now is mainly developed to relocate residents from an older development. As residents from the older developments, they get a discount price for the designated commercial housing. The new CHC is inhabited by a lot of residents from the old developments.

Some others mention that they moved into the new CHC close to their older development. As their old community is close by, some of their former neighbours also purchased the property and moved in the same new community. Thus they continue to enjoy the existing acquaintances in the CHC.

### **5.2.2 Influence of the Physical Environment**

When asked whether they think they change their behaviours in community outdoor spaces after moving into CHCs, respondents usually give negative answers. They tend to be defensive and claim that they keep their habits in CHCs. They claim, “Those are our [family’s] habits. No matter where we live, our habits stay the same”<sup>1</sup>; “I am not sociable by nature. I don’t talk to neighbours a lot anyway”; “Our family is not talkative. It is fine with us that here [in CHCs] people don’t talk to neighbours.”

After the respondents answer some specific questions about their habits in the SHCs and CHCs, it turns out that they do have different behaviour patterns in the two kinds of communities. When respondents realize the change in their behaviours, they tend to claim that the different environment led to the changes.

Respondents state that they have more opportunities to meet with their neighbours in the SHCs. A lot of respondents say that they used to talk to neighbours in older developments. They easily meet their neighbours in the community, especially on the shared stairways,

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<sup>1</sup> All quotes from the interviews are translated by me from the original language, Chinese mandarin or Shanghainese.

and would naturally greet and chat with each other. Some respondents also mention that there is a lot of communication among the residents on the same floor. One respondent reports, “We have eight families on the same floor. We always do things in the common area on the floor and usually talk to each other.”

In CHCs, however, there are usually only two families on one floor and the common area on the floor is solely used as a corridor. Respondents reported that they use elevators instead of stairways. They take the elevator, get out and enter their apartments right away. They claim that they don’t have as much chance to meet and get to know neighbours in CHCs and that’s why they don’t really talk to neighbours after the move to the CHC.

Respondents also report that they did not do exercise in SHCs. Some report, “I may take a walk in SHCs, but I never jog there. People were sitting all around and there was no space for one to jog. ... Nobody was running or exercising there.”; “The outdoor spaces were full of parked bicycles. There was no space for you to exercise.’ When they move into CHCs, a lot of them start exercising in the area where the equipment is installed. Some claim, “...Now [in the CHC], I often take walks on the pathway that is paved with cobblestones.<sup>2</sup> My husband walks on the cobble stones too. He usually walks with me.”; “... I run a lot. I use the treadmill to run.” In one case, a young professional reports that she didn’t start exercising until after moving into the CHCs. However, she goes to the gym instead of the community exercise area. She reported the reason for that being “...that equipment is always occupied by old people.” Some respondents mention that

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<sup>2</sup> Walking on cobble stones especially with bare foot is a way of massaging the bottom of foot and is believed to be good for the health.

they start to play Taigi in CHCs as “there was no room to practice in the old community.” After moving into the CHC, they can “have a large group practicing Taiga right in front of the apartment building.”

Some respondents mention that they play mah-jong, a popular board game in China, in their communities. They say, “before [in the SHC], I played mah-jong at my neighbours.” Now in the CHC there is a community recreation centre where mah-jong rooms are available. “Now we go to the community centre to play mah-jong”, they say.

In the observation, I record some residents doing housework in the SHC outdoor spaces. Respondents also confirm this in the interviews. They also mentioned some reasons why they do some housework outside of their apartment. In SHCs, residents usually live in very compact apartments and have very limited space at home. A lot of times there is no separated dining room or living room. All functions are served in the kitchen and bedrooms. They report, “For some housework, one needs space to get around and conduct affairs. Since we didn’t have enough room at home, we had to go outside of our apartment.”; “Some housework is dirty. We have to do it outside; otherwise we will dirty our room.” Whereas in CHCs residents usually get larger space in their apartment and don’t need to get out for housework anymore.

### **5.2.3 Influence of the change in living conditions**

Respondents report that some change of life style and living conditions influenced their behaviour in community outdoor spaces. A lot of respondents report disassembling,

cleaning and reassembling vent hoods in SHC outdoor spaces. This was also seen in my observation. This kind of work is dirty and takes a lot of room. It is reasonable to move it outside of one's dwelling. In CHCs, however, I don't see people cleaning vent hood in the outdoor space anymore. Respondents also state that they don't do that in commercial housing anymore. Some state, "Before, we had to do it. Now, we have professional maintenance for the vent hood. We don't need to do it anymore." One respondent says, "Our new vent hood is the maintenance-free type now."

Some respondents mentioned that they don't socialize as much in the outdoor space in CHCs. "After we got the TV, we spend a lot more time at home watching TV", one respondent reports. One other respondents mentions,

"When we were in the old place [in the SHC], the wiring system can not run the AC. So, we had to go outside of our apartment to get some wind when it is very hot on some summer nights. Now [in the CHC,] we can safely run AC and don't need to go out for some cool air anymore."

## 6 Conclusion

There are different behaviour patterns in SHC and CHC outdoor spaces according to this study. Generally, more people are observed in SHCs. There are also different activities in the outdoor spaces. Design of the spaces as well as the change of residents' living conditions has an effect on the behaviour patterns.

### *6.1 Different presence ratio in the spaces*

According to the collected data, the total presence ratio-people in outdoor space divided by community population in SHCs and CHCs is statistically different. The ratio in SHCs is significantly higher than the one in CHCs. There is also a difference in the ratio of residents in community outdoor spaces engaged in different activities. In SHC outdoor spaces, more people are walking, talking, and standing. There is no significant difference in the ratio of residents engaging in other activities including walking pets, sitting, biking and exercising among the two types of communities.

The study also shows that presence in the outdoor space does not relate to the distance it is from the nearest entrance. Features of a space do affect resident presence. Among the different type of spaces, furnished areas enjoy highest presence ratio. Following that are entrance areas. The next level of presence appears in areas connecting alleyways and furnished areas and spaces in front of apartment buildings. There is no significant difference between these two types of spaces. Then less presence appears in spaces

connecting two alleyways and between two lateral sides of buildings, with no significant difference between the two. According to the collected data, the least resident presence is in spaces between a community walls and an alleyway or between a community walls and a lateral side of a building have the least resident presence ratio. Again, there is no significant difference between these two types of spaces.

## ***6.2 Different behaviour patterns***

According to the observation and interview, there are different behaviour patterns in the outdoor space in SHCs and CHCs.

### **Doing housework in community outdoor spaces**

In SHCs, residents do various domestic tasks in community outdoor spaces. Some residents prepare food and do laundry around their extra sink in the outdoor spaces. Some others repair their bicycle and clean the vent hood etc. While doing housework, they also greet and talk to neighbours that pass by. In CHCs, hardly any resident does housework in the community outdoor spaces.

### **Sitting**

In SHCs, there are few benches furnished in the outdoor spaces. Residents take their own chair outside to sit in the outdoor space. In CHCs, there are usually substantial numbers of benches. The ones close by the exercising equipment are usually quite popular while some other benches seem under-used.



## **Children playing**

In the observation, there are more younger children, toddler and infants present in the outdoor spaces in CHCs. This seems a contradicting result with the general presence. There are some reasons for this. In the state-housing communities, outdoor spaces are mostly either concrete road pavement or fenced-off plantation. Younger children do not have a proper facility or space to play. The hard concrete pavement is not toddler or infant friendly. There is usually a children's playground in each CHC. The playgrounds are geared to young children, with the ground paved by rubber surface or sand. Toddlers and younger children can enjoy their games and at the same time play safely in children's playgrounds in CHCs. The outdoor spaces in CHCs have more green coverage, a large part of which is covered by grass. The soft surface is good playground for toddlers and infants. They can totter and stumble without risking hurting themselves.

### ***6.3 Respondents' view of reasons for the changes***

In the interviews, respondents are asked whether they think they changed behaviour patterns after they moved into CHCs. Their first response is usually defensive. A usual response would be, "[W]e have our own ways. No matter where we live, we keep our habit."

When the interview progresses and gets into more and more detail, it usually turns out that the respondents do have different behaviour patterns in the outdoor spaces of the two types of communities. As the respondents come to realize that they do behave differently in CHCs, they tend to attribute the changes to the alteration of the physical environments.

### **6.3.1 Changes in physical environments**

When they state that they interact with neighbours more in SHCs, they add explanations. Some claim that in SHCs, they take the stairways everyday. They easily meet with their neighbours on the stairways and thus naturally greet and chat with them. While in CHCs, they take elevators to go upstairs and downstairs. According to them, they don't have as much chance meeting neighbours as they used to and thus they communicate with neighbours a lot less.

Respondents also claim that they communicate with neighbours on the same floor quite often in SHCs as they "have to go by the neighbour's front door to get home." Also, respondents "do housework in the same area with neighbours of the same floor." In this way, they inevitably meet their neighbours on a frequent base. In CHCs, residents can always get to their own front door without going by any other households. Meanwhile, they report that in CHCs they no longer take housework outside of their households. All these according to the respondents make it difficult to meet neighbours on the same floor in CHCs.

### **6.3.2 Change of living conditions and lifestyles**

Respondents also report that the change of living conditions and lifestyle is also responsible for their change of behaviour in community outdoor spaces.

Residents state that in SHCs they have no space to do certain housework at home and have to go outside of their apartment. Their living conditions improve a lot in CHCs. They have larger space at home, with different rooms serving different functions. As a result, they can do housework in designated rooms and don't need to go outside for conducting the tasks anymore. At the same time, residents are relieved from certain domestic tasks. Maintenance of some household appliances is taken over by professionals. Household products are designed to be easier to maintain or maintenance-free.

Respondents also confirm that they spend more time at home while less time in the community outdoor spaces. The improvement of interior environment and facilities keeps them inside more. Air-conditioning home makes it unnecessary to go outside to get some breeze on a hot summer night; entertainment facilities such as television also keep residents inside more.

#### ***6.4 Appropriation of space and association with neighbours***

Although respondents emphasize the difference in the physical environments in the two kinds of communities when reasoning their change of behaviours, we cannot help noticing that there are also similarities in the two. In both environments, residents enter the communities via several entrances, pass some shared alleyways and get to their buildings. In the apartment buildings in CHCs, residents still have common space in front of elevators and share almost the same amount of, if not more, space with other households on the same floor. This is similar to the environments in SHCs. Why do residents feel and behave differently in the similar environments? Other factors rather

than the physical environments also have effect in the dynamics.

As found in other studies, appropriation of spaces creates stronger accord with the space and the people around it (Newman, 1995). Residents in this study also present generally more interaction with others in spaces where they have certain control. In SHCs, residents appropriate various spaces outside of their household. In the community alleyways, residents spontaneously occupy a piece of space for conducting domestic tasks. Any household could occupy an area in the outdoor space for its own uses on their own floor. This creates the sense of control and builds up accord over such spaces. In SHC apartment buildings, the stairways and the common space on each floor is usually the extension of room for households on the floor or in the building. In the shared area on each floor, residents do housework, place or store household articles temporarily or for a long term. This kind of occupation of space extends to the whole area on the floor and even to the stairways. The appropriation of spaces makes residents feel more comfortable to associate with each other. Such association among residents extends throughout the communities and enhances the interaction in the community outdoor spaces.

Compared to the spaces mentioned above in SHCs, the ones in CHCs are not appropriated by residents. The common spaces in CHCS remain clear from any intervention and are only for designated uses. In the open alleyways, I do not see any resident claiming an area for their domestic tasks; the common spaces inside of apartment buildings have no articles from any of the households in the building. These spaces are similar to the ones in SHCs, but are not appropriated by residents. In such unclaimed

spaces, residents are not active in communicating with each other.

The findings of this study show that there are different behaviour patterns in outdoor spaces in SHCs and CHCs. The differences are in the ratio of presence and number of people engaging in certain activities in outdoor spaces, as well as in the type of activities and the use of the spaces and furniture. The study also shows indications of what influences residents behaviour in community outdoor spaces. Factors include the layout of the community, the design of the physical environments including the furniture and the green spaces. The change of residents' life styles also has effect on the change of behaviour patterns in community outdoor spaces.

## **7 Discussion**

It is assumed that a quality residential environment should not only accommodate freedom for action and activities, adaptation and adjustment, but also encourage interaction among residents (Lay, 1997). This study reveals some relationship between the environments in SHCs and CHCs and residents' behaviour. These findings arouse further questions and indicate sensible recommendations.

In this chapter, I talk about the implications drawn from the study. I discuss issues including residents' perception of the outdoor spaces in the two types of communities, their values and expectations on their housing conditions, their attitudes towards certain behaviour in communities. Also, I talk about the possible problem following the decrease of communication in communities, the constraints in reality in housing project designs, and some recommendations for designing community environments that encourage interaction and activities.

### ***7.1 Residents' perception of community spaces and behaviour in communities***

After residents move into CHCs, they seem to abandon certain behaviour they used to have in SHCs such as placing household articles in the common areas or doing housework in community outdoor spaces. There may be different reasons for the change. First of all, there are clear regulations in the CHCs forbidding routines in SHCs such as

appropriating spaces outside of individual apartments or doing and hanging laundry in community outdoor spaces. Those rules are set up by the property managers and all the residents are to strictly comply with the rules. There are similar yet less strict rules in SHCs. The rules in SHCs are usually not closely monitored.

Secondly, residents in CHCs are more willing to obey the regulations and regard violations of the regulations disgraceful. Residents in SHCs, on the contrary, usually feel free not to respect such regulations. There is certain understanding among the residents that it is ok to use some common space for individual households.

Moreover, residents perceive the two kinds of environments differently. The designs of spaces give different messages to residents in terms of the purpose of the spaces. In SHCs, other than fenced off green areas, most outdoor spaces are cement-paved areas. One can easily read that the paved areas are mainly designated as alleyways yet with the possibility of multiple functions. Occupying some space for housework makes the space a working area. Placing chairs and sitting and chatting around one corner makes that corner a socializing milieu. The outdoor spaces in SHCs are quite flexible and versatile because of the less defined designing.

In CHCs, outdoor spaces are mostly carefully designated for different purposes. Green areas and grass pavement are clearly defined. Planned alley ways of different levels are also clearly seen in the communities. Smaller pathways are paved with stones and are usually in a curved design. In such environments, one will clearly read the designation of

spaces and follow the indications to a certain extent. For instance, people would not linger around and socialize in an alley way that is designed mainly for local circulation.

From the study we can see that the norms of how to behave in SHCs and CHCs are different. The property managers in CHCs establish the rules. Residents, after moving into CHCs, change their point of view about proper behaviour and follow the new rules. One question here is why the norms are changed in CHCs. Properties in CHCs are usually more valuable than the ones in SHCs. Would the changes be connected with the higher class of properties? Do people change their routines when they are financially well off? The other questions are: why the norms change into such ways; why higher property value is associated with less presence and use of outdoor spaces in community and less communication among residents.

## ***7.2 What the lost communication leads to***

According to the observation and interviews in this study, there is more communication among residents in SHCs than CHCs in general. In SHCs, a lot of communication takes place when residents are doing their housework and/or where they claim a piece of space in the communities by appropriating an area for housework or placing their household articles. In CHCs, residents keep the outdoor spaces the way they are designed and have little additional input in the environments. They also have little communication with neighbours in these kinds of areas unlike what they do in SHCs. Thus the socializing time accompanying the housework that taking place in community common spaces is decreased in CHCs. However, human beings' basic social needs-communication with



others and the sense of community-don't change because of new community environments. It thus brings up the question of where this kind of communication goes in CHCs. If it cannot be obtained in the community as it used to be in SHCs, where do residents get it or how can residents meet this basic social need? According to the responses in interviews, residents are aware of the decrease of communication yet do not feel the need to seek other resources to meet the social need. If this kind of decrease of communication is accepted, where would it lead to ultimately? Will residents change the nature of being a species of communication and abandon their ability and need for social connection?

The distance among residents in CHCs creates isolation in the environment. More and more residents will be alone in their individual households yet together in the same communities. For a certain population, this kind of isolation can cause problems. Elderly people, for example, are retired and live a less busy life. To them, social interaction with others is especially important. It is more difficult for the elderly to get connection with others when communities as their immediate social environment get less interactive.

### ***7.3 Who Decides on the Design of Community Environments***

This study shows that the large central open areas and formal landscaping in CHCs do not always attract people. If the design is not that practical, why are CHCs designed in this way? The commercial housing market and its operation have a lot of say here.

Developers invest in CHCs with maximized profit as their goal. The main concern of the design of CHCs would be whether it attracts customers and customers who would be

willing to buy the property.

In the current market, potential property buyers have certain expectations on their future properties. Individual customers and designers mention that indoor conditions of the apartments tend to be the most important for buyers. Factors like the space and light in the interior of apartments are the major concerns. Other than that, there is no obvious expectation for the areas like outdoor space in the communities. Developers thus use the planned large central green areas and careful landscaping to enhance the design theme of the housing projects and represent the quality of the project.

When it comes to making a purchase, customers usually carefully examine the interior design of the apartments and plan their use of space inside. They usually also look at the representation of the exterior of the apartment buildings and the outdoor spaces in the community as a part of the whole housing project. Potential buyers don't seem to examine the usage of outdoor space, however. Developers and planners comment that the goal of the design of CHC outdoor spaces is mainly representation. Thus we have the absence of concern about how residents can use the space and how to accommodate communication among residents in communities. These factors hand-in-hand lead to the specific way of designing and landscaping of CHCs.

#### ***7.4 Recommendations on Design of Community Spaces***

Residents that moved into CHCs already develop different patterns of behaviour in outdoor spaces and have less communication with each other. Social interaction is not as

vibrant compared to SHCs. What can we do to regain the vitality of social life in community outdoor spaces? What can we do to encourage communication among residents? Planning of the environment is possible to influence behaviour patterns and create more lively environments and accommodate interactions among residents (Gehl, 1987). We can learn from the existing examples in SHC environments and create such spaces in CHCs.

As shown in this study, certain areas in community outdoor spaces attract higher presence and more activities and interactions. Communication in communities is more vibrant when people have control of outdoor spaces (Lay, 1997). In SHCs, a lot of interaction occurs in areas where residents can appropriate space to certain extent. In CHCs, however, managerial control and residents' perceptions prevent such occupation of space. We need to seek other ways to facilitate interaction among residents.

There are also other examples from this study. Some significantly vibrant areas are furnished with exercising equipment and the surrounding areas with benches. These spaces share some common features. They offer facilities that serve purposes practical to local residents. They are usually combined with other furniture and become a greater attractor.

We can consider design of some usable spaces in front of each building. Some possibility could be a paved ground with some stools and some tables where people can relax and do some housework on the table. As observed in SHCs, residents use space in front of their

building and have vibrant interaction with others on the spot. We can program some space where residents can conduct some household function or social activities. If residents have such facilities with easy access, they would be happy to informally extend their working and socializing space.

Another suggestion could be designing some common space in the hallway of each building. As reported in the interviews, residents have a lot of interaction inside of the buildings among neighbours. Respondents also claim that the design of the space in CHCs prevents them from meeting their neighbours as easily as in SHCs. If we can design some space in the building and facilitate such communication, presumably residents will reactivate their interaction. We can set up an area in the hallways with simple furniture such as benches and indoor plants. Residents can clearly read the design that these are designated and well maintained areas for their use. This kind of areas provides a buffer zone between the outdoor spaces in communities and the private territory of individual households. They are connected closely with residents' own properties yet at the same time situated at a distance from their private space. Residents in the building would be comfortable in associating with others in such areas. All these factors would encourage communication among residents in the communities.

As shown in other studies, residents' input in community planning is efficient and helpful in community planning (García-Ramon et al., 2004; Robbie, 2001). I also recommend encouraging residents in CHCs to make suggestion to property managers. As the direct user of the community outdoor space, residents' opinion should be heard and their

suggestion may well be practical and realistic.

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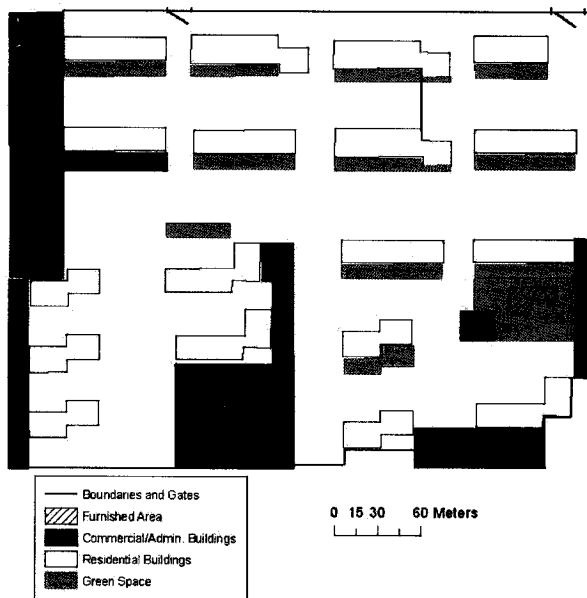
## 9 Appendices

### 9.1 Figures

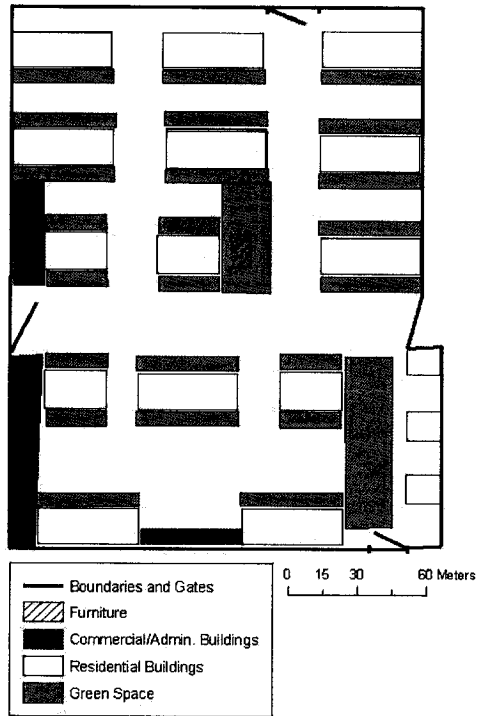


1. Changyi 2. Ercun 3. Sicun 4. Jinshanghai 5. Xiandai 6. Jialu  
Image Source: [www.autumnleaves.com.cn/shanghai-map/shanghai-map.htm](http://www.autumnleaves.com.cn/shanghai-map/shanghai-map.htm)

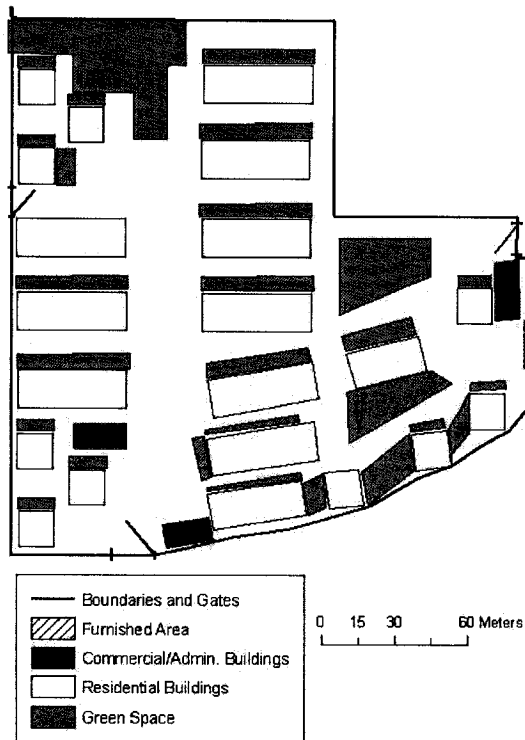
**Figure 1: Sites Distribution in Shanghai Urban Area**



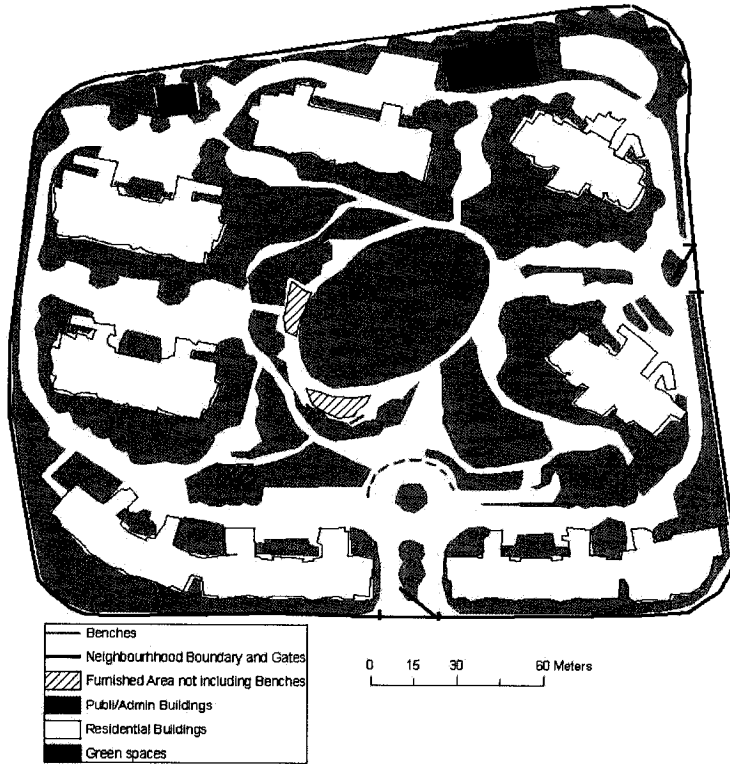
**Figure 2: Changyi Community plan**



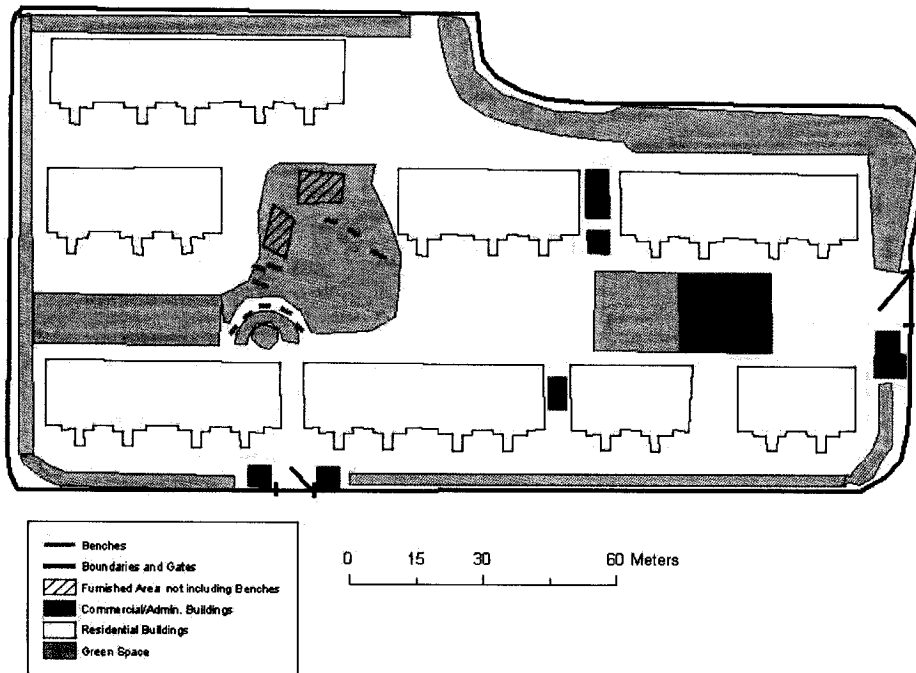
**Figure 3: Ercun Community Plan**



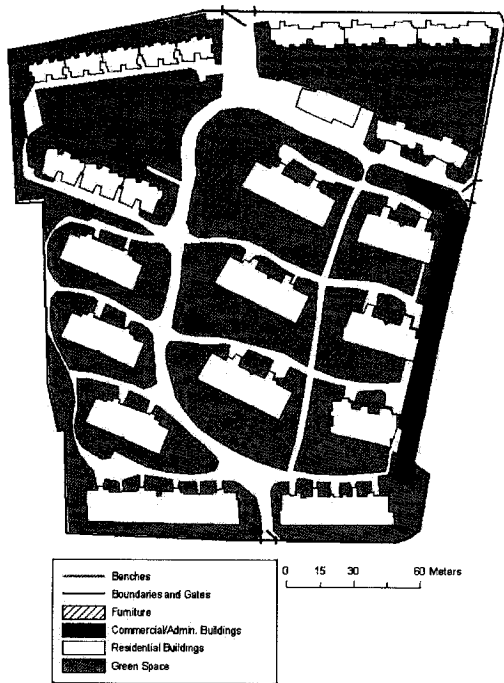
**Figure 4: Sicun Community Plan**



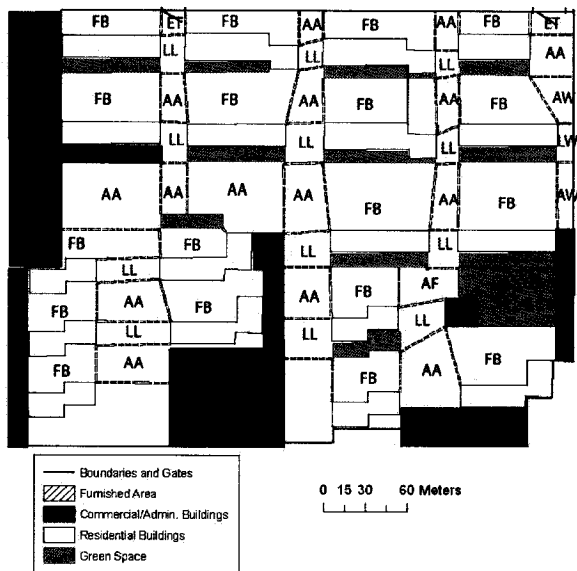
**Figure 5: Jinshanghai Community Plan**



**Figure 6: Jialu Community Plan**



**Figure 7: Xiandai Community Plan**



**Figure 8: Grid Division of Changyi**

## 9.2 Images



**Image 1: Stone Stools in SHCs**

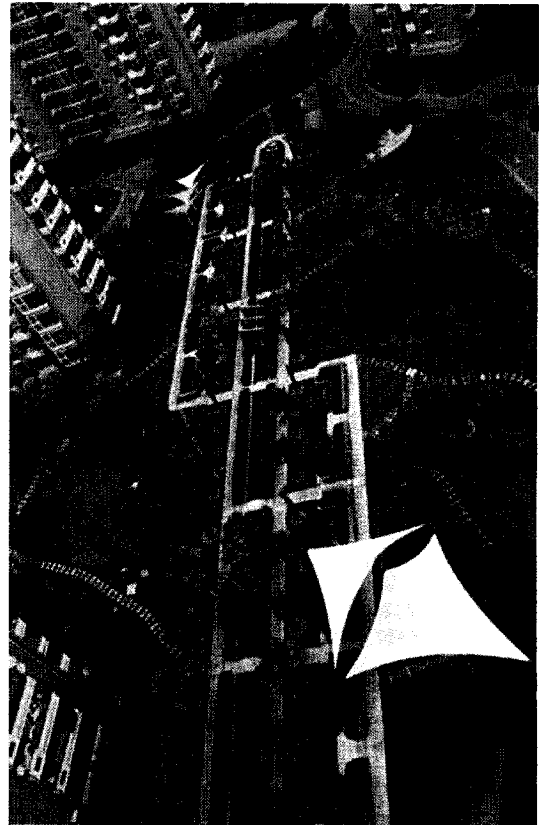


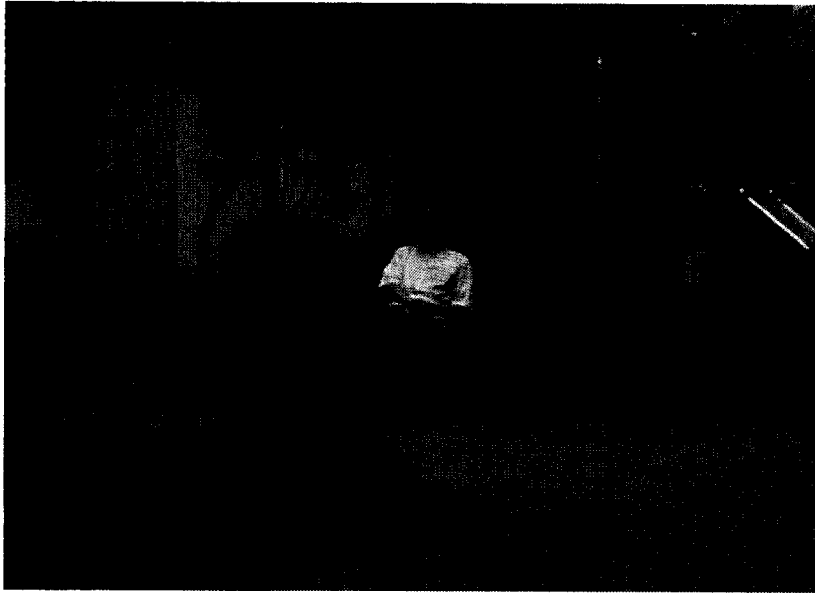
**Image 2: Benches in Xiandai, a CHC**



**Image 3: Benches and Landscape in JiaLu, a CHC.**

**Image 4: A CHC Green Space Seen From Above**





**Image 5: Green Space in SHCs - Boundaries**



**Image 6: Green Space in CHCs**

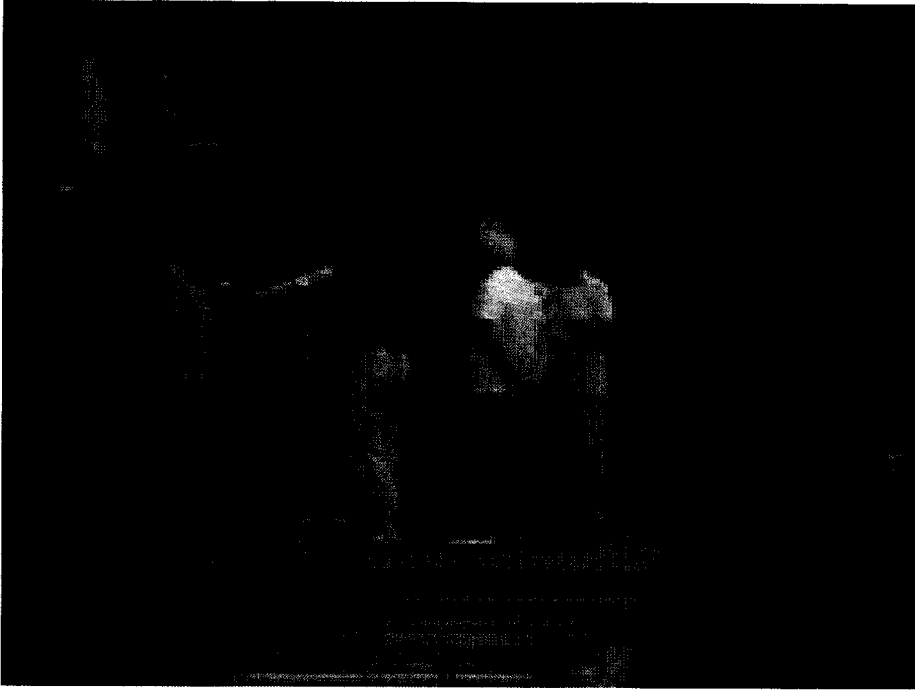


**Image 7: Children's Playground in CHCs**



**Image 8: Exercising, Socializing and Sitting around Exercise Equipment in Ercun**





**Image 9: Exercising and Socializing around Exercise Equipment in Ercun**



**Image 10: Exercising Socializing around Equipment in Jinshanghai**



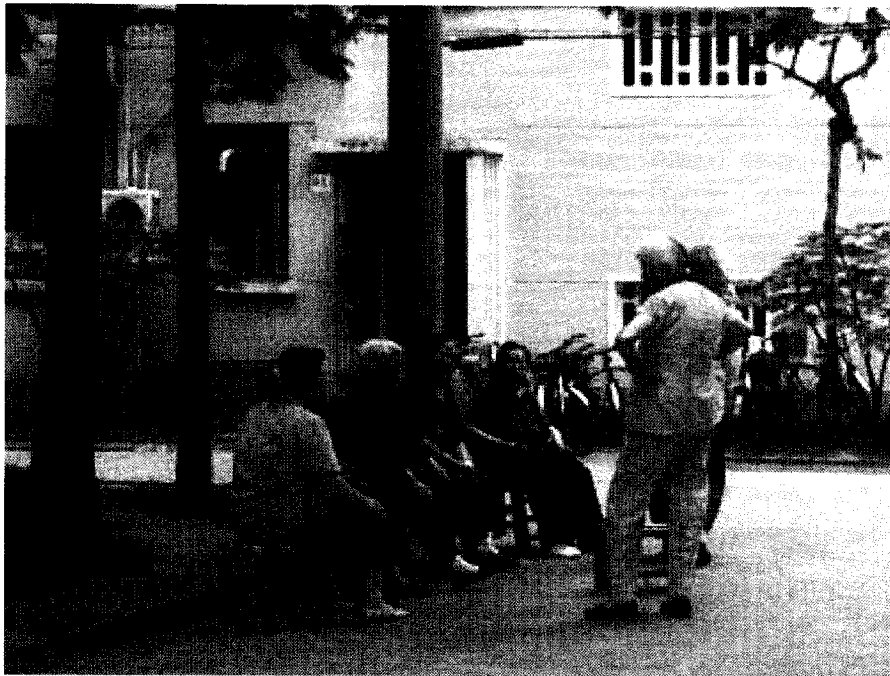
**Image 11: Adults and Children Around Adults Exercise Equipment in Xiandai**



**Image 12: Adults Holding young Children in Ercun**



**Image 13: Adults and Children in Children's Playground in Jialu**



**Image 14: Sitting in Ercun**



**Image 15: Rooftop Garden in Xiandai**

### 9.3 Tables

**Table\* 1: T-Test of Higher Presence in SHCs than CHCs**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	27
Sample Mean	0.036
Sample Standard Deviation	0.0118
Population 2 Sample	
Sample Size	20
Sample Mean	0.0289
Sample Standard Deviation	0.0085
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	26
Population 2 Sample Degrees of Freedom	19
Total Degrees of Freedom	45
Pooled Variance	0.000111
Difference in Sample Means	0.0071
t Test Statistic	2.284716
Upper-Tail Test	
Upper Critical Value	1.679427
p-Value	0.013548
Reject the null hypothesis	

**Table 2: T-test of Higher Participation in Walking in SHCs**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	15
Sample Mean	0.018569
Sample Standard Deviation	0.010068
Population 2 Sample	
Sample Size	15
Sample Mean	0.008837
Sample Standard Deviation	0.004732

Intermediate Calculations	
Population 1 Sample Degrees of Freedom	14
Population 2 Sample Degrees of Freedom	14
Total Degrees of Freedom	28
Pooled Variance	6.19E-05
Difference in Sample Means	0.009732
t Test Statistic	3.388159

Upper-Tail Test	
Upper Critical Value	1.70113
p-Value	0.001053
Reject the null hypothesis	

\* Population 1 is Residents in SHCs;  
Population 2 is Residents in SHCs;

**Table 3: T-test of Higher Participation in Talking in SHCs**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1* Sample	
Sample Size	15
Sample Mean	0.006914
Sample Standard Deviation	0.002117
Population 2** Sample	
Sample Size	15
Sample Mean	0.003964
Sample Standard Deviation	0.00263

Intermediate Calculations	
Population 1 Sample Degrees of Freedom	14
Population 2 Sample Degrees of Freedom	14
Total Degrees of Freedom	28
Pooled Variance	5.7E-06
Difference in Sample Means	0.00295
t Test Statistic	3.384092

Upper-Tail Test	
Upper Critical Value	1.70113
p-Value	0.001064
Reject the null hypothesis	

**Table 4: T-test of Higher Participation in Standing in SHCs**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	15
Sample Mean	0.004015
Sample Standard Deviation	0.002154
Population 2 Sample	
Sample Size	15
Sample Mean	0.002091
Sample Standard Deviation	0.002099

Intermediate Calculations	
Population 1 Sample Degrees of Freedom	14
Population 2 Sample Degrees of Freedom	14
Total Degrees of Freedom	28
Pooled Variance	4.52E-06
Difference in Sample Means	0.001924
t Test Statistic	2.477616

Upper-Tail Test	
Upper Critical Value	1.70113
p-Value	0.009764
Reject the null hypothesis	

**Table 5: T-test of Higher Participation in Children Playing in CHCs**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	15
Sample Mean	0.002757
Sample Standard Deviation	0.001907
Population 2 Sample	
Sample Size	15
Sample Mean	0.004916
Sample Standard Deviation	0.003326

Intermediate Calculations	
Population 1 Sample Degrees of Freedom	14
Population 2 Sample Degrees of Freedom	14
Total Degrees of Freedom	28
Pooled Variance	7.35E-06
Difference in Sample Means	-0.00216
<i>t</i> Test Statistic	-2.181

Lower-Tail Test	
Lower Critical Value	-1.70113
<i>p</i> -Value	0.018871
Reject the null hypothesis	

**Table 6: Correlation Between Distance and Presence**

<i>Regression Statistics</i>	
Multiple R	0.154123
R Square	0.023754
Adjusted R Square	0.02279
Standard Error	5.011923
Observations	1015

**Table 7: Correlation Between Distance and Presence Excluding Furnished Areas**

<i>Regression Statistics</i>	
Multiple R	0.184468549
R Square	0.034028645
Adjusted R Square	0.033001016
Standard Error	3.104589486
Observations	942

**Table 8: T-Test of Presence in AA lower than AF**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	200
Sample Mean	1.68
Sample Standard Deviation	2.22
Population 2 Sample	
Sample Size	45
Sample Mean	2.95
Sample Standard Deviation	4.56
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	199
Population 2 Sample Degrees of Freedom	44
Total Degrees of Freedom	243
Pooled Variance	7.801111111
Difference in Sample Means	-1.27
t Test Statistic	2.755901567
Lower-Tail Test	-
Lower Critical Value	1.651148402
p-Value	0.003148323
Reject the null hypothesis	

**Table 9: T-Test of Presence in AA lower than F**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	200
Sample Mean	1.68
Sample Standard Deviation	2.22
Population 2 Sample	
Sample Size	70
Sample Mean	11.39
Sample Standard Deviation	12.14
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	199
Population 2 Sample Degrees of Freedom	69
Total Degrees of Freedom	268
Pooled Variance	41.60427
Difference in Sample Means	-9.71
t Test Statistic	-10.8401
Lower-Tail Test	
Lower Critical Value	-1.65056
p-Value	3.04E-23
Reject the null hypothesis	



**Table 10: T-Test of Presence in AA lower than ET**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	200
Sample Mean	1.68
Sample Standard Deviation	2.22
Population 2 Sample	
Sample Size	75
Sample Mean	5.97
Sample Standard Deviation	5.48
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	199
Population 2 Sample Degrees of Freedom	74
Total Degrees of Freedom	273
Pooled Variance	11.73261
Difference in Sample Means	-4.29
<i>t</i> Test Statistic	-9.24995
Lower-Tail Test	
Lower Critical Value	-1.65045
<i>p</i> -Value	3.36E-18
Reject the null hypothesis	

**Table 11: T-Test of Presence in AA lower than AW**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	200
Sample Mean	1.68
Sample Standard Deviation	2.22
Population 2 Sample	
Sample Size	65
Sample Mean	0.98
Sample Standard Deviation	1.75
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	199
Population 2 Sample Degrees of Freedom	64
Total Degrees of Freedom	263
Pooled Variance	4.474341
Difference in Sample Means	0.7
<i>t</i> Test Statistic	2.317834
Upper-Tail Test	
Upper Critical Value	1.650668
<i>p</i> -Value	0.010613
Reject the null hypothesis	

**Table 12: T-Test of Presence in LL lower than LW**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	140
Sample Mean	2.05
Sample Standard Deviation	2.75
Population 2 Sample	
Sample Size	55
Sample Mean	0.74
Sample Standard Deviation	1.21
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	139
Population 2 Sample Degrees of Freedom	54
Total Degrees of Freedom	193
Pooled Variance	5.856211917
Difference in Sample Means	1.31
<i>t</i> Test Statistic	3.401660449
Upper-Tail Test	
Upper Critical Value	1.652787069
<i>p</i> -Value	0.000407062
Reject the null hypothesis	

**Table 13: T-Test of Presence in LL lower than LW**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	140
Sample Mean	2.05
Sample Standard Deviation	2.75
Population 2 Sample	
Sample Size	55
Sample Mean	0.74
Sample Standard Deviation	1.21
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	139
Population 2 Sample Degrees of Freedom	54
Total Degrees of Freedom	193
Pooled Variance	5.856211917
Difference in Sample Means	1.31
<i>t</i> Test Statistic	3.401660449
Upper-Tail Test	
Upper Critical Value	1.652787069
<i>p</i> -Value	0.000407062
Reject the null hypothesis	

**Table 14: T-Test of Presence in FB higher than LW**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	365
Sample Mean	2.78
Sample Standard Deviation	3.24
Population 2 Sample	
Sample Size	55
Sample Mean	0.74
Sample Standard Deviation	1.21
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	364
Population 2 Sample Degrees of Freedom	54
Total Degrees of Freedom	418
Pooled Variance	9.330593
Difference in Sample Means	2.04
t Test Statistic	4.6172
Upper-Tail Test	
Upper Critical Value	1.648507
p-Value	2.59E-06
Reject the null hypothesis	

**Table 15: T-Test of Presence in FB higher than LL**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	365
Sample Mean	2.78
Sample Standard Deviation	3.24
Population 2 Sample	
Sample Size	140
Sample Mean	2.05
Sample Standard Deviation	2.75
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	364
Population 2 Sample Degrees of Freedom	139
Total Degrees of Freedom	503
Pooled Variance	9.686509
Difference in Sample Means	0.73
t Test Statistic	2.359413
Upper-Tail Test	
Upper Critical Value	1.647889
p-Value	0.009343
Reject the null hypothesis	

**Table 16: T-Test of Presence in F higher than LW**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	70
Sample Mean	11.39
Sample Standard Deviation	12.14
Population 2 Sample	
Sample Size	55
Sample Mean	0.74
Sample Standard Deviation	1.21
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	69
Population 2 Sample Degrees of Freedom	54
Total Degrees of Freedom	123
Pooled Variance	83.31914
Difference in Sample Means	10.65
<i>t</i> Test Statistic	6.475191
Upper-Tail Test	
Upper Critical Value	1.657336
<i>p</i> -Value	1.02E-09
Reject the null hypothesis	

**Table 17: T-Test of Presence in F higher than LL**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	70
Sample Mean	11.39
Sample Standard Deviation	12.14
Population 2 Sample	
Sample Size	140
Sample Mean	2.05
Sample Standard Deviation	2.75
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	69
Population 2 Sample Degrees of Freedom	139
Total Degrees of Freedom	208
Pooled Variance	53.94413
Difference in Sample Means	9.34
<i>t</i> Test Statistic	8.687167
Upper-Tail Test	
Upper Critical Value	1.652212
<i>p</i> -Value	5.52E-16
Reject the null hypothesis	

**Table 18: T-Test of Presence in F higher than FB**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	70
Sample Mean	11.39
Sample Standard Deviation	12.14
Population 2 Sample	
Sample Size	365
Sample Mean	2.78
Sample Standard Deviation	3.24
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	69
Population 2 Sample Degrees of Freedom	364
Total Degrees of Freedom	433
Pooled Variance	32.31020508
Difference in Sample Means	8.61
<i>t</i> Test Statistic	11.60871416
Upper-Tail Test	
Upper Critical Value	1.648380312
<i>p</i> -Value	1.3006E-27
Reject the null hypothesis	

**Table 19: T-Test of Presence in ET higher than LW**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	75
Sample Mean	5.97
Sample Standard Deviation	5.48
Population 2 Sample	
Sample Size	55
Sample Mean	0.74
Sample Standard Deviation	1.21
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	74
Population 2 Sample Degrees of Freedom	54
Total Degrees of Freedom	128
Pooled Variance	17.97899
Difference in Sample Means	5.23
<i>t</i> Test Statistic	6.947992
Upper-Tail Test	
Upper Critical Value	1.656845
<i>p</i> -Value	8.4E-11
Reject the null hypothesis	

**Table 20: T-Test of Presence in ET higher than LL**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	75
Sample Mean	5.97
Sample Standard Deviation	5.48
Population 2 Sample	
Sample Size	140
Sample Mean	2.05
Sample Standard Deviation	2.75
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	74
Population 2 Sample Degrees of Freedom	139
Total Degrees of Freedom	213
Pooled Variance	15.36825
Difference in Sample Means	3.92
<i>t</i> Test Statistic	6.987942
Upper-Tail Test	
Upper Critical Value	1.652039
<i>p</i> -Value	1.76E-11
Reject the null hypothesis	

**Table 21: T-Test of Presence in ET higher than FB**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	75
Sample Mean	5.97
Sample Standard Deviation	5.48
Population 2 Sample	
Sample Size	365
Sample Mean	2.78
Sample Standard Deviation	3.24
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	74
Population 2 Sample Degrees of Freedom	364
Total Degrees of Freedom	438
Pooled Variance	13.79766
Difference in Sample Means	3.19
<i>t</i> Test Statistic	6.773898
Upper-Tail Test	
Upper Critical Value	1.64834
<i>p</i> -Value	2.03E-11
Reject the null hypothesis	

**Table 22: T-Test of Presence in ET Lower than F**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	75
Sample Mean	5.97
Sample Standard Deviation	5.48
Population 2 Sample	
Sample Size	70
Sample Mean	11.39
Sample Standard Deviation	12.14
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	74
Population 2 Sample Degrees of Freedom	69
Total Degrees of Freedom	143
Pooled Variance	86.65344
Difference in Sample Means	-5.42
<i>t</i> Test Statistic	-3.5035
Lower-Tail Test	
Lower Critical Value	-1.65558
<i>p</i> -Value	0.000307
Reject the null hypothesis	

**Table 23: T-Test of Presence in AW lower LL**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	65
Sample Mean	0.98
Sample Standard Deviation	1.75
Population 2 Sample	
Sample Size	140
Sample Mean	2.05
Sample Standard Deviation	2.75
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	64
Population 2 Sample Degrees of Freedom	139
Total Degrees of Freedom	203
Pooled Variance	6.143781
Difference in Sample Means	-1.07
<i>t</i> Test Statistic	-2.87614
Lower-Tail Test	
Lower Critical Value	-1.65239
<i>p</i> -Value	0.002228
Reject the null hypothesis	

**Table 24: T-Test of Presence in AW lower than FB**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	65
Sample Mean	0.98
Sample Standard Deviation	1.75
Population 2 Sample	
Sample Size	365
Sample Mean	2.78
Sample Standard Deviation	3.24
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	64
Population 2 Sample Degrees of Freedom	364
Total Degrees of Freedom	428
Pooled Variance	9.385809
Difference in Sample Means	-1.8
<i>t</i> Test Statistic	-4.36421
Lower-Tail Test	
Lower Critical Value	-1.64842
<i>p</i> -Value	8.01E-06
Reject the null hypothesis	

**Table 25: T-Test of Presence in AW Lower than F**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	65
Sample Mean	0.98
Sample Standard Deviation	1.75
Population 2 Sample	
Sample Size	70
Sample Mean	11.39
Sample Standard Deviation	12.14
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	64
Population 2 Sample Degrees of Freedom	69
Total Degrees of Freedom	133
Pooled Variance	77.93378
Difference in Sample Means	-10.41
<i>t</i> Test Statistic	-6.84584
Lower-Tail Test	
Lower Critical Value	-1.65639
<i>p</i> -Value	1.27E-10
Reject the null hypothesis	



**Table 26: T-Test of Presence in AW lower than ET**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	65
Sample Mean	0.98
Sample Standard Deviation	1.75
Population 2 Sample	
Sample Size	75
Sample Mean	5.97
Sample Standard Deviation	5.48
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	64
Population 2 Sample Degrees of Freedom	74
Total Degrees of Freedom	138
Pooled Variance	17.52355
Difference in Sample Means	-4.99
<i>t</i> Test Statistic	-7.03417
Lower-Tail Test	
Lower Critical Value	-1.65597
<i>p</i> -Value	4.26E-11
Reject the null hypothesis	

**Table 27: T-Test of Presence in AF lower than AW**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	45
Sample Mean	2.95
Sample Standard Deviation	4.56
Population 2 Sample	
Sample Size	65
Sample Mean	0.98
Sample Standard Deviation	1.75
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	44
Population 2 Sample Degrees of Freedom	64
Total Degrees of Freedom	108
Pooled Variance	10.28628148
Difference in Sample Means	1.97
<i>t</i> Test Statistic	3.167405136
Upper-Tail Test	
Upper Critical Value	1.659085144
<i>p</i> -Value	0.001000027
Reject the null hypothesis	

**Table 28: T-Test of Presence in AA higher than AW**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	200
Sample Mean	1.68
Sample Standard Deviation	2.22
Population 2 Sample	
Sample Size	55
Sample Mean	0.74
Sample Standard Deviation	1.21
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	199
Population 2 Sample Degrees of Freedom	54
Total Degrees of Freedom	253
Pooled Variance	4.188984
Difference in Sample Means	0.94
<i>t</i> Test Statistic	3.016475
Upper-Tail Test	
Upper Critical Value	1.650899
<i>p</i> -Value	0.001409
Reject the null hypothesis	

**Table 29: T-Test of Presence in AA lower than FB**

Data	
Hypothesized Difference	0
Level of Significance	0.05
Population 1 Sample	
Sample Size	200
Sample Mean	1.68
Sample Standard Deviation	2.22
Population 2 Sample	
Sample Size	365
Sample Mean	2.78
Sample Standard Deviation	3.24
Intermediate Calculations	
Population 1 Sample Degrees of Freedom	199
Population 2 Sample Degrees of Freedom	364
Total Degrees of Freedom	563
Pooled Variance	8.529091
Difference in Sample Means	-1.1
<i>t</i> Test Statistic	-4.28133
Lower-Tail Test	
Lower Critical Value	-1.64756
<i>p</i> -Value	1.09E-05
Reject the null hypothesis	