



The
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**Research on the Interaction between Ageing People and Urban Open Space
in Chinese Cities – A Case Study of Beijing, China**

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Abstract

This research has aimed to produce a comprehensive and effective conceptual framework which can be applied to urban open space design in Chinese cities, in order to improve the well-being and quality of life of their elderly people. Open space around residential communities contributes to the well-being of elderly people. The benefits of urban open space have been evidenced by many studies, but few of these focus on their psychological benefits. Inadequate understanding of the ways in which they can generate psychological satisfaction can lead to difficulty in making effective improvements in design for the ageing population. This research has four objectives:

1. To develop the nature of physical, and psychological dimensions relevant to the relationship ageing people have with open space and bring this understanding into a conceptual framework.
2. To test the initial conceptual framework and to analyse the way it works in relation to people in Beijing.
3. To reflect on the use of the initial conceptual framework, and revise it in light of the academic literature.
4. To make open space design recommendations focused on the social and perceptual dimensions of open space to promote the quality of life and wellbeing of the elderly.

The first objective has been achieved by producing the initial conceptual framework, addressing the ways in which people, place, behaviour, emotional bonding and wellbeing impact upon psychological issues. This, in turn, determined the approaches and indicators employed in the methods used in this research, for example the mixed-method combination of quantitative and qualitative approaches with a questionnaire, semi-structured interview, observation and mapping which were applied to the investigation of five neighbourhood parks in Beijing. The second objective was achieved in three steps. The first tested the associations in the initial conceptual framework to discover the internal structure and key features of their relationships by using descriptive statistics, Goodman and Kruskal's gamma correlation test, and comparative analysis based on the data from questionnaires and some indicators from the semi-structured interviews. The second part produced a behaviour map of ageing people based on observation and mapping. The third part uncovered features of usage, desire and thought of the elderly people, based on both observation and semi-structured interviews. The third objective was achieved by integrating the findings on the perceptual, behavioural, social and physical dimensions which emerged from the study carried out in accord with the second objective. The gap between the current state of neighbourhood parks and the desires of the elderly people who use them was identified by comparing observations of their behaviour and their thoughts as revealed in their semi-structured interviews. The final objective was achieved by decisions based on the predictions of the final conceptual framework and the gap identified in third objective.

This research has produced five main contributions to the field of urban neighbourhood park and urban open space design, addressing its social and perceptual dimensions including both theoretical development and practical application. The first illustrates the associations between physical, social, and perceptual dimensions of neighbourhood park and psychological, behavioural, personal dimensions of the elderly which can fill the gap existing within the literature review of people-place relationship in social and perceptual dimension. The second is that it has uncovered the differences in performance in psychological, social, perceptual and behavioural dimensions of ageing people, in terms of both gender and ageing steps, filling the gap in studies of older people using urban space. This can help designers to meet the various different desires of the target group. The third contribution is that it exposes the gap between the desires of elderly people and the current environment of the neighbourhood parks in a way which may help designers and planners to find a more effective direction for ageing friendly design. The fifth contribution is the proposal of a conceptual framework for understanding the qualities of attractiveness in neighbourhood parks and in the group activities offered to elderly people there, helping designers to engage with the elderly, so that they can use neighbourhood parks to improve their quality of life and well-being.

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Fundamentality of the research

Chapter 1 Introduction

1.1 Research background

Ageing population is a global challenge, in 2017, there were 962 million people aged 60 and over globally, more than twice as many as in 1980, when there were 382 million older people worldwide.(United Nations , Department of Economic and Social Affairs, 2017) The number of older persons is expected to double again by 2050, when it is expected to reach nearly 2.1 billion. Two thirds of the world's older people live in developing regions, where their numbers are growing faster than in developed countries. By 2050, it is projected that nearly 8 out of every 10 older people in the world will live in developing regions.

China, a developing country, officially entered the ageing era in 1999. Based on the sixth national population census in 2010 (the latest data), by 2015 there will be 216 million senior citizens over 60 in China, accounting for 16.7% of the total population. People over 65 years old are forecast to reach 300 million, while those over 60 years old are forecast to reach 430 million, 30 per cent of the whole population. The Circular of the State Council (2017), 'On issuing the 13th Five-Year National Plan for Developing Undertakings for the Elderly and Establishing the Elderly Care System', reported that the current situation is challenging. It is estimated that by 2020, the number of elderly people over the age of 60 will increase to around 255 million, accounting for 17.8% of the total population; the number of elderly will increase to 29 million, and the number of elderly living alone and in an empty nest (a description of their position when their children have grown up and left home) will increase to 1.18 m. For about 100 million people, the old-age dependency ratio will increase to about 28% and social security expenditure for the elderly will continue to grow. (Central Compilation & Translation Bureau, 2015) The elderly are the largest 'fragile' group in China, so their health and care is one of the most prominent problems for society. Actively responding to the ageing of the population requires efforts to improve the health expectations and self-care abilities of all citizens in their old age, to minimise the negative effects of population ageing and improve the quality of life of the elderly while maintaining the vitality of economic and social development.

Population ageing has a significant impact on all spheres of society, particularly in the construction of the living environment, which is of particular relevance to older persons. Therefore, the study of outdoor activity sites for the elderly in residential areas is particularly important today, when the trend towards ageing is becoming more and more evident.

1.2 The significance

The results of this study have very important and far-reaching implications for the construction of age-friendly cities and the maintenance and improvement of the physical and mental health and well-being of the elderly. The implications of the study are set out below on three levels.

The first is the importance of design guidance for age-friendly urban spaces. At present, domestic research on outdoor activity venues for the elderly mainly focuses on the qualitative research on the outdoor environment for the elderly, such as studies have shown that outdoor activity venues for the elderly have special design requirements in terms of safety and comfort. (J. L. Wang, W. Tang, L., 2012) However, at this stage, there is a lack of research on the size of outdoor spaces for older persons, and

the size of outdoor spaces for older persons is vague in existing norms. For example, in the "Planning and Design Code for Urban Residential Areas" issued by the Ministry of Construction in 2002, activity areas for the elderly, together with basketball, volleyball, mini-ball and children's activity areas, are generally categorized as residents' fitness facilities, and there is no separate list of outdoor activity areas for the elderly, nor is there any clear regulation or guiding recommendation on their total size or the size of various types of areas. The lack of scale studies has contributed to a certain extent to the inappropriate scale of the actual design and construction of outdoor activity sites for the elderly, or the inappropriate proportion of the various types of activity sites.

The second is the importance of positive contributions to the health and mental health of the growing number of older people themselves. The lack of research on the mental health concerns of older people and the impact of site activity psychology and excitement has resulted in a lack of effective theoretical support for government guidance and design measures, which not only affects the effectiveness of policy interventions and design, but also delays the goal of helping older people maintain their physical and mental health.

Therefore, people-oriented research requires a comprehensive understanding and excavation of the culture and memory of the local population. In addition to the global issues surrounding loneliness, bereavement, retirement and the transformation of social status, the Chinese elderly have distinctive characteristics, such as a sense of filial piety rooted in culture, a sense of community based on the memory of the times, dependence on children due to the one-child policy, intergenerational upbringing and the migration of urban elderly. These have shaped the preferences and perceptions of the Chinese elderly in the use of urban space, in terms of behavioural activities and psychological and social satisfaction.

The third is the importance of a macro perspective for proactive and anticipatory guidance on proactive adaptation to ageing in China's rapid urbanization process. Ageing has been accompanied by rapid urbanization in China, a developing country that has seen its urbanization rate rise from 47.8% in 2010 to 60% by 2020. This shows that there is still a lot of room for planning and implementation of ageing-friendly cities in the process of urbanization, and the lack of theoretical support will seriously affect the effectiveness of active ageing policies and the long-term quality of life of the future elderly. This makes the study of the interaction between the elderly and urban public spaces in China very urgent.

The contributions of this study have great short-term significance for the implementation of age-friendly urban construction in the urbanisation of the future, and long-term far-reaching significance for active aging in urban regeneration. For the theoretical research on aging in China, which has a late start, this study has laid a solid theoretical foundation for the design research and theoretical study of urban aging in China in the future, provided a methodological framework and theoretical framework, and made a guiding and forward-looking development for further enhancing the sense of well-being brought by the use of urban space for the elderly. At the same time, although this study focuses on the general context of the elderly in China, it is still relevant to the urban space design in other countries that also face the challenge of ageing, and has pioneering value for theoretical research.

1.3 The motivation

High levels of physical inactivity are of concern as they contribute to many major health problems, including cardiovascular disease, cancer and obesity. Mytton, Townsend, Rutter, and Foster (2012) One approach to tackling this challenge is to use green space, so physical activities in green space have been

widely studied. (Akpinar, Barbosa-Leiker, & Brooks, 2016; McFarland, Waliczek, & Zajicek, 2008; R. J. Mitchell, Richardson, Shortt, & Pearce, 2015; Richardson & Mitchell, 2010; Van Dillen, de Vries, Groenewegen, & Spreeuwenberg, 2012) Green space not only benefits general health, but also contributes to positive well-being and psychological health outcomes, improving self-esteem and mood. (Barton & Pretty, 2010; R. J. Mitchell et al., 2015; S. J. Park, Jeon, Kim, Kim, & Roh, 2014) Based on a systematic review of activity and design of outdoor spaces, Thompson (2013, p. 92) argued that two questions arise: ‘what are the kinds of environments that attract different people to be active, and what kinds of activities do people want or aspire to do?’ How to engage the elderly to use urban open spaces is the issue of concern addressed here.

The scope of the problem can be identified as:

- The urgent need for contributions to improve the well-being and quality of life of the elderly;
- Insufficient study of how to engage the elderly in using urban open space in order to maintain both their general and mental health.

Clarification of the relationship between the elderly and urban open space is a necessary basis on which to improve their quality of life and well-being. The association between the physical characteristics of urban open space including size, type, design features, the components of parks and the levels of health and of physical activity within them have been investigated in a number of studies. (Akpinar, 2016; Gomez et al., 2010; Jones, Hillsdon, & Coombes, 2009; Mytton et al., 2012) But as Moulay et al. (2018) said, ‘while most findings benefit urban designers in making parks and public spaces more visually and physically functional, the impact of this quality on users’ psychological sense and well-being has not been adequately explored in the literature.’ Urban open space is a comprehensive whole, of which the physical is one dimension, and there is limited research on the multiple dimensions of urban open space in relation to the elderly. This risks losing the charm of open spaces and missing opportunities to improve the elderly’s quality of life by engaging them in design interventions.

The scope of this problem can be identified as:

- There is a lack of an integrated understanding of the multi-dimensional urban open space complex, which is not just a comprehensive description, but an understanding of the functioning and composition of its systems.
- The imbalance in the development of research across dimensions is far less significant for the social and perceptual dimensions than for the visual ones, even though they are critical for the impact on human perception.

1.4 Research aim and objective

This research aims to present a comprehensive and effective conceptual framework to guide the design of urban open spaces in Chinese cities, in order to improve the quality of life of ageing people.

This is achieved by addressing four research objectives:

1. To develop an understanding of the nature of the physical and psychological dimensions relevant to the relationship ageing people have with open space, and to bring this understanding into a conceptual framework.
2. To test the initial conceptual framework and to analyse the way it works in relation to people in Beijing.
3. To reflect on the use of the initial conceptual framework, and revise it in light of the academic literature.
4. Ultimately to use this as a means to make open space recommendations focused on social and perceptual dimensions of open space in Chinese cities.

1.5 Research procedure

This research is divided into four stages: ‘to explore’, ‘to test and analyse’, ‘to develop’, and ‘to apply’. There are a few key sub-objectives in each stage, which are identified as follows:

Table 1-1 the research process with sub-objectives in four stages.

Stage 1:	1-1 To explore the characteristics of ageing people in China.
To explore	1-2 To explore the current development of urban open space in China to determine the range of sites in Beijing which were used for this research.
	1-3 To explore the interaction relationships between ageing people and urban open spaces, on the physical and psychological dimensions used to produce the potential conceptual framework of the relationship on theoretical inference.
Stage 2:	2-1 To produce behaviour maps of ageing people in urban open spaces.
To test and analysis	2-2 To explore ageing people’s usage, desires and personal thoughts.
	2-3 To discover the inner structure and key features of the relationship and express them in a conceptual framework.
Stage 3:	3-1 To discover the gap between the current state of urban open spaces and the desires of ageing people.
To develop	3-2 To integrate the perceptual, behavioural, physical and psychological dimensions to discover the links between them into a comprehensive conceptual framework.
Stage 4:	4-1 To discover how to promote the quality of life and well-being of ageing people in China through intervention in design.
To apply	4-2 To make open space design recommendations focused on the social and perceptual dimensions of open space in Chinese cities.

1.6 Thesis outline

This thesis is structured in four parts with 12 chapters. Foundation of research park include chapter 1, Part I, which include chapter 2 to 5 to explore and build the solid and systematic fundamental basis of this research. Part II including chapter 6 to 9, tests and analyses. Part III, chapter 10, integrates and develops. Part IV, comprising chapters 11 and 12, is on application.

Chapter 1 (introduction) describes the background and motivation for this research, and goes on to discuss the research aim, objectives, and sub-objectives as well as the procedures.

Chapter 2 (methodology) introduces the research methodology. It states the research methods and approaches to analysis applied to achieve the research aim and objectives, outlining the scope and methodological framework of the research. It indicates the selection, design, pilot, data collection and data analysis approaches of methods used in later chapters.

Chapter 3 (Literature review) describes the theories and policies relating to the elderly in China, focusing on the characteristics of and changes to the ageing population, the direction and development of policies for the elderly, and the limitations and barriers surrounding well-being and psychological health.

Chapter 4 (Literature review) describes theories relating to the research, focusing on the development of concepts of urban open space in China. This determines the types of urban open space employed in this research and establishes the criteria for site selection in Beijing. It then introduces the five selected neighbourhood parks in Chaoyang District in Beijing.

Chapter 5 (Literature review) explores the theories' relation to the people-place relationship in terms of their physical and psychological dimensions. The various concepts and messy definitions of the relationship make it look like a jigsaw puzzle, (Lewicka, 2011) so this research has deconstructed the current theories into three parts, elements, links, and process, to reconstruct and produce a new conceptual framework. This is used to guide the structure and design of the questionnaire and semi-structured interviews.

Chapter 6 (Questionnaire data analysis) reveals the results of the analysis of the questionnaire data (n=418). There are three parts, the demographic profile of the sample, the testing and analysis of seven associations from the conceptual framework in qualitative statistic approaches described by SPSS, and data comparison. This examines the differing psychological performance and features influenced by using a neighbourhood park, the activity patterns, gender, ageing steps and other social-demographics of the elderly.

Chapter 7 (semi-structured interview analysis) reveals the features, desires and views of the elderly about the multiple dimensions of the neighbourhood parks. Thematic analysis reveals the differences between people in terms of gender and ageing steps, employing structural analysis in context.

Chapter 8 (supplementary correlation analysis) tests the significant associations between emotional bonding, experienced psychological benefits, self-rated psychological status and attributes of the social and perceptual dimensions. The data used for statistical analysis in this section comes from both the questionnaire and semi-structured interviews. (Same participants in both surveys.)

Chapter 9 (behavioural analysis based on the questionnaire and observation) describes features of the

behaviour of the people being studied. The findings were obtained in fieldwork by questionnaire, observation and mapping. The questionnaire data is used in the analysis of the usage features, and observation data contributes to answering two questions, where did the elderly go most frequently in a neighbourhood park, and how were they using them.

Chapter 10 (findings) integrates the main findings from chapters 6-9 into four sections. The first integrates conceptual frameworks of differing performance in multiple dimensions of the neighbourhood parks relating to gender and ageing steps, and draws associations between the psychological, perceptual, social and behavioural dimensions into one comprehensive conceptual framework. It lists all the production of the conceptual framework produced by this research. The second section provides an integrated and re-constructed theoretical supplement based on the key points from findings from this research. The third part describes the gap between the current state of neighbourhood parks and the desires of ageing people, identified by integrated comparison of findings regarding their desires, usage and their views on the parks' attractiveness. The fourth section describes an approach to improving the quality of life and well-being of the elderly by offering a treemap of each indicator.

Chapter 11 (research discussion) discusses the integrated research findings obtained in chapter 10 and discusses them in five sections. It reflects on the sub-objectives in procedure, objectives, and the research aims of this research, and discusses the significance of the main integrated findings, describing the unique contribution that this research has delivered. It sets out the applications of this research and makes recommendations for design decision-making. It discusses the research methods applied in the fieldwork and explains the limitation and the potential areas for further research built on this work.

Chapter 12 (Conclusion) reviews the main research outcomes on both theoretical and practical dimensions.

PART I TO EXPLORE

Chapter 2 Critical review on Ageing people in China and Ageing-friendly city

2.1 Introduction

This chapter provides a comprehensive context for the full text on the richness of epochal and cultural identities of the Chinese elderly, including a discussion of the barriers faced by the elderly in the broad sense, as well as a discussion of the epochal memory and cultural identities of the Chinese elderly, the social phenomena presented by the contemporary Chinese elderly and their impact. These set the context for the whole study in a targeted manner and reveal research gaps to be researched and filled based on previous findings. In the second half of this chapter, the concept and challenges of age-friendly cities and the role of urban open space in them are elaborated, revealing the potentially important impact of community parks on the elderly and the issues that still need to be addressed through research, especially the insufficiencies in the perceptual and social dimensions of urban design.

2.2 The barriers of aging people

There are many barriers around aging people, such as ‘Youth-oriented Society’; ‘Physical Isolation’; ‘Shifting Social Value’; ‘Sensory Losses’; ‘Diminished Power’; ‘Retirement’.(Oyer & Oyer, 1976, p. 10) All of these barriers hinder elderly people to feel belonging and interacting and communicating with the others, even currently these barriers still around the older people. However, these barriers hindered this process, many elderly people feel isolated and anxiety when they are aging and feel losing. As a result, they feel less satisfied with life and less happy. The consequences of the barriers of aging people always are tired up with problems of psychological health. (Hawton et al., 2011; Liang, Krause, & Bennett, 2001; Perissinotto & Covinsky, 2014) With the recession of the physiological function, the transformation of objective social factors and roles in a family with age, some of the breeding and the accumulation of negative emotions become psychological problems in some of the elderly people. According to the report from WHO (2017), there are approximately 15% of adults aged 60 and over suffer from mental disorder. These common problems are mainly psychological representation in the following aspects:

2.2.1 Loneliness, emptiness and frustration.

There are over 1 million older people say they always or often feel lonely in the UK. (Age, 2014) According to the national survey sample in China, there are about 28% of older Chinese adults reported feeling lonely.(Luo & Waite, 2014) In general, the older adults always faces unexpected circumstance as following:

Firstly, the elderly feel dull and bored in their lives as if time passes slowly owing to their narrowed living space and decreased interpersonal relationships after their retirement. As a result, they may become passive and pessimistic. In particular, it is difficult for them to adapt to their lives after their retirement with the changes to their roles in the society. For instance, elderly people who previously worked as leaders may feel “useless”, “inferior” and “depressed” once they retire.

Secondly, original knowledge structures and skills of many retired senior citizens aren’t adaptable any more with tremendous changes in modern society, economy, politics and cultures. Consequently, the generation gap between the elderly and the young tends to be widened at a faster pace. Unrecognized by young people regarding their inherent values and lifestyles, the elderly people can hardly communicate and exchange with their sons and daughters. Under this situation, it makes the communication more difficult between these two generations of people.

Thirdly, changes have happened to family structure. Nowadays, family structure has transformed from “four generations living together under one roof” into “two generations under one roof” or “a young couple” type structures. In this case, it gets hard for senior citizens to get together with their children and grandchildren. The young people who make their living far away from their homes even have less time to stay with their parents.

Furthermore, some elderly people would be widowed, unfortunately, or their peer relatives or friends pass away successively. Failing to adapt to such changes immediately, the elderly are often reminiscent of the past, lamented about the present and worried about the future. With feelings of emptiness and loneliness, many old people become emotionally fragile, depressed, stressful, downhearted, solitary and weird, with a lack of interest in getting along with others. All of these make lives of the elderly people monotonous and dull. Undoubtedly, some old people feel depressed and lonely.

2.2.2 Geriatric depression

In fact, geriatric depression is a collective term for mental disorders of old people, generally including primary and secondary major depression, neurotic depression and reactive depression. (Blazer, 2003; Fiske, Wetherell, & Gatz, 2009) Plenty of old people are more concerned about their physical health as they grow older, but usually ignore their mental health. Geriatric depression belongs to a somatic symptom arising from mental disorders caused by many factors. Just like hypertension and diabetes, it can hardly be explained with a cause. From the perspective of social psychological factors, elderly people often have to face plenty of special events in their lives as they get old. With the increase in mental stress, they have become tolerant of spiritual frustrations due to aging of their body.

In this period, the social support from colleagues and friends declines with the decrease of their social interactions. In addition, their children are generally in the busiest period of their life, so they may easily neglect caring about the elderly people regardless of emotions or lives. The elderly people generally gain less familial and social support from the elderly people as compared with their youth. Particularly, they feel much more lonely and depressed with the approaching of some traditional festivals.

2.2.3 Senior personality disorder.

Although personalities of the elderly people are relatively stable in their old ages after development, accumulation and cohesion, changeability and development possibilities are objective, dependent upon different scope and extent. (Segal, Coolidge, & Rosowsky, 2006) Wu (2010) discovered from their Cattell's 16 personality factor questionnaire survey that personalities are pretty stable in old ages, personality factors of the elderly people that may change with their age.

Senior personality disorders shall be mostly attributed to problems about old people's adaptability to life. Due to their lower adaptability to the society and weaker tolerance of stress, the elderly people tend to be more depressed and frustrated. In daily lives, they present some abnormal personalities, which is a manifestation of senior psychological disorder. Known as mental disorder with the major clinical manifestation of extremely low spirits, depression is characterized by low spirits, retarded thinking. Depressed people are often private, dependent, passive and stubborn.

2.2.4 Retirement syndrome

Retirement syndrome is a fairly common mental illness for the elderly people. (De Vries, 2003) According to statistics, nearly 30% retiree may suffer from retirement syndrome to different extent. Retirement syndrome means that old people have passive feelings such as loneliness, disappointment, anxiety, depression, sadness and fear as they fail to adapt to their new social roles, changes to their living environment and lifestyles, or refers to a kind of mental adjustment disorders thereby induced to make them have any conducts deviated from normality. Such mental disorders may trigger other physiological diseases and impact people's physical health.

Retirement is a major change to one's life, so great changes will occur to all aspects of the people concerned such as content of life, pace of life, social status and interpersonal relationships. Old people may become emotionally depressed, conduct acts deviated from normality and even suffers from diseases because they fail to adapt to abrupt changes to their living conditions.

2.2.5 Syndromes of empty-nest families

“Empty-nest families” mean that the elderly people live lonely without children. (B. A. Mitchell & Lovegreen, 2009; Su et al., 2012) According to statistics home and abroad, such families mainly refer to families where elderly people live alone and old spouses live. “Empty-nest elders” mean old people who don't live together with their children, including those without children and living apart from their children. With the aging of society and evolution of family structures, there has presented a dramatic increase in empty-nest families.

According to data reported on People (Li & Lu, 2014) there have been 23, 400, 000 “empty-nest elders” in China at present, appropriately accounts for 25% of families of elderly people and tends to increase at fast pace. As parents of the first-borns become old, empty-nest families will become major forms of families of elderly people in China. It is forecasted that there will be 90% empty-nest families in China, where the families of elderly people will become “nest-empty”. (Li & Lu, 2014)

The ending of the one-child policy leaves this particular generation as a unique social phenomenon of our time, such China's ageing pattern is unique compared to many ageing or aged societies in developed countries. (J. Yu & Rosenberg, 2017) As special groups among the elderly population, the old people of empty-nest families shall not only go through a transformation of period from the middle-aged to the old-aged, but also have to undertake the transformation of family period from nuclear or stem families to empty-nest families). With inadequate emotional comfort, healthcare and life care, the elderly people may easily have “empty-nest syndromes”, which may not only seriously influence their physical and mental health, but also bring various difficulties to families and thereby cause a range of social problems. In China, old people mostly have the idea of “bringing up a son for their old age” and enjoying basking in the love of their families, surrounded by their children and grandchildren. Highly emotionally dependent upon their children, they become increasingly physically and mentally aged that they just need to depend upon the younger generation. Nevertheless, their children have gotten married, had their jobs and leave far away. The passive emotions such as loneliness, inferiority and self-pity thereby induced are just known as “empty-nest syndromes”.

Summary

These consequences of the barriers around aging people lead to the psychological damage to them and reduce the well-being of them. As Thwaites, Mathers, and Simkins, (2013, p.52) point out ‘ the fundamental requirement for people to experience a sense of belonging as a vital human need, central, as Honneth (1995) demonstrates, to sustaining self-identify and self-esteem’. However, the urban open spaces, as the main place should play a significant role to provide positively supportive environment for them to communicate with the others and to increase the feeling of belonging.

However, currently, in many design processes, the needs of aging people in the psychological aspects have been always neglected. How to engage aging people and improving the well-being of them still is question need to be answered in the research of urban open spaces design. Furthermore, which parts of the urban design have the potential effects to interevent the negative emotions of aging people will be an important question should be answered in this research.

2.3 Current situation of ageing population in China

This section set out the definition of ageing people and presents the ageing trend of population in China and the statement of the older population Beijing city, which help to inform which district should be

choose as an study case for this research and contribute to calculate the sample size of survey detailed in methodology chapter.

2.3.1 The definition of ageing people

‘Citizens over 60’ were the focus of *The Law of the People's Republic of China on the Protection of the Rights and Interests of the Elderly*. (*The People's Republic of China Yearbook*, 2013, p. 834) In the Sixth Demographic Census of China, the age classification is 0-14, 15-64 and 65 plus. (*The People's Republic of China Yearbook*, 2013, p. 862) The retirement ages for Chinese citizens are, ‘Currently...60 for men, 55 for female white-collar workers and 50 for female blue-collar employees. 50 for male and 45 for female for special workers engaged in underground, high altitude, high temperature, particularly heavy physical labour or other work that is harmful to health’ (“*中华人民共和国劳动法*,” 1995) The official retirement ages, which were adopted six decades ago when life expectancy was much lower, have not adapted to economic and social development, said Yin Weimin, Minister of Human Resources and Social Security at a press conference, and need to be raised in the next few decades. (XINHUA, 2016) In older times, 50 years old was the line which separated the elderly, as recorded in the *Book of Rites* (礼记.曲礼上).

The retirement age is a milestone of older people in research relating to urban open space. The age of older people is often defined as over 65 in research carried out in developed countries, like Europe and the UK, and America. (Annear, Cushman, & Gidlow, 2009; Bean, Vora, & Frontera, 2004; Day, 2008; Gibson, 2018) In the Chinese context, some researchers have chosen to draw that line at people over 60 for their research participants. (Pleson et al., 2014; J. Yu & Rosenberg, 2017) A study in Hong Kong (E. H. K. Yung, Winky K.O, & Chan, 2017), a survey of the satisfaction of the elderly for the urban planning and environment, the older participants were over 56. Noon and Ayalon (2018) selected older people, women over 62 and men over 67. In a study of the relationship between retirement age and national insurance, older people are included from the earliest retirement age, which is over 45, covering middle aged and older adults. For this research, ‘ageing people’ defined as those who are age over 45 and older, focusing on the ageing people who have vacant time in using urban open space after retirement. There are two advantages of the definition of ageing people used for this research. It contributes to our understanding of deference and trends of change in the character of behaviour and psychological statements by the elderly in China. And a specified age of life does not form a boundary between the adult and older adult: ageing is a process of life, even though retirement is a milestone marking changes in people’s life style.

2.3.2 Ageing population in China

It is expected that by 2020, the number of elderly people aged 60 and over will increase to about 255 million, accounting for about 17.8% of the total population. The elderly will increase to about 29 million, those living alone and in an empty nest will increase to about 118 million people, and the elderly dependency ratio will increase to about 28%. **错误!未找到引用源。** shows the rapidly increasing trend of the ageing population in the next few decades.

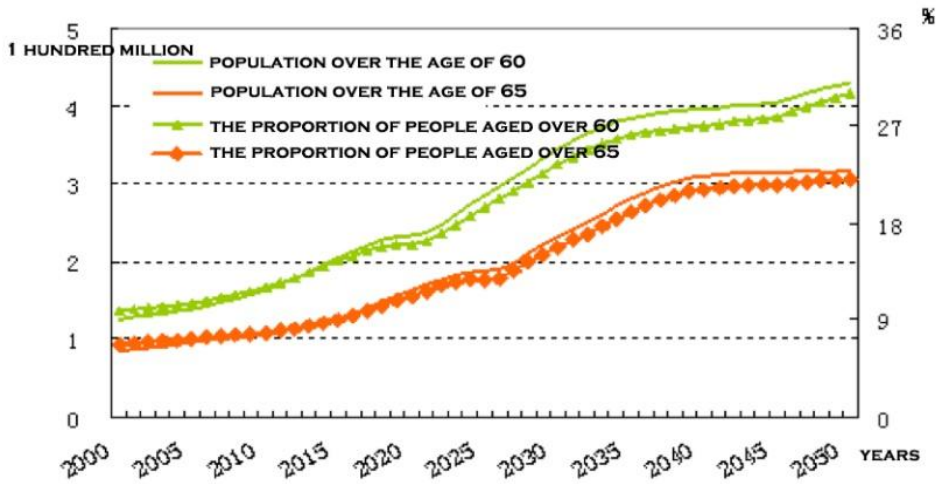


Figure 2-1 the increasing trend of ageing population in China. Source: the Fifth National population Census (2003) (the latest national version) Cited on Chinese government website (2007)

2.3.3 Ageing population in Beijing

Social security spending on the elderly will continue to grow. **错误!未找到引用源。** shows the age structure of population in Beijing, the older people occupied large percentage. By the end of 2016, there were about 3,292,000 elderly residents aged 60 and over in Beijing, accounting for 24.1% of the total household registration population, the second largest in the country.

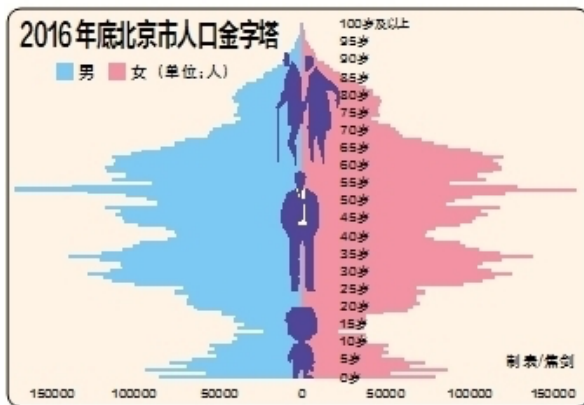


Figure 2-2 the age structure of population in Beijing on 2016. Source: Beijing Government (2016) Cited in 'Report of Ageing industry and ageing care in Beijing (2016-2017)'

Of these, 164,900 elderly people have been identified as elderly persons with a disability. The number of seniors aged 80 and over grew from 426,000 in 2012 to 595,000 in 2016. The number of centenarians rose from 544 in 2012 to 751 in 2016. By the end of 2016, there were 2.166 million elderly residents in Beijing's six districts, accounting for 65.8% of the city's elderly population. The number of non-farm households accounted for 2.69 million people, accounting for 81.7% of the city's elderly population. The highest level of population aging is in Fengtai District, with 29% of the elderly population and the lowest in Daxing, with 20.3%.

The largest household registration population is Chaoyang District, with 573,000 people, followed by Haidian District and Xicheng District, with 494,000 and 392,000, respectively. This research chose Chaoyang District, Beijing, as an case sample on which to base the design of the survey, with the sample

size calculated by the population with calculation uses confidence level = 95%, the confidence interval identified as ≤ 5 , reliable enough to represent the population as a whole. It informs the sample size for questionnaire survey and semi-structured interview survey detailed in methodology chapter.

2.4 The culture and memory the current ageing people in China

Human habits and behaviours are derived from previous experiences and are influenced by culture. This section contextualises the impact on contemporary older people's behaviour in terms of both memory and culture, and uses this as a basis for discussing the unfulfilling of spatial needs hidden in contemporary controversies. This section provides clues and reflections for this paper to examine and tap into the needs and perceptual foundations of older people.

2.4.1 The memory and influence of the broadcast calisthenics in China

The broadcast calisthenics is accompanied by the growth of each generation, in the past 60 years, rooted in the memory of Chinese, especially the aging people. With the memory and the long-time training, the collective exercise regularly is possibly becoming a habit of aging people in China.

However, this period of the radio gymnastics as a previous experience influence the adaptation level of aging people in the cognitive field and impact the types of activities of them on the urban open spaces in Chinese cities. Majority of aging people in China are relatively more prefer the group activities, such as the square dancing, which is similar to the radio gymnastics, peoples exercising with simple music. According to Helson's adaptation level theory mentioned above, previous experience of the person as an important influence factor is closely linked to the awareness and standard of individual adaptation level or comfortable level. To some extent, broadcast calisthenics as the memory of that age is possibly impacting the activities and habits of aging people in urban open spaces. It is different compared to the western aging people. Depending on the differences, there should be some adjustment in designing urban open spaces to meet the specific needs of Chinese aging people, but currently it always been neglected and lead to many conflicts of using urban spaces in Chinese cities.



Figure 2-3 December 1951, Shanghai Nanyang model high school students in the first edition of broadcast calisthenics. Source: Xinhuanet (2012)



Figure 2-4 Thousands of people gather for broadcast calisthenics in a stadium, in 1959. Source: Xinhuanet (1959)



Figure 2-5 Students doing radio gymnastics in morning in Wangjiangxian middle school, April 2011. Source: Sishuiliunian (2011)

2.4.2 The memory and influence of the Chinese culture and custom

There are many specific traditionally culture activities in China, such as Yangge, Taijiquan and so on. Recently, there is a new popular type of activity, which is square dancing. Majority of these activities has same characters including groupment, uniformity, target of healthy and benefit your body and soul feel better. In addition, they are entertaining with the value of view and admire. Furthermore, in the processes of these activities, aging people also have a lot of opportunities to talk with others, develop friend and obtain the positive feedback from others, which are a significant approach to maintain self-esteem and improving well-being of aging people. But, there are some conflict of using urban open spaces between aging people and the others, although these activities are healthy, traditional, and valuable in culture. However, in deep extent, it is possibly that the designers and researchers are overlook the needs of aging people and the habits of aging people, which leads to the conflicts of occupying the space of squares and the other urban open spaces with different uses.

- **Yangge:**

Yangge is one form of the popular Chinese folk dance in rural and urban in northern China. It is rooted from the Song Dynasty in Chinese history and is one of the most typical kind of folk arts in China. However, it is especially popular among aging people in many Chinese cities. Mostly, in the evening, crowds of people go out into the streets and squares and dance together for exercise and performance.



Figure 2-6 the performance of Yangge team by the elderly in China. Source: Y. Wang (2014)

- **Taijiquan:**

Taijiquan ,a state-level non-material cultural heritage, is rooted in the philosophy of Confucianism, a traditional Chinese tai chi Taoism, which is represents Yin and Yang dialectical concept as the core. It benefit people to set the temperament, strengthen physical health care. Taijiquan is the combination of Yi-Jing of Yin and Yang, composed by five elements, and Traditional Chinese Meridians, the formation of ancient art and handled the guidance of a kind of inside and outside and repair. It emphasises the

action as soft, slow, light spirit, and flexibility. However, Taijiquan is especially popular among aging people in China. Senior citizens always do Taijiquan at early morning in some open spaces with plants, such as park and some square.



Figure 2-7 Taijiquan exercise of the elderly in China. Source: Ren (2013)

- **Square dancing:**

Square dancing is a kind of combination of aerobics and dance. It is a self-organized spontaneously activity in square and vacant area in living communities or nearby communities, with the purpose of fitness and benefit health. Some of square dancing are usually accompanied by high decibel, rhythmic music with rich rhythm dance. However , due to square dancing is mostly unarmed fitness , its low cost and ease of participation, it is very popular especially among aging people. But there are some public debates of the square dancing with noise.



Figure 2-8 Square dancing group in park

2.4.3 Lack of awareness of the elderly's needs in urban open space hidden in contemporary space debates in China

As many News and TV show, Chinese square dancing is very popular in China. Some scholars point out that it is a representative of the mass culture activity, although some opponents said it is a 'public nuisance'. (BBC, 2013; Sun, 2013) Group activities and lively atmosphere are relatively rooted in Chinese culture in daily life, especially the aging people. H. Wang (2014) in China Daily identifies 'Group dancing in open squares or other public spaces is a favourite pastime for middle-aged and retired women across China, who usually enjoy it in the evening, or sometimes late into the night, as a good way to keep fit and socialize.' The square dancing has obvious value for participants. In this process, senior citizens have more opportunities to explore friendship and communication with each other and maintain fitness.

Depending on the discussion among the barriers of retired people, square dancing, as social activities,

provide a good platform for them to contact with the others and show themselves. The communication and social interaction play a significant role in improving the psychological health of elderly people. According to a Chinese research report through quantitative data collected in Hebei province in China, it illustrates the group leisure movement can improve the well-being of the elderly people. (Wei, 2014) In the process of square dancing, the interactions are also referring to the emotional fulfilment and self-cognitive achievement, which is closely linked with human wellbeing. Because expressions of the other people will become a part of information representing the place for people to experience a sense of belonging, which is relation to sustaining self-identity, as the foundational requirement of human needs. (Thwaites, Mathers, & Simkins, 2013) Thus, the square dancing seemly become a obvious positive activities benefiting the aging people. But, why still some young citizens arise fervent protests to against this positive activity? In some extent, it possibly due to the different adaptation level in cognition, because the differences between previous experience of aging people and currently young citizens, depending on the inference of Helson's adaptation level theory mentioned above.

However, why these conflicts from the differences just occur on the squares inside or nearby the communities in Chinese cities? In earlier study, Spivack (1974, p.34) discovered a deep approach of rethinking this problem or phenomenon in theoretical field. According to Spivack (1974, p.34):

One other factor threatens the holistic nature of the human habitat: our environments are for the most part designed and built by a few for use by the many. As absentee ownership and large scale development increase, fewer people have the opportunity or the 'power' to significantly influence or even modify the form of their shelter. This practice guarantees that, in the absence of evaluation procedures, the designer makes will be repeated, and will become the burden of all to live in. This amplification of error has for many years continued unquestioned and unchecked. No doubt some of our contemporary urban crises, social and physical, are in part the legacy of practice.

It is also existing in current urban city, the argument of age-friendly city relates to the way in which older people may experience marginalisation within urban environment. (Tine Buffel & Phillipson, 2016) How to make the older people visible become a question. It is a significant questions whether current design form of the urban open space is still suitable for implementing the age-friendly city in the future and whether some omission of needs of aging people is in the initial step, especially the social dimension of design urban open spaces in Chinese cities.

The square dancing of aging people is very popular in China and marked as a public culture in some extent. In current urban open spaces, which part is hindering the omissions of needs of aging people? What elements of design arise the urban crises in urban open spaces in Chinese cities? In the structure of the sense of place, is the square dancing as an activity in the public space combined into the sense of the place? And whether the perception of the place is depending on the person as a participant or a non-participant? Could these specific activities of Chinese aging people become a component of symbolism in the Chinese urban open space and happily accepted by the other citizens through new concept of designing approach?

2.5 The life style of the current ageing people in China

This section describes and discusses two phenomena prevalent in China related to the modern lifestyles of the elderly: one is the migration behaviour of the elderly; the other is the intergenerational parenting of the elderly. These two phenomena are also closely related and have a complex impact on the quality of life and well-being of the elderly. The analysis of the causes, characteristics and effects of these two phenomena can not only help us understand the motives of the elderly's behaviour in urban space, but also provide a basis for the understanding of the needs of the elderly in this study.

2.5.1 Inter-city migrations

This section analyses the urban migration behaviour of the elderly from three aspects, including

influencing factors, characteristics, and influences, thus providing a more comprehensive perspective to better understand the particular phenomenon in China and providing a unique context for the study to understand the motivations for the behaviour of the elderly.

2.5.1.1 Factors affecting the migration of the elderly population

- social factors

With the gradual acceleration of social ageing, the first generation of only children entering the age of marriage and childbearing, the socialization of old age has not yet matured, and the trend of family-based old age has become a reality, the elderly population will continue to migrate in large numbers. An empirical study that family factors are the main drivers of migration among the older population, while the higher cultural quality of the children who move in, the considerable economic base, the close relationship with the parents, the presence of infants and children in the family who need care are all family factors that contribute to the migration of the older population.(Y. Zhang, Sun, & Zhou, 2012) It can be seen that the migrating elderly population is more dependent on their children, and while they want to be accompanied by their children, they also want to support and assist them financially, mentally and in household chores.

- Cultural factors

Compared to Western societies, family members in Chinese society are more closely connected. (Y. Zhang et al., 2012) Chinese families tend to have two or even three generations living together. As a result, the tendency of the elderly in China to migrate to the place where their children live is higher, and many of them want to use their spare energy for the next generation rather than living alone after retirement. This phenomenon is consistent with the culture existing in the eastern cultural factors, the rapid demographic and family structure changes can't shake the filial piety as a key intergenerational support schemata.(S. Park & Lee, 2017) In addition, in our culture, there is a long-standing tradition of "settling down and relocating again", and elderly people generally do not easily leave the place where they have lived their whole lives and choose to start a new life in their later years, especially the rural elderly population (Y. Zhang et al., 2012), so the difference between the urban and rural elderly population in China is more pronounced.

- Factors of regional development differences.

There are huge differences in development between regions in China. Eastern cities have more advantages in living service facilities and medical services than central and western cities. Therefore, according to Y. Zhang et al. (2012) the migration direction of the elderly population in China is isomorphic with the migration direction of the young and middle-aged population, and migration in developed areas. For example, Guangdong, Tianjin, and Shanghai are the main migrating populations of the elderly migrants, which constitutes a sharp contrast with cities in the developed countries that migrate to small towns and cities with lower living costs.

2.5.1.2 Characteristics of elderly migration

The migrant elderly in China are dominated by low-income, non-agricultural household registration, and their social and economic status is relatively high, mainly represented by higher education, higher income, and higher professional status.(Meng et al., 2004) In addition, the physical health of these elderly migrants is better.(S. Wang, Shen, & Wang, 2015) "Sixth Census" data shows that the proportion of "relative relatives" has increased. (Y. Liu, 2014; S. Wang et al., 2015; W. zhang & liu, 2018) The above trends indicate that China's floating population is moving out of the country with the elderly. Further empirical analysis shows that the migration of the elderly population mainly reflects the needs of children. (Meng et al., 2004; Y. Zhang et al., 2012) The main purpose is to reunite with the children, take care of the housework for the children or care for the grandchildren, and reduce the work pressure

of the children and other family factors, so they are mostly social migration.

There is evidence that there are differences between the migration patterns of the elderly in the east and the west. The migration of the elderly in China is centered on children, which may be one-stop or transfer between several children's residences, the plausible explanation is differences in economic development levels. (Meng et al., 2004) An analysis of the migration process of the elderly found that the impact of the life cycle on the migration behaviour of the elderly is relatively prominent. According to Chai, Li, and Shen (2010), the migration of the elderly in China mainly includes the mobilization type, the family-oriented type and the assisted offspring type; "Point-oriented" (hedonistic), but there is a clear migration of assisted offspring; in the advanced age, the migration model of the elderly in China and the West is mainly family-oriented (aid-oriented) and facility-oriented (facility-oriented).

2.5.1.3 Influence of elderly migration behaviours

- Social isolation

The proportion of middle-aged and senior citizens aged 70 years and over in the urban migration elderly population is relatively high, the majority are women. Compared with urban non-migrating seniors, urban migrants have a higher proportion of socioeconomic status; those who do not have a spouse and live with children account for a larger proportion, and the number of surviving children is larger; self-rated healthy and unhealthy. The proportion of elderly, female, spouse-free, unhealthy, and living with children in urban migrants is higher than that in urban non-migrants. This may be due to events such as widowhood and poor health of the elderly, which prompted them to migrate to their children. This coincides with the conclusions put forward in the life cycle theory of migration: that life events such as retirement, widowhood, and deterioration in health directly affect the migration of the elderly. This type of migration of the elderly is mainly to seek passive assistance for children to provide care assistance. In addition, compared with urban non-migrants, urban migrants have better economic conditions. Most of them live in modern communities, and the leisure and entertainment facilities in their communities are more complete. It can be seen from this that assistance-based migration is common among the elderly urban migrants in China. Living with children, a higher standard of living, a better living environment, and more complete facilities have become factors that attract elderly migration. But in some cases, social isolation brought to them in the new environment.

- Family isolation

In the urban migration elderly population, the proportion of the elderly in family segregation generally increases with age, and the proportion of family segregation among the 65-69-year-old elderly is the highest. (W. Zhang & Liu, 2018) According to a logistic model study by W. Zhang and Liu (2018), older persons with missing family members, such as spouses and children who do not live with their children, are more likely to fall into family segregation. Health conditions may hinder the interaction between urban migrating seniors and family members. There are also differences in the situation of migrating elderly people with different forms of social participation falling into family segregation: the proportion of elderly people participating in economic and public welfare activities in family segregation is higher; while the proportion of people involved in political activities and family care of children falls into family segregation low. In terms of social environment, the proportion of migrating seniors who have enjoyed local elderly privileges and living in a community with leisure and entertainment facilities has fallen into family segregation; urban migratory elders living in modern communities are at the lowest risk of family segregation.

- Friends isolation

Regarding the isolation of friends, except for the elderly who have other household registration types, the proportion of those who are in the isolation of friends is lower than that of the migrants. Among the elderly groups identified by other characteristic variables, the elderly in the isolation of friends are

among the migrants. The proportion is much higher than the non-migrating elderly.

From the perspective of urban elderly population migration, among all age groups, senior citizens are at the greatest risk of segregating friends. W. Zhang and Liu (2018) illustrated that older people with higher socioeconomic status are relatively less likely to be in isolation. Older people with better health are less likely to fall into friend isolation. Older urban migrants have a higher percentage of segregated friends than non-employed seniors, while older people who are actively involved in public welfare activities, political activities, and family care for children have a relatively low proportion of segregated friends. In terms of social environment, the proportion of senior citizens who enjoy local elderly privileges and those living in communities with leisure and entertainment facilities fall into friend isolation; the elderly who live in urban villages have the highest proportion of friend isolation, while those living in modern types The city's urban migrants have the lowest percentage of friends in isolation.

In summary, this section explores and discusses the migration behaviour of older persons, which is influenced by three main factors: social, cultural, and geographical development factors. The main motivation is to help the children, or to receive help from the children. And different factors contribute to different migratory behaviours in the elderly with different characteristics. Whereas the second section provides a specific description of the characteristics of migration behaviour of the elderly, migration behaviour is mainly focused on the urban elderly. Finally, the psychological impact of migration on the elderly is discussed, mainly the isolation caused by migration, which is manifested in three ways: social isolation, family isolation and friend isolation.

2.5.2 Inter-generational childcare

This section analyses and discusses the three aspects of intergenerational upbringing, namely the social factors that contribute to the phenomenon of intergenerational upbringing, the physical and psychological effects of intergenerational upbringing on the elderly in a general sense, and the behaviour and effects of intergenerational upbringing on the Chinese elderly in the context of Chinese culture. Differences in cultural and social factors result in different behavioural choices and different psychological influences.

2.5.2.1 Social factors affecting intergenerational care

The state of intergenerational care in various countries depends first on the intergenerational relationship model of each country's society and the characteristics of social capital networks. (Gray, 2005) The intergenerational relationship model is closely related to people's behaviour and social and cultural models. (Lin & Li, 2018) Taking care of children involves the interests of three generations of grandchildren, grandchildren, and children. Some scholars emphasized that in China, Vietnam, Myanmar, Thailand and other countries, the cultural norms of continuation of family blood and lineage are still playing a strong role to this day. (Knodel & Nguyen, 2015) This concept encourages people to regard intergenerational care as a fun but not pressure. (Y. Zhang, 2014) In other countries' cultural concepts, the sense of responsibility for grandchildren to take care of grandchildren is relatively weak, which makes grandchildren more willing to pursue their own development during leisure and regard child care as a burden rather than an obligation. (Hank, 2007) This phenomenon reveals that the cultural perspective is very important for understanding the intergenerational care activities.

2.5.2.2 The effect of intergenerational care on the physical and mental health of the elderly

For ancestors, the impact of intergenerational care on their physical and mental health and quality of life is complex. Some studies have pointed out that participating in intergenerational care will enable the elderly to actively participate in activities in their daily lives, which is beneficial to the health of the elderly; but some studies have pointed out that caring for children will bring an extra burden to the life of the elderly and is not conducive to the health of the elderly. In response to these confusions, some scholars used health indicators and quality of life indicators to measure and verify. Hayslip Jr,

Blumenthal, and Garner (2015) conducted a survey on the living conditions of 86 elderly people participating in intergenerational care and found that their health level had declined.

On the contrary, some scholars believe that the elderly who participate in the intergenerational care can enjoy the intimate relationship with their grandchildren and thus enhance their sense of well-being, so that the body and mind are healthier. Di Gessa, Glaser, and Tinker (2016) used the SHARE database to conduct research and found that the elderly who participated in intergenerational care had better health conditions than those who did not participate. Another study across 12 European countries, such as Buber, found that elderly people who do not take care of their grandchildren are more likely to be depressed than those who take care of their grandchildren. (Buber & Engelhardt, 2008) Based on the context of China, Lin and Lv (2016) that participating in intergenerational care makes the elderly have a higher degree of social participation, reduces their loneliness, and thus improves their health.

2.5.2.3 Chinese elderly's happiness and intergenerational care

There are some empirical studies suggested that intergenerational raising behaviour improves the subjective well-being of middle-aged and old people. Through a logistical analysis for the older Chinese, L. Chen (2018) among the middle-aged and elderly people who also have grandchildren under the age of 16, the middle-aged and elderly people who care for the grandchildren have a higher level of subjective well-being than the middle-aged and elderly people who do not care for the grandchildren. In addition, the circumstance and the impact of intergeneration is changing with the grandparents ageing. Middle-aged and elderly people who live with their children and are 45-55 years old are more likely to get happiness from looking after their grandchildren. (L. Chen, 2018) With older people ageing, the proportion of supporting grandchildren between generations will gradually decrease, and the impact on subjective well-being will also gradually weaken.

2.6 The cultural specificity and difference of Chinese ageing people

According to the above research and analysis, the elderly face a lot of troubles in their lives, such as loneliness, senior depression, retirement syndrome, etc. This is a problem that global research on aging is trying to solve, and compared to the Chinese elderly, they have many unique characteristics and cultural backgrounds, which affect their psychological and behavioural aspects, and thus, different phenomena and influences appear. Next, I will summarize the culturally relevant differences for the elderly in China in the light of the elaboration above in the following four areas.

- First, in terms of barriers, the phenomenon and impact of empty nesting of the elderly is prominent in China, mainly because of social and cultural differences. Both the one-child policy and the dramatic rise in population mobility have affected the Chinese elderly, who have deep-rooted family ideologies.
- Second, psychologically, cultural and epochal memory manifests itself in the psychology of older Chinese people as a stronger collective consciousness and a strong psychological need for a sense of belonging.
- The third is in terms of behaviour. The importance of fitness and the diversity of fitness activities evolved through the history of culture and folklore is a very important characteristic of the elderly in China. In other words, the inheritance of health and wellness in Chinese culture is an important factor influencing the behavioural activities of the elderly.
- The fourth is on the phenomena. The widespread impact of historical and cultural differences on the elderly has resulted in two phenomena unique to China: inter-city immigration, and inter-generational childcare. But these phenomena also raise new problems for the elderly, with social isolation, family isolation, and friend isolation caused by migration.

This study provides a unique and in-depth interpretation of the Chinese elderly, and provides a solid basis for exploring the environmental perception and interaction of the elderly.

2.7 The policies on active responses to ageing population and for promotions on ageing friendly environment in China

Documentary analysis has been carried out by the government in a political review of the development of the ageing population. It examined policies from 2013 to 2018 relating to the ageing industry and responses to ageing, and was published by the Chinese government. It identified the direction for the improvement of ageing service.

In 2013, it was announced in *Decision of the Central Committee of the Communist Party of China on Some Major Issues Concerning Comprehensively Deepening the Reform* that there should be an active response to the aging of the population, to speed up steps in the establishment of a social endowment service system and the development of the service industry for the elderly, to establish a more equitable and sustainable social security system, promote the reform of the endowment insurance system in government organs and units, realize the overall nationwide basic pension fund, improve the care and service system for the elderly in rural areas, and study and formulate the policy of raising the retirement age in progressive steps. (Yearbook, 2014, p.299)

Opinions on Accelerating the Development of the Endowment Services Industry issued by The State Council proposed that a diversified endowment system covering urban and rural areas should be based on home living, community and institutional support.

This means that improvement in the health level of the elderly can increase the rate of home-based care for the aged and reduce the economic burden of aging. Community parks can serve as venues for community-based activities, mainly for the elderly living in the surrounding areas, increasing the social participation and addressing the social needs of the elderly. The barrier-free and accessible convenience of community parks are important factors increasing opportunities for the elderly to attend activities and encouraging them to travel independently.

Guiding Opinions on Strengthening the Standardization of Endowment Service, Guiding Opinions on Advancing the Liability Insurance Work of Endowment Institutions, Notice on Promoting the Work of Endowment Service Facilities in Towns, Opinions on Accelerating the Training of Talents in Endowment Service Industry and Accelerating the Promotion of Health and Endowment Service Engineering Construction were issued in 2014. It was proposed at *The Fifth Plenary Session of the Eighteenth CPC Central Committee* in 2015 established a diversified endowment system covering urban and rural areas which is based on home living, community and institutional support. The *Beijing Home-based Endowment Service Regulations* were the first attempt to regulate home-based endowment services in China; *Rules for the Implementation of Community and Home-based Endowment Service Standards* was issued later in Shanghai.

On September 8, 2015, the National Symposium on Aging Propaganda was held in Beijing. Experts at the symposium believed that the issue of ageing had become a major strategic issue related to the national economy and for people's livelihood as well as the long-term stability of the country. The contradictions of getting old before getting rich and getting old before getting ready were prominent in China, having a far-reaching impact on China's economic growth, the coordinated development of urban and rural areas, social security, medical and health care, social management and other fields. The dual tasks of achieving sustainable economic and social development and improving the livelihood of 10,000 elderly people had become more arduous and heavy. A 'Month for Respecting the Elderly' was introduced.

In 2016, *The 13th Five-Year Plan Outline of National Economy and Social Development* deployed in special chapters of the 13th Five-Year Plan Outline proposed carrying out actions to deal with population

ageing, to strengthen top-level construction and to establish a system dealing with population ageing based on population strategy, reproductive policy, employment system, endowment service, social security, health security, personnel training, environmental support, social participation and other support. It promoted the ‘Construction of Livable Environment for the Elderly’.

On May 27, the Political Bureau of the CPC Central Committee held its 32nd collective study about the forms and countermeasures for China’s ageing. Xi Jinping put forward the following proposals: adhere to combining the response to population ageing by promoting economic and social development; adhere to combining meeting the needs of the elderly by solving the problems associated with an ageing population; strive to tap the vitality and opportunities that population ageing brings to national development; strive to meet the growing material and cultural needs of the elderly; and provide a comprehensive and coordinated development of strategies addressing ageing.

China Report of The Development on Aging Cause 2013, the first blue paper on the development of strategies to deal with China’s ageing population, was compiled by China Aging Science Research Centre to fill in the gaps in this field. According to the Blue Paper, by the end of 2013, the elderly population in China would exceed 200 million. (China Yearbook, 2014)

Recently, Chinese Aging Scientific Research Center and Social Science Literature Press (2018) published *the Blue Paper on Aging: the Investigation Report of Urban-rural Old People’s Life Status in China* together, depending on *the 13th Five-Year National Plan for Developing Undertakings of the Elderly and Establishing the Elderly Care System (national [2017]13)*. One of countermeasures and suggestions by aiming at realistic issues is to accelerate construction of a livable environment:

1. It is necessary to set up an age-friendly livable environment construction philosophy, construct the common public and civil infrastructures for each age group, and gradually transform unsuitable public and civil infrastructures according to that philosophy.
2. It is essential to insist on a human-oriented base, formulate aging-fitting transformation standards for infrastructures, conduct an aging-fitting transformation for infrastructures used by the elderly, formulate and implement improved age-friendly environment construction standards, ecological standards, technical standards, age-friendly livable cities and urban-rural community evaluation standards, and form a standard evaluation system.
3. It is necessary to construct an age-friendly livable urban and rural community environment. Urban and rural community environment should fully consider the social contacts of the elderly and their daily life needs. It is necessary to reinforce urban and rural ecological community environment construction and build a sanitary and clean community environment.
4. It is necessary to promote age-friendly city construction. It is essential to scientifically compile an age-friendly city construction plan, enhance service functions for the public and service facilities for the aged, and enhance life safety, convenience, and comfort for urban old people.

Summary

The direction regarding to ageing friendly environment in polices, is:

1. ‘Establishing an aging response system’,
2. ‘promoting the construction of a livable environment for the elderly’,
3. ‘Efforts to meet the growing material and cultural needs of the elderly, and promoting the overall and coordinated development of the cause of ageing’.

The special areas which need improvement to build an ageing friendly environment policy are:

1. The urban and rural community environment should take full account of the social interaction and daily life needs of the elderly.
2. Gradually upgrade inappropriate public and civilian infrastructure.
3. Formulate and implement age-friendly environmental construction standards, ecological standards and technical standards, as well as age-friendly livable cities, urban and rural communities, and form a standard evaluation system.
4. Scientific preparation of age-friendly urban construction planning, enhance public facilities and service facilities for the elderly, improve the safety, convenience and comfort of urban elderly life.

Efforts to promote health in neighborhoods include:

1. 'Active response to an ageing population, home-based, community-based'
2. 'hold the elderly month'

2.8 The ageing friendly city and urban design

This section presents senior-friendly cities and urban design in four convenient ways, beginning with a description of the origin and definition of the concept of AFC and later theoretical developments, the division of components and dimensions, and discussing and supplementing existing divisions. The perceptual dimension of urban design theory should be added to the construction theory of age-friendly cities as a fourth intersecting dimension. Based on the above description and discussion, this section provides a discussion of the challenges facing the AFC and The role of neighbourhood parks are underestimated in the social and perceptual dimensions of the design of age-friendly cities. This chapter provides the theoretical basis for the study and reveals the direction of research that is needed in modern times.

2.8.1 The concept of age-friendly city

Population ageing is taking place and brought challenge across nearly all countries of the world become a necessary issues in current society. The concept of 'age-friendly city' is initiated by World Health Organization (WHO) in WHO framework Global Age-friendly Cities: Guide) (2007) as a term to define and reflect the attempts to create and develop supportive urban environment for the older people, and provided the checklist of features of an age-friendly city across eight domains. It is based on the earlier WHO policy of Active Ageing (WHO,2002) call for political action to create age-friendly environments and support the older people remain active and healthy. After that, the age-friendly city came to a priority topic embedded in the other core themes including Caring and Supportive Environment, Healthy Living and Health Urban Environment and Design (WHO Regional Office for Europe, 2009) For this research, the age-friendly city is long term target for the urban design which need to apply the contribution from this research to improve the well-being and both physical and psychological health of the older citizens.

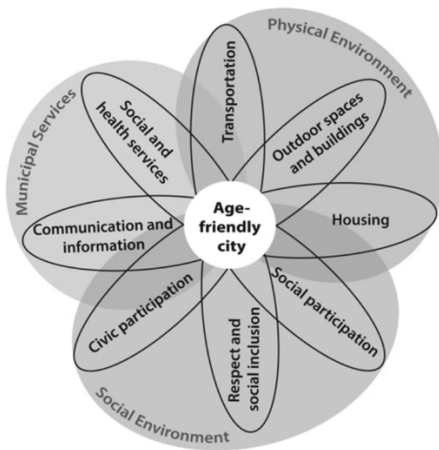


Figure 2-9 the domains of an Age-friendly city. Source: Jackisch, Zamaro, Green, and Huber (2015), p.1109

2.8.2 The development of age-friendly city

Based on the development of the context of age-friendly city, WHO gives the checklist with eight dimensions and three core themes, which has been clustering into three mutually reinforcing and overlapping dimensions of interventions in Figure 2-9 by Jackisch et al. (2015). This development gives relatively new understanding of the overlapping clusters of the dimensions including physical environment, social environment, and multiscriptal service based on empirical studies. However, in the urban design perspective, this conceptual framework ignores the role of the perceptual dimension, which is closely linking with the experiential and emotional production of the older users, reflecting into conceptual framework should be social participation, respect and social inclusion, communication and information and outdoor space and buildings, where provide the space for these perceptual interactions.

In addition, there are various approaches to creating age-friendly environment. It was ranged from an emphasis on physical infrastructure to the quality of social relations that promote social participations. (Tine Buffel & Phillipson, 2016; A. Scharlach, 2012; A. E. Scharlach & Lehning, 2012) In implementing age-friendly strategies, programmes and project, Jackisch et al. (2015) suggested two interventions making a city more age-friendly, as ‘removing barriers and creating supportive physical environments’ and ‘creating resilient social environment’. The aim is to increase the quality of life of them by maintaining the ability of perform essential daily actives and counteracting social isolation, cognitive and physical decline. For this aim, it is necessary to create opportunities and environments that stimulate older people to engage in social and physical activities. However, in order to better implement and enhance the effectiveness of practice, inquiry into and understanding of the daily activity needs and habits of contemporary older persons becomes a fundamental goal, and inquiry into the factors that engage older persons in activities becomes even more important. Further, how these daily activities and environmental factors impress on older people's well-being and psychological factors in their interactions with the environment also form the cornerstone of our efforts to propose better and more effective policy interventions and design guidance.

2.8.3 The challenge in social and perceptual dimensions existing urban design relating to age-friendly city

With the ageing trend coming, there are more challenges emerged in urban design, especially in social and perceptual dimension, the ways in which older people may experience marginalisation than the physical dimension. Handler (2014, p. 12) pointed out: ‘Cites are, for the most part, spaces that are imagined and structured with a younger, working age demographic in mind. Older people are not, typically, incorporated into the mainstream of thinking and planning around urban environment.’

Recently, the barriers free urban infrastructures are emphasized and applied in the most part of global cities to provide an easy achieve and safety journey for the older users in their daily life. (Graham et al., 2018) However, the perceptual and social inclusive need more attention in providing age-friendly cities to easy access to the social environment and healthy interact with the perceptual atmosphere, to let them feeling engaged, estimated, respected and belonged to the environment. This research have furthermore considered how comprehensive of effective of the interaction between ageing people and urban open space on their psychological health focusing on the perceptual and social dimensions to contribute to this challenge.

2.8.4 The role of neighbourhood parks are underestimated in the social and perceptual dimensions of the design of age-friendly cities.

The literature on associations between the use of park and physical health (Akpınar et al., 2016) and quality of life (Camargo, Ramírez, & Fermino, 2017) are widely emphasized and evidenced by a range of empirical studies. The benefits of green spaces have been suggested as increasing physical activity, reducing psychological stress, anxiety and depression, increasing social contacts and cohesion. (Dadvand et al., 2016; Van Herzele & de Vries, 2011) In addition, green space has shown to contribute to better health outcomes in improving self-esteem and mood. However, there are still some aspects are not been adequately explored in current studies.

While most findings focusing on the visually and physically function, the impact of these qualities on user's psychological sense and well-being has not been adequately explored in the literature (Moulay et al., 2018), especially in systematic understanding perspective.

In addition, the older users with different physical and psychological statement, so that the interaction between them and the urban open space will be different will younger people. Some empirical studies investigated the difference in usage and experience of environment by age and gender, such as the more requirement of park's aesthetic qualities for women (Richardson & Mitchell, 2010), the role of environment regard to age and gender segregation (Noon & Ayalon, 2018), comparison the engagement across age groups (Askari, Soltani, & Mohd, 2015). Currently, while the large age groups have been compared, such as children, young people, and older people, however, ageing is a process, it covers the people from younger aged older people to the middle aged older people and advanced aged people, who have different changing condition of the physical and cognitive decline, the different usage and experience and sense of environment is insufficient concerned in previous studies. In regarding to gender, up to knowledge, the differences of interaction of older people by gender in different ageing stages is not been explored and delivered.

Moreover, benefits of green space are evidenced, but how to engage the older people using the green space is less concerned. It is important to understand the process of developing an affective bonding between users and urban green space, including attractiveness, emotion, meaning, and behaviour (Moulay et al., 2018; Scannell & Gifford, 2017), especially for the older park users.

In addition, neighbourhood park as a kind of small size of urban open space has been insufficient investigated in delivering age-friendly city. Some empirical studies indicate that the urban green space with different size fulfil different functions and different relationship with users. (Wolfe, Groenewegen, Rijken, & de Vries, 2014) For example, district parks or national parks serve the whole urban area and they shows more significance in weekend and holiday recreation, while pocket or neighbourhood parks form a strong connection with daily local life (Kaźmierczak, 2013; Moulay et al., 2018; Ruijsbroek et al., 2017), especially the older citizen. The role of neighbourhood parks are underestimated in developing age-friendly city, the concern on the impact of the social and perceptual dimension of neighbourhood park are insufficient in current studies. the barriers-free in sense and accessibility of social environment is also important as removing the physical barriers around the older users.

Furthermore, the importance of social environment has been suggested, but how it works is insufficiently investigated. Based on a review of qualitative research findings, McCormack, Rock, Toohey, and Hignell (2010, p. 723) highlighted that ‘the importance of assessing both physical and social environments of parks in relation to usage and physical activity patterns.’ The impacts of the social environment of park on psychological state are rooted in two ways, one is from the benefit of increasing physical activities influenced by social environment, second is the direct influence from social environment. However, how the mechanism works is insufficiently explored in a systematic view.

In addition, while some concepts in perceptual dimensions such as place attachment have been investigated in understanding the usage of parks, the perceptual dimensions are still underestimated in influencing the process of engaging older people for the neighbourhood park.

In conclusion, taken together with previous research, the role of neighbourhood parks in age-friendly cities has been underestimated, and the deficiencies in this research are mainly present in the social and perceptual dimensions. From the above discussion, the gaps in theoretical research have been uncovered, which can be concluded in the following six points.

- First, there is a lack of systematic understanding of the psychology and perception of older people's interaction with their environment.
- Secondly, there are no studies that break down the study of large older age groups, such as the psychological and perceptual differences between men and women at different stages of aging.
- Third, few studies have focused on how to engage seniors in park activities.
- Fourth, the neglect of neighbourhood parks in the study of green spaces, especially the social and perceptual dimensions.
- Fifth, the mechanisms of influence of the social environment and behavioural activities and psychological factors in open urban spaces have not been deeply explored and systematically and reliably dissected.
- Sixth, the perceptual dimension is underestimated in the study of age-friendly cities.

2.9 Summary

This chapter sets the stage for a comprehensive and systematic period and cultural context for the entire study, dissecting the difficulties faced by the elderly from their perspective, as well as elaborating on the trend of ageing in China and the situation in Beijing from a macro perspective, and discussing in depth the unique characteristics of the contemporary elderly, shaped by factors such as culture and memory, which are manifested in the four dimensions of impairment, psychology, behaviour and phenomenon. (see 1.6 for details)

In addition, this chapter provides an in-depth vertical summary and analysis of the guiding direction of the Chinese government's policy on active ageing in relation to Chinese characteristics of ageing. As with urban design and spatial planning, this thesis summarizes three directions for policy guidance and four specific policies that urgently need to be guided and implemented through research. This provides this paper with the macro direction that the findings need to be addressed and applied, and also makes the findings of the exploratory research more relevant for policy direction.

Finally, the paper elaborates on the concept and development of age-friendly cities in the context of previous research, and discusses the challenges and shortcomings of the relevant research. After an in-depth and comprehensive analysis, this paper summarizes 6 deficiencies in theoretical research. (See 1.8.4 for details)

A comprehensive literature review provides a comprehensive theoretical background and period and cultural characteristics for the entire study. More importantly, this chapter, after discussion and review,

points out the current gaps in research on older people and age-friendly cities and reveals the issues that need to be addressed in this study. And the question about the big picture is how to make a systematic understanding of the relationship between older people and the neighbourhood park, and how the perceptual dimension, the social dimension, the psychological dimension, the behavioural dimension, the material dimension, interact to form a system of holistic connections. In the following chapter, this paper will dig deeper into this issue through a review and discussion at the theoretical level and achieve the first research goal of this paper, to form a new conceptual framework of the original system for this study.

Chapter 3 Review on interaction relationship

3.1 Introduction

Local environment, green space, and nature setting have evidenced benefits on the older people's health. (Dzhambov & Dimitrova, 2014, p. 259; Kweon, 1998; Michael, Green, & Farquhar, 2006; Takemi Sugiyama & Ward Thompson, 2008) Using parks, as physical activities and walking in the urban green space can improve both general health and mental health, quality of life and wellbeing of the elderly. (Neale et al., 2017; Todd et al., 2016; Van Cauwenberg et al., 2011; van der Pas et al., 2016). The effects of physical attributes of large scale parks on the activities has been investigated by empirical researches. (Akpinar, 2016; Artmann et al., 2017; Astell-Burt, Feng, & Kolt, 2016; Dzhambov & Dimitrova, 2014; Gomez et al., 2010; Kearney & Winterbottom, 2005; Kweon, 1998) However, how the neighbourhood park engaged the ageing people is limited researched, especially the social dimension and perceptual dimension. Moreover, how the interaction relationship works between ageing people and urban open space in a holistic view is still underexplored, in which the components in the relationship possibly contribute to different aspects of psychological health with different extent. According to the review of 40 years publications, Lewicka (2011) states that 'the studies on people-place relationships seem to be stuck in definitional questions and attempts to fit together various place-related concepts, such as place attachment, place identity, rootedness, sense of place, place dependence or place satisfaction. There are treated as different pieces of a broken jigsaw puzzle which may (and should) be put together.'

In this section, a critical review on the people-place relationship on a human-oriented foundation regarding to social dimension and perceptual dimension applied to clarify the main component, process of the interaction relationship. Based on the integrated empirical findings, the components, links, process emerged has been reconstructed into a new conceptual framework to express the nature understanding of the relationship, which used to direct the questionnaire design and tested to investigate which special component actually contribute to well-being, quality of life, positive mental health, loneliness of the ageing people.

3.2 De-constructed the empirical understanding of people-place relationship

People-place relationship is emphasized mainly in social dimension and perceptual dimension of urban design. There are a few models conceptualised the relationship and process, and some critical links emerged. This research is based on a human-oriented approach to explore the understanding of the people-place relationship. Thus, the review on the empirical studies is focusing on the people, as how they experience the environment, how they tie with the environment, and why they experience and need it.

3.2.1 Empirical models and process of the people-place relationship.

A critical review on empirical findings and development of human-oriented concepts in the people-place relationship. There are three main concepts, as place attachment, environmental perception in environmental psychologies, and adaptation level of human. It is significant to review and discuss the development of concept, process of interaction, methods applied in empirical studies to identify the gap and predict the appropriate method used in this research, however, it explore the essential elements, link, process in a theoretical foundation for producing a potential conceptual framework in a holistic view.

3.2.1.1 Place attachment

Place attachment defined as cognitive-emotional bonds between the individuals and important environment. (Scannell & Gifford, 2017) It is critical human-oriented concept investigated in the field of urban design and environmental psychology. The component and process of place attachment have been conceptualized into several models in different studies.

Raymond, Brown, and Weber (2010) consider place attachment is overview concept combined place identity, place dependence, social bonding, and nature bonding. By contrast, Bradley S. Jorgensen and Stedman (2001) suggested place attachment as an attitudinal construct, which is a subordinate concept placed with place identity, place dependence for sense of place. Scannell and Gifford (2010) proposed another three-dimension people-place-process framework of place attachment, in which person dimension covering the individually or collectively determined meanings, places dimension focusing on the characteristics of place, including spatial level and social level, process dimension emphasize the affects, cognitive, and behavioural component. The refining definitional concerns on place attachment is continues as evolution of place attachment concepts.(Moulay et al., 2018)

In relation to the elderly, Burholt (2012) gives a different conceptual definition of place attachment for the elderly living in rural area, in which includes three main dimension as social (social integration. Social support), historical perspective, physical (appropriateness of the environment, aesthetics). T. Buffel et al. (2012) investigated the impacts of types of communities on the extent which experience of place attachment of the elderly by applying the conceptual model proposed by Livingston, Bailey, and Kearns (2010). There are two dimensions including functional attachment, reflecting the ability of a place to enable us to achieve what we want to do, emotional attachment, the feelings and emotions people have about certain places. (T. Buffel et al., 2012).

In comparison, the common ground of place attachment is the human-oriented concept which describe the emotional link people establish with places where is especially important for them. In details, the social aspects has been emphasised by them in different context, such as social bonding (neighbourhood, belongingness, familiarity) (Raymond et al., 2010), social level of place dimension (social arena, and social symbol) (Scannell & Gifford, 2010) social aspects (social integration and social support) (Burholt, 2012). Another component has been emphasised by most of them is physical environment, such as nature bonding (Raymond et al., 2010), physical level of place dimension (Scannell & Gifford, 2010), physical aspect (appropriateness of environment and aesthetics)(Burholt, 2012), and the functional attachment (T. Buffel et al., 2012). In addition, place attachment is shaped by individual experience and group's culture, it is reflect the individual cognitive and affective process of attachment (Cross, 2015; B. S. Jorgensen & Stedman, 2006), and the expressions of attachment is mainly in their behaviours(T. M. Cheng, Wu, & Huang, 2013; Halpenny, 2010).

Thus, the triple-dimension conceptual framework from Scannell and Gifford (2010) shows a more logically and comprehensive expression of the place attachment. This research continues to apply the definition and construct of place attachment proposed by Scannell and Gifford (2010). In the application of measurement in China, the indicators has been justified depending on the responses in pilot study of questionnaire.

The methods what used to investigate place attachment cover both quantitative and qualitative approaches. The qualitative approach includes depth interview used to explore the processes of place attachment (Cross, 2015) and semi-structued inteviuw to explore the experienced benefit of it (Scannell

& Gifford, 2017). The quantitative method includes Principal component analysis (G. Brown & Raymond, 2007; von Wirth, Grêt-Regamey, Moser, & Stauffacher, 2016) which is used to refine and to built the measuremen scale the component of the concept, correlation analysis(Hernández, Carmen Hidalgo, Salazar-Laplace, & Hess, 2007) which used to assess the impact of natives and non-natives on the place attachment, liner regression analysis (von Wirth et al., 2016) and multiple regression analysis (G. Brown & Raymond, 2007) which used to assess the impact of landscape value on place attachment in large scale and spatial cross-correlation analysis which used to assess the impact of location to place attachment and gives predictions. 5-points Likert scale is widely used in measurement of place attachment. (G. Brown & Raymond, 2007; Hidalgo, 2014; B. S. Jorgensen & Stedman, 2006; Raymond et al., 2010; von Wirth et al., 2016)

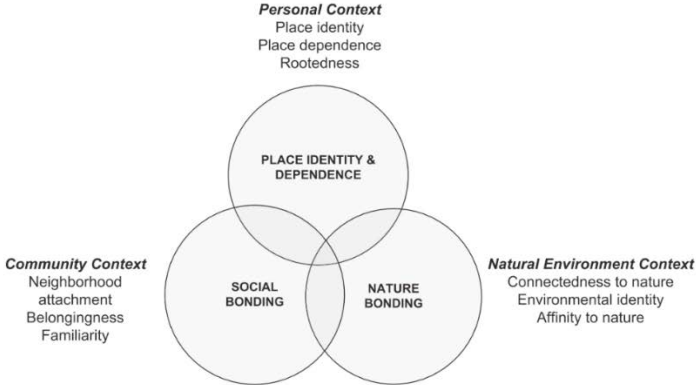


Figure 3-1 Raymond et al. (2010) three-pole and four-dimensional conceptual model of place attachment

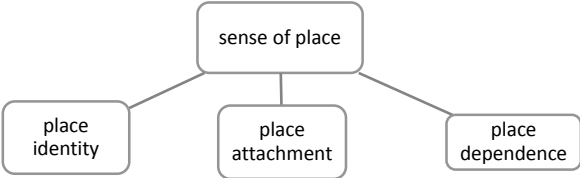


Figure 3-2 Bradley S. Jorgensen and Stedman (2001) three dimeson model of place attachment.

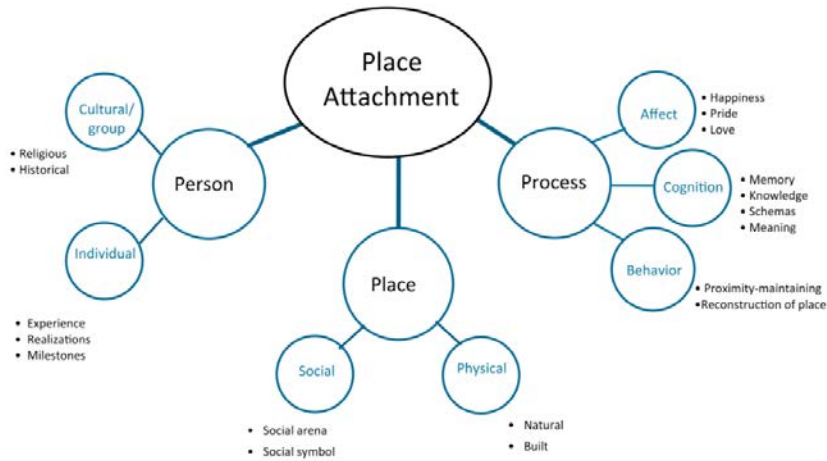


Figure 3-3 Scannell and Gifford (2010) tripartite model of place attachment

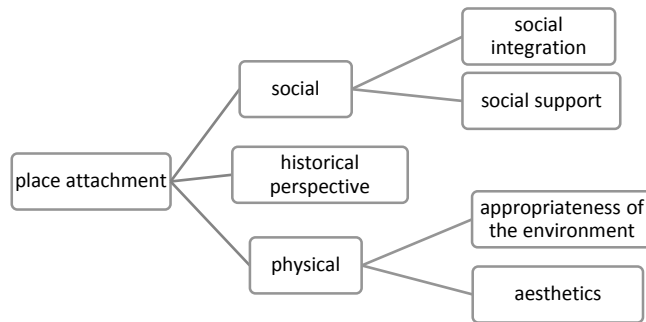


Figure 3-4 Burholt (2012) concept map of attachment of place for older people in rural areas

In this research, the measurement of place attachment consist to use 5-points Likert scale. This research applied correlation analysis to achieve the purpose in stage 2 to assess the affection of place attachment on psychological status and the association between social and behavioural attributes on the place attachment, because the correlation could show whether there a statistically significant association between two indicators and what extent of impacts between them. It is appropriated for this research.

3.2.1.2 Environmental perception in environmental psychologies

Environmental perception, as a human-oriented concept describes perception as a process relating to gathering, organising and making sense of information among the whole environment in the fields of urban design and environmental psychological studies. (Carmona, 2010, p. 111) The ‘perception’, sometimes, is identified as four dimensions of perceptions including: ‘cognitive’, ‘affective’, ‘interpretative’, and ‘evaluative’. (Bell, Greene, Fisher, & Baum, 1996; Carmona, 2010) There is another description of the modality of transaction of human-environment relationship form Stokols and Altman (1987, p. 259) cited in Bonnes and Secchiaroli (1995, p. 66) It emphasises the individual cognitive process from the environment and the expression in behaviours. The individual behaviours shaped by the environment and response of social environment in this process. In this way, it built the

essential understanding of the continuity of interaction in people-place relationship. However, there is few studies focusing on the continue interaction between the ageing people and urban open space, especially on perception.

Table 3-1 phase and form of transaction in environmental psychologies. Source: Stokols, 1978, p.259, cited in Bonnes and Secchiaroli, 1995, p.66

		Form of transaction	
		<i>Cognitive</i>	<i>Behavioural</i>
Phase of transaction		Interpretive	Operative
	Active	Cognitive representation of the spatial environment	Experimental analysis of ecologically relevant behaviour
		Personality and the environment	Human spatial behaviour
		<i>Evaluative</i>	<i>Responsive</i>
	Reactive	Environmental attitudes	Impact of the physical environment
		Environmental assessment	Ecological psychology

3.2.1.3 Adaptation level of human

To investigate the human-oriented interaction in urban open space, the adaptation level, as a concept, can used to explain why different people have different level of satisfaction and give the different feedback in the same environment. The rooted definition from Helson (1964) emphasises the impact of accumulation of previoures stimulating experience on people’s response to new stimuli. It widely used to investigate the foundational association between behaviours, job satisfaction, quality of life and happiness in psychology, (Andrews & Withey, 2012; Biddle, 2013; Bowling, Beehr, Wagner, & Libkuman, 2005). However, It provide a district perspective from psychological studies, which treat physical attributes, social attributes of the environment as a stimuli for people, who with different background, such as ageing stage, education, cultural background, native or non-native, will have different adaptation level and different environmental satisfaction level in the urban open space.

Depending on the adaptation level of human, the interaction relationship is not an independent issue, but also has the characteristics of times and culture with district differences, especially the people with different previous background will have different environmental experience and needs. It is consist in Some urban space studies, which point out that ‘the choice that individuals make in any particular environment are responsive to the individual’s ego, personality, characters, goals and values, available resources, past experience, life stage, etc.’. According to Wilson et al. (2013), late life cognitive decline leads to loss of well-being. The extent of physical decline and self-acceptance of them are influencing the level of well-being. The special characteristics of older people will lead them have different experience and perception in the urban open space. However, there is limited research investigating which part of experience impacting by what kind of characters of people with what extent of impacting, especially for the ageing people in detailed.

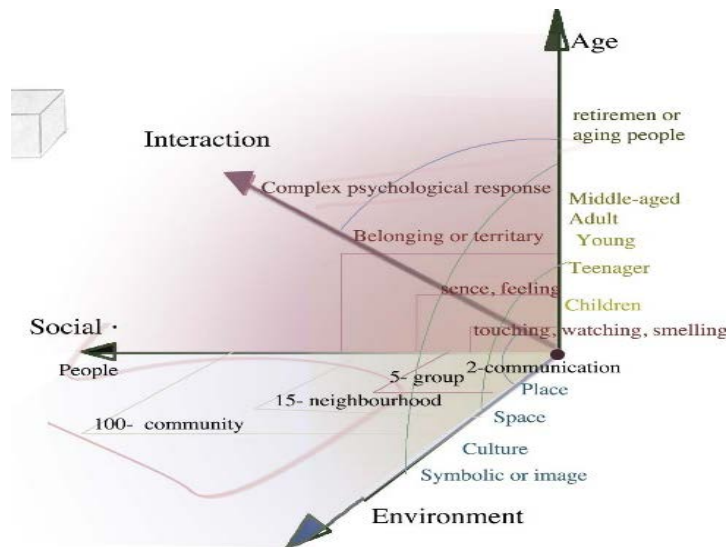


Figure 3-5 The interaction of individual-environment with age in three dimensions analysis system

3.2.2 Critical links in people-place relationship

A critical review is applied on the links among human behaviours and human needs with space, which are critical concepts associated with well-being and psychological issues. Human behaviour and human needs are two essential concepts in social dimension of urban design, especially for the ageing people in the neighbourhood park. It is significant to clarify the empirical findings and gap existing around them, which has significant contribution in building the understanding of the interaction relationship.

3.2.2.1 Human behaviour and space

The consideration of the human-space relationships start with environmental determinism, that by negating the role of human agency and social influence, physical environment has a determining influence on people's behaviour. (Carmona, 2010, p. 133) It emphasises the one-way process from the physical environment. People generally shows some normal behavioural habits in special environment, such as parks. According to Goličnik and Ward Thompson (2010), the behaviour of public park users shows 'edge effect' and 'landmarks' on occupation, and the role of active zone and buffer zone in big size public parks. The different conditions of users in different ageing stages possibly lead to different performance in urban open space, especially in smaller size space, as the neighbourhood park. The benefit of physical activity and exercise of the elderly on both health are widely acknowledged, however, how they engaged into the physical activity and motivations of using the urban open space is limited researched, especially in detailed as gender and age group.

The behaviour of using urban open space was explored through some visualization method, as GIS mapping with on site observation,(Ghavampour, Del Aguila, & Vale, 2017; Kienast, Degenhardt, Weilenmann, Wäger, & Buchecker, 2012; Todd et al., 2016), the data of behaviour has been record by researcher on sites and transfer point by point with information into the GIS software to produce the visualization map of occupation of behaviour. In this process, although GIS can help to release the visualization of behaviour space, it does not play the advantage of GIS software itself for the simulation

in computing. Instead, it brings the time-consuming of operating of the impute operation due to the complexity of its own functions.

With the development of programming and cloud computing, some online platform with open programming and fast update to new technology starts to instead some traditionally complex software. Mapbox is a new online platform to visualize the mapping by editing database with simple options. It has big potential in fuzzy visualization, or large-view visualization applications, and has the potential to introduce VR technology into behavioural spatial researches in the future.

By shaping the physical environment, human activity, social life and social relations are influenced in three pattern including 'constituted through space', 'constrained by space', and 'mediated by space'.(Dear & Wolch, 1989) However, the interaction relationship emphasises the continuous two-way process, in which people influenced at the same time by the space where people created and modified. As Carmona (2010, p. 133) point out that 'human behaviour is inherently situational, embedded in physical – but also 'social', cultural' and 'perceptual' – context and settings'. A holistic and human-oriented approach is contributing to research on the interaction relationship clearly and deeply. Compared with impact of physical attributes, what real influence on behaviour is the motivation and needs of the space user.

3.2.2.2 Human needs and space

The environment provided for users with a range of environmental opportunities as what people are able to do. The behaviour that individuals make in any particular environment are responsive to their goals, personality, and needs. The hierarchy of human needs has been proposed by Maslow (1968), which identified five-stage of human needs. Human needs are associated with their wellbeing, especially in social needs, as the satisfaction level of affection, behavioural confirmation, and status relating to age, physical loss, are affecting the wellbeing of the elderly.(Steverink & Lindenberg, 2006) According to Matsuoka and Kaplan (2008) based on review during past decades, they summarised the human needs in the urban landscape cover six categories, as contact with nature, aesthetic preference, recreation and play, social interaction and privacy, citizen participation in design process, sense of community identity. The engagement and needs of human with urban public space is affected by different factors, such as age groups. Askari, Soltani, and Ahmad (2014) pointed out older square users shows less interests in carrying out social interaction with other age groups compared with young people, and older people are more concerned with physical needs and environmental satisfaction. As Gibson (2018) stated that the empirical studies determine age influences usage of park, but we know little about why, the situation that their specific needs, preference are neglected will leads the particularly disadvantage of the older adults with constraining in frequenting parks. Gibson (2018) pointed out differed with younger adults, motivation of older adults is fulfilment of their autonomy needs, which is strongest predicted by natural environment, as a common park amenity. However, the culture and type of urban open space of the older people will affect their preference respective to their needs and how to engage them using park.

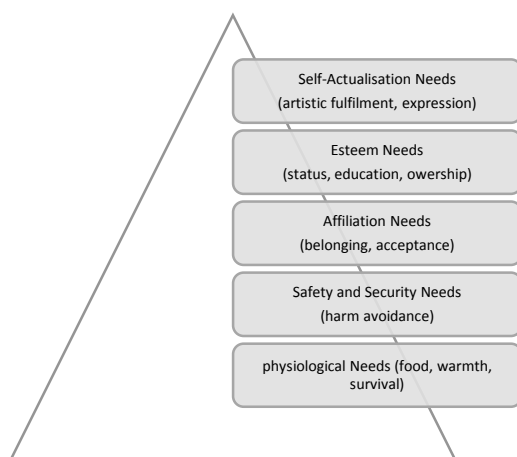


Figure 3-6 the hierarchy of human needs by Maslow (1968)

The methods used to investigate the specific needs of older people covers, questionnaire with correlation analysis, ANOVA, and regression analysis approach (Askari et al., 2014; Gibson, 2018) and semi-structured interview (E. H. Yung, Conejos, & Chan, 2016). A structural equation model hypothesised by Malek, Mariapan, and Shariff (2012) to assess the quality of neighbourhood park by measuring indicators of preferences and needs of users and use patterns, which is without measurement and practice. However, currently, the needs and attractive of the ageing people in urban open space is underexplored, especially for the neighbourhood park in China. In this research, A qualitative approach, as semi-structure interview is appropriate for digging the depth understanding and new concepts of awareness of the ageing people.

3.2.3 5.2.3 Summary

Depending on the critical review and discussion above, some key gaps could be identified as below:

1. There are limited studies investigating the two-way of the interactional people-place relationship in a holistic view, especially the elderly people.
2. The differences in need, preference of ageing people in urban open space is underexplored, especially in detailed terms of gender and age groups.
3. There is limited research investigating which part of experience affecting by what kind of characters of people with what extent of influencing, especially for the ageing people in detailed.
4. The impacts of perceptual dimension and social dimension of the place on behaviours of ageing park users are underexplored.
5. There are limited studies tested behaviour with social context and emotional bonding on the experienced psychological benefit in the neighbourhood park.
6. There are limited research investigating how the ageing people engaged in urban open space and how to attract them to use it to improve both general and mental health.

For the research methods, there are some inspiration emerged to apply in this research:

1. In this research, the measurement of place attachment consist to use 5-points Likert scale.
2. This research applied correlation analysis to achieve the purpose in stage 2 to assess the affection of place attachment on psychological status and the association between social and behavioural attributes on the place attachment, because the correlation could show whether

there a statistically significant association between two indicators and what extent of impacts between them. It is appropriated for this research.

3. Instead of the traditional mapping method using GIS software with time-consuming, Mapbox, a new online platform with visualization function by editing database using simple options. It has big potential in fuzzy visualization, or large-view visualization applications, and has the potential to introduce VR technology into behavioural spatial researches in the future.
4. In this research, A qualitative approach, as semi-structure interview is appropriate for digging the depth understanding and new concepts of awareness of attractiveness and needs the ageing people.

However, based on the critical literature review on human-space relationship, the elements, links and process emerged can be reconstruct into a potential conceptual framework to express the two-way interactional human-space relationship associated with well-being and psychological issues for the ageing people in a holistic view.

3.3 Re-construct into potential conceptual framework

According to the discussion above, the model of place attachment is links the person and group, social and physical environment, and process of psycholog. It is proposed by Scannell and Gifford (2010) to express the relationship, but did not test how it works. Transaction process of environmental perception emphasises the continuity and two-way of the interaction, which is consist with description of space made by people in the social dimension, although there is limited research investigate what extent of impact of social dimension of space on psychological health and well-being. Adaptation level of human means the response of human to the environment is associate with individual previous experience and conditions as age, which affect the level of adaptation and satisfaction of person in an environment. Nevertheless, the impact of ageing of people on the usage and experience in the neighbourhood park is underexplored. However, to integrate the understanding together is an effective approach to understand the continually two-way interactional people-place relationship.

Based on the understanding, the links has been re-constructed into a new conceptual framework regarding to psychological, perceptual, behavioural, personal, social temporal dimension and view the interaction relationship in a holistic and dynamic view.

In detail, the conceptual framework proposed as a micro-perspective model. If we assume that one person is an independent object into a 'place'. The first thing is the person recognise the affective of the environment, and then 'operative', give the feedback as behaviour into the environment. The influence of the behaviour have been recognised by this person and 'evaluative' the influence and then give another responsive as behaviour to the environment. If there are some person in the place together, the behaviour settings of them will build an effective social environment with time going, therefore the interactional influence is existing on human. The accumulation of the cognitive experience influence individual psychological health and satisfaction, such as satisfaction level of affection, behavioural confirmation, and status, self-esteem, loneliness, well-being, quality of life. The vertical coordinates expresses the personal conditions, as their previous experience, ageing stage, education, etc. it means personal condition influence the level of dimension of interaction and cognitive level.

In a macro perspective , the whole interaction system in a place is composed of many different

individual transaction systems, which are continues exchange and mutual effect and combine a continue change of dynamic system. In the reciprocal process, some systems of places are homeostatic, but some places are not. It is a significant question what causes social sustainable environment in urban open space, especially for the neighbourhood park.

3.4 The structure and key concepts of the interaction relationship for test and analysis

To test and analysis the actual internal relationships in the conceptual framework, which are in the highlighted portion of the diagram, as shown throughout the study. The way to mine the actual internal relationship of the theoretical conceptual framework is based on inferences, targeted questionnaire data, and validation hypotheses.

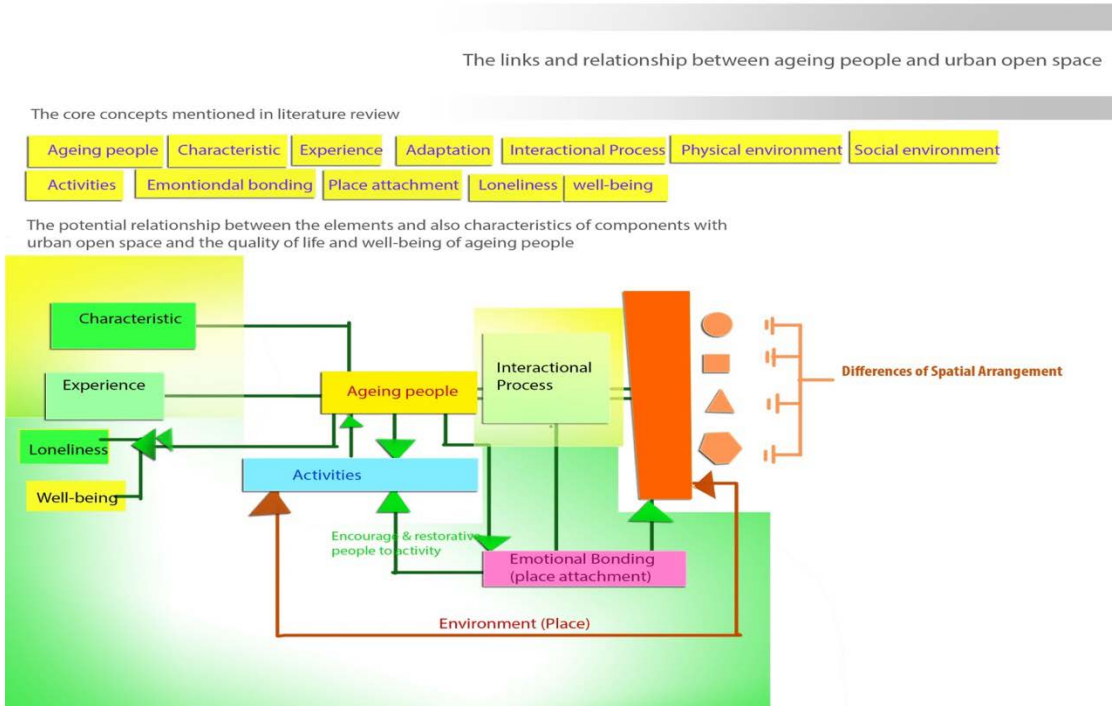


Figure 3-7 the re-constructed conceptual framework of people-place relationship in a microscopic perspective

Firstly, according to the theoretical review, construction, and extension of the literature review, we can get the conceptual framework shown in figure 5.9 of the theoretical interaction between people and urban open space among a range of concepts in perceptual dimension, behavioural dimension, social dimension, and physical dimension. (Lewicka, 2011; Scanell and Gifford, 2010; Hidalgo, 2013) These factors interact to affect people's feelings.

Secondly, the microscopic perspective view of the conceptual framework of interaction changing with time shown in figure 5.10 has been visualized. Because of the relationship between each other, the understanding of this framework is still vague. Therefore, in order, a deeper understanding of this relationship, the concept of Adaptive level theory (Helson, 1964a; Helson, 1964b) has been introduced, in this meaning, this interaction will be understood as a continuous process of change with the time sequence. (Bell et al., 1990; Stoloks, 1978)) People's characteristics, such as the social relevance (Whyte, 2001; 2006; Khotdee, et al., 2011; Woodcraft, et al., 2011), age (Rohels ,1967; Canter, 1977), previous

experience (Helson , 1964) and environmental characteristics affect people's activities and perceptions in the environment. (Helson, 1964a; Helson, 1964b; Scanell and Gifford, 2010; Aspinall et al., 2010) This kind of activity is also divided into behavioural activities and emotional ties, which is the process of this interaction. The concept of this activity includes physical activity and social activities. For the object of this study, the final impact on perception are the two important factors for the psychology of the elderly, the impact of happiness and loneliness. (Scanell and Gifford, 2017a; Scanell and Gifford, 2017b)

Antecedents	Interaction	influence or result
<ul style="list-style-type: none"> •people •environment 	<ul style="list-style-type: none"> •activity •emotional bonding 	<ul style="list-style-type: none"> •well-bing •reduction of loneliness

Figure 3-8 the antecedents, interaction, and result divide the concepts

Finally, depending on the understanding above, the structure was clarified and divided into three parts as antecedents, interaction, and influence or result shown in Figure 3-8. It used in two logical approach as directing the data collection (see Figure 4-2) and the associations needed to be tested. As a result, the hypothetical relationship between them is very clear as below:

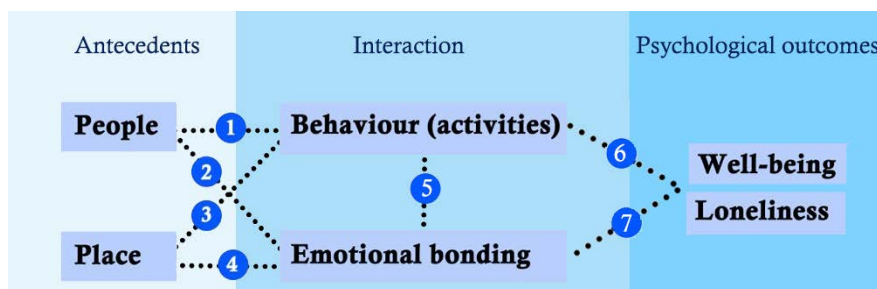


Figure 3-9 the hypothesizes deducted from the conceptual framework.

Figure 3-9 shows seven pairs of associations as following:

The four hypothesizes between antecedent (people and place) and interaction (activities and emotional bonding):

1. Different characteristics of ageing people prefer different activities in neighbourhood parks. **(Descriptive statistics and comparative analysis)**
2. Different characteristics of ageing people have a different extent of emotional bonding with the neighbourhood parks. **(Goodman and Kruskal's gamma test in SPSS)**
3. Different features of neighbourhood parks lead ageing people doing different activities. **(Observation and Mapping, and questionnaire data)**

4. Different features of neighbourhood parks lead ageing people having a different extent of emotional bonding. **(Descriptive statistical, the weight rate analysis and comparative analysis, qualitative data from interviews)**
5. Ageing people do different activities in neighbourhood parks will have a different extent of emotional bonding. **(Descriptive statistical, the weight rate analysis and comparative analysis)**
6. The associations between different activities of ageing people in neighbourhood parks and their psychological statement. **(Descriptive statistical, the weight rate analysis and comparative analysis, qualitative data from interviews)**
7. The associations between different extent of emotional bonding of the ageing people in neighbourhood parks and their psychological statement. **(Goodman and Kruskal's gamma test in SPSS)**

3.5 Summary

This chapter applied critical review on the interaction relationship to contribute four aspects as below:

1. To understand the empirical findings of people-place relationship;
2. To identify the gaps in current studies of interaction relationship regarding to ageing people and urban open space.
3. To produce an initial conceptual framework by re-constructing the elements, links, process to express the continually two-way interactional people-place relationship and conceptual framework for ageing people and urban open space.
4. To obtain the aspiration for methods, and to use the conceptual framework to divide a range of hypotheses, which should be tested and analysed in stage two.

Chapter 4 Research methodology

4.1 The scope of the whole research and research method framework

The aim of this research, as stated in Chapter 1, is to produce a comprehensive and effective conceptual framework which can be used to guide the design of urban open spaces in Chinese cities in order to improve the quality of life of the ageing population.

This aim is achieved by addressing four research objectives as follows:

1. To develop the nature of physical, and psychological dimensions relevant to the relationship ageing people have with open space and bring this understanding into a conceptual framework.
2. To test the initial conceptual framework and to analyse the way it works in relation to people in Beijing.
3. To reflect on the use of the initial conceptual framework, and revise it in light of the academic literature.
4. To make open space design recommendations focused on the social and perceptual dimensions of open space to promote the quality of life and wellbeing of the elderly.

To address the research objective and features, a framework has been designed (see figure 2.1) to explain the process. A methodological framework (see figure 2.2) was established to ensure that this research is carried out logically, coherently and productively.

This research is structured into four stages, ‘to explore’, ‘to test and analyse’, ‘to develop’, and ‘to apply’, adopting a mixture of methods combining qualitative and quantitative research approaches in four stages:

In stage 1, ‘to explore’, a literature review and documentary analysis help to develop a theoretical understanding to achieve three research sub-objectives, ‘to explore the characteristics of ageing people in China’, ‘to determine a range of sites in Beijing’, and ‘to produce a conceptual framework for people-place relationships’.

- Different backgrounds give people different experiences; people are rooted in their history and culture. Exploring the characteristics of ageing people, their rich backgrounds with cultural, social, historical and political knowledge could contribute to explaining the ageing people’s interests and preferences.
- Exploring the understanding of the current state of development of urban open spaces in China can help us recognise the gap between them and the preferences of the elderly. It is necessary to focus on neighbourhood parks because they are the type of urban open space most closely linked with ageing people in daily life. Since Beijing’s Chaoyang District has the greatest number of older people in the city and its planning is relatively less affected by historical factors, future research findings will have broader applicability. Six neighbourhood parks have been selected as research sites based on criteria depending on documentary analysis and site visits. Appropriate mixed research tools have been employed to carry out this study.
- Exploration of interactional relationships in physical and psychological dimensions which can build a theoretical foundation which clarifies the elements, links, and process by deductive inference, deriving logical conclusions from established theory.

In stage 2, ‘to test and analyse’, there are three methods, observation and mapping, semi-structured interview and questionnaire. These are applied to achieve three sub-objectives. The questionnaire designed in terms of the conceptual framework described above is used to establish the inner structure

and key features of the dynamic system of interactional relationships, using quantitative statistical analysis approaches from SPSS. The semi-structured interviews set out to uncover the usage features, desires and personal views of the elderly by qualitative thematic analysis in NVivo. The result of the semi-structured interviews and questionnaire supplemented each other and combined to achieve these two sub-objectives. Observation and mapping was used to produce the behaviour map of the elderly and supplemented the semi-structured interviews.

In stage 3, 'to develop', the outcomes of the questionnaires, semi-structured interviews and observation were integrated to achieve two sub-objectives, establishing the gap between the current state of urban open space and the desires of the elderly, and integration of the perceptual, behavioural, social, physical and psychological dimensions to establish the links among them in a comprehensive conceptual framework for the relationship between ageing people and urban open space.

Stage 4 is 'to apply'. The comprehensive and integrated conceptual frameworks are used to tackle two issues to discover how to promote quality of life and well-being of ageing people in China through improving the environment and intervention, and to make open space design recommendations focused on social and perceptual dimensions of open space in Chinese cities.

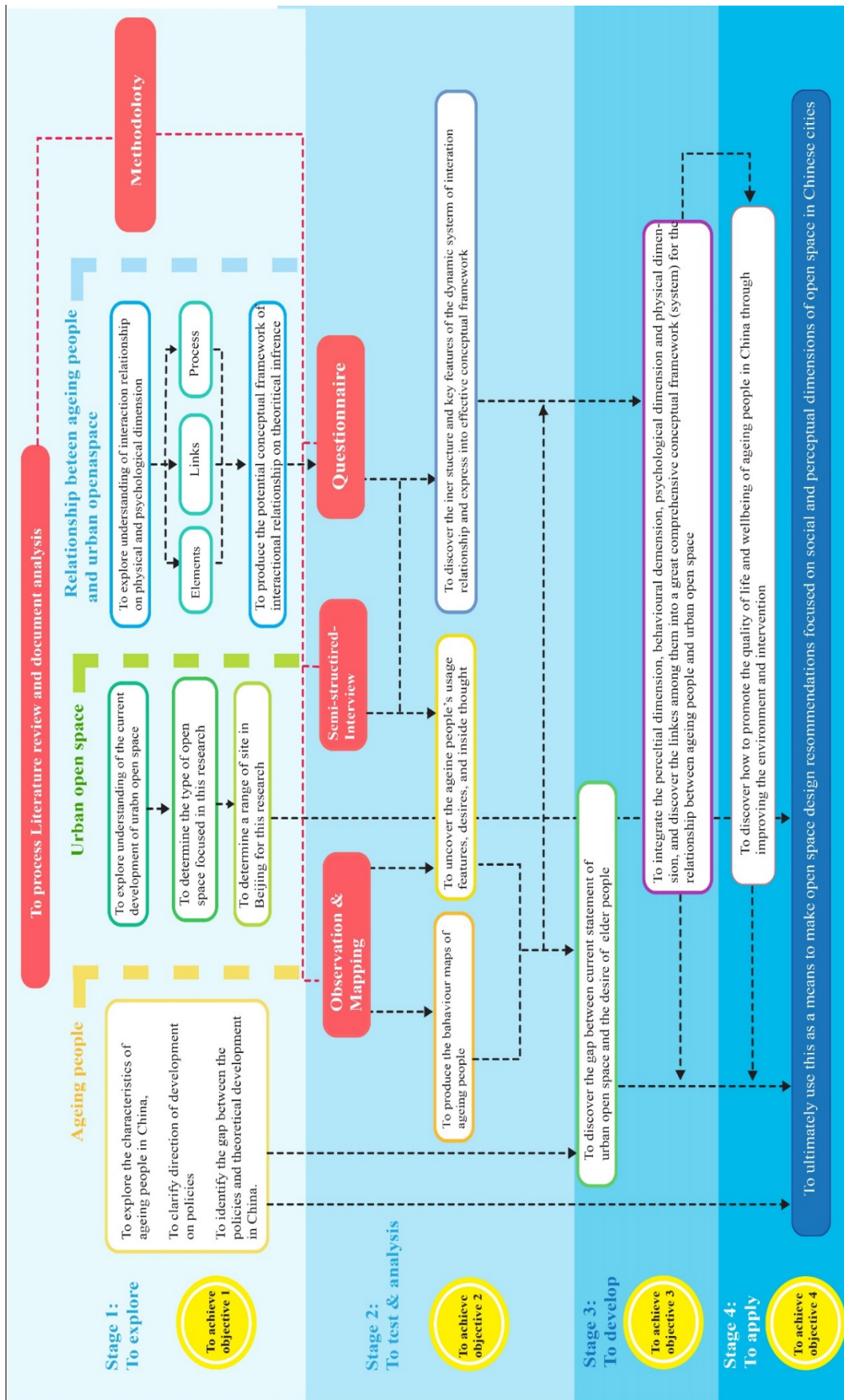


Figure 4-1 the research framework of this research

4.2 The selection and design of research methods for this thesis

The research methods selected and applied in this thesis are mixed, supporting an in-depth, comprehensive study which combines qualitative and quantitative approaches. Today's theories and researches focus on human behaviour, environment, human perception and psychological research. (N. C. Chen, Dwyer, & Firth, 2014; E. H. K. Yung et al., 2017) Separating these areas of study has caused some limitations of understanding. As Dadvand et al. (2016, p. 161) point out 'Green spaces are associated with improved health, but little is known about mechanisms underlying such association.' The environment, human perception, human behaviour and psychology should be studied as a whole, so that we can understand their interactions and respond through carefully designed interventions to improve people's wellbeing. The connections between various components make this research an interdisciplinary study, requiring the application of different research methods for different elements. Each research method complements and supports the others to achieve the aims of the research.

Johnson et al. (2007, p.123) said that 'Mixed method is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches for breadth and depth of understanding and corroboration.' Within a systematic review of human-environment relationships, Kabisch, Qureshi, and Haase (2015, p. 32) argue that 'the application of a multi-methods approach that includes measurements of objective activity indicators and established perception surveys may be the most effective way to reduce the subjectivity and make the results transferable.' The method applied in this research is mixed-method.

Five research methods have been identified as appropriate for this project, a literature review, documentary analysis, non-participant observation, questionnaire and semi-structured interview. A literature review and documentary analysis are used to build the fundamental basis for this research; the mixed-method integrated observation and mapping, semi-structured interview and questionnaire are used to test the proposed conceptual framework and investigate the personal views of the elderly. Each of these research methods is discussed separately elaborated below.

4.2.1 The structure of data survey based on the initial conceptual framework

the selection of the survey method was based on the conceptual framework obtained in Chapter 3, which is in fact the basis for guiding and determining the three data survey methods. To conduct a social survey, we must clarify the concepts, developing the indicators and evaluating the indicators. (De Vaus & de Vaus, 2013, p. 41) The initial conceptual framework used to guide what data needed in this research, Figure 4-2 is based on the **错误!未找到引用源。** and Figure 3-8 delivered from critical review of literature, the tools designed for every element deduced by each facet from the conceptual framework.

In terms of cause-and-effect, three types of variables have been defined: independent, intervening and dependent. (Vaus, 2014, p.21, Abu-Bader, 2016, p.6). They correspond with antecedences (ageing people, environment), interaction processes (activity and emotional bonding), and outcomes (wellbeing and loneliness).

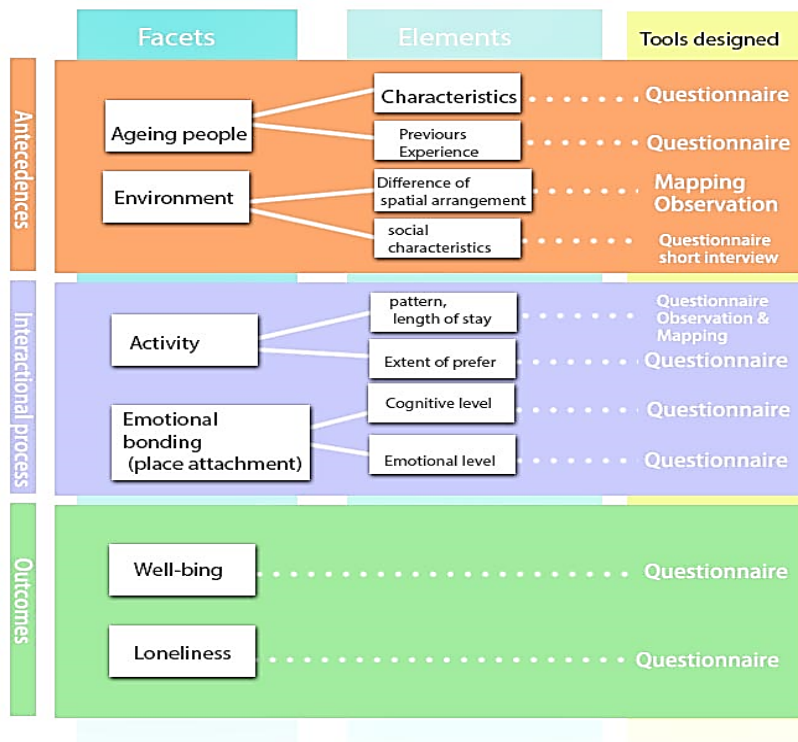


Figure 4-2 the data collection design framework

4.2.2 The key concepts of the initial conceptual framework in research survey

The reconstructed conceptual framework delivered from chapter 3 applied in data survey guiding what kind of data need to collected in the questionnaire and extended survey. This section set out to discuss and summaries the definition of these concept used in this research, especially it is significant to decide what dimensions of concept, what items including dimensions and what description used to collected the data of item.

4.2.2.1 Quality of life, Well-being

‘Quality of life’ is a phrase commonly used in the field of medicine, psychology and other health related disciplines, to describe assessments of an individual’s holistic experience of life. (Kabisch et al., 2015; Lee & Hung, 2011; Marcheschi, Laike, Brunt, Hansson, & Johansson, 2015) The World Health Organization (WHO) has defined quality of life as a multidimensional construct that results from subjective evaluations of fundamental aspects of life like physical and psychological well-being, social functioning and the environmental quality of life. (Marcheschi et al., 2015; *WHOQOL Annotated Bibliography* 1996; *World report on ageing and health*, 2015) An increasing number of recent studies have highlighted the benefits of the natural environment, parks on the quality of life of citizens. (Askari et al., 2014; Camargo et al., 2017; Kabisch et al., 2015) Quality of life is an important indicator to measure the impact of urban open space, including the range of parks, public square, community public space. This is especially so for evaluation and measurement in the studies of the ageing population. Well-being is considered a potential resource for ageing well (Allerhand, Gale, & Deary, 2014) and maintaining positive psychological well-being is a critical part of healthy ageing. (Díaz-López et al., 2017; López Ulloa, Møller, & Sousa-Poza, 2013) the protective effective of positive well-being persists after adjustment for negative affection and depression. Allerhand et al. (2014) pointed out that ‘depression had a greater effect upon this association for those with higher well-being, but exercise protected cognitive performance against the adverse effects of lower well-being of the elderly’. So

positive psychological well-being is a critical indicator of mental health in healthy ageing studies. In recent years, it has been evaluated to test the impact of physical activity, the physical character of parks, and the environmental attributes of neighbourhood open space for older people in developed countries (Aspinall et al., 2010; McCormack et al., 2010; Netz, Wu, Becker, & Tenenbaum, 2005).

In this research, quality of life and psychological well-being are assessed to investigate the effects of the use of neighbourhood parks on the mental health of ageing people, especially in the social and perceptual dimensions. The measurement of these indicators is consistent with the fifth wave of the Chinese Longitudinal Healthy Longevity Survey (CLHLS) in 2008 in China, which investigated the effects of using neighbourhood parks by the elderly in comparison with the national average.

4.2.2.2 Loneliness

Loneliness is defined as a qualitative, subjective evaluation of an individual's expectations of and satisfaction with the frequency and closeness of their contacts (Salimi, 2011; Shankar, McMunn, Banks, & Steptoe, 2011). Loneliness is linked to low self-esteem, depression, and physical illness, which are especially detrimental to the health and well-being of the elderly (B. S. Liu & Rook, 2013; Salimi, 2011; Shankar et al., 2011). B. S. Liu and Rook (2013, p. 814) suggested that emotional and social loneliness is impacted by social exchanges, and that the risk of loneliness increases with advanced age due to poor health, residential relocation and the loss of social network members and therefore opportunities for socializing. There is a greater risk of being socially isolated and feelings of loneliness among older adults (Shankar et al., 2011). Loneliness is a critical factor affecting mental health and quality of life of the ageing people. In this research, the measurement of loneliness is consistent with CLHLS.

4.2.2.3 Experience of psychological benefits

There is increasing evidence which demonstrates that one of the psychological outcomes of place attachment is well-being. (Rollero & De Piccoli, 2010; Janine L. Wiles et al., 2009) Scannell & Gifford (2017) investigated 'experienced psychological benefits', ways in which person-place cognitive-emotional bonds benefit individuals psychologically. These are memories, belonging, relaxation, positive emotion and others, based on context analysis with different types of place and geographical scale. The phrase, experienced psychological benefit, is used to describe the range of psychological outcomes in an overview. Scannell and Gifford (2017) go on to suggest that future work should develop a quantitative measurement of psychological benefits which could assess the relative contribution of emotional bonding on the psychological outcomes. In this research, indicators of psychological benefit were surveyed to assess the benefits relating to neighbourhood parks for the elderly, so the results of this research may contribute towards filling this gap.

4.2.2.4 Social psychological needs

Social psychological needs are a concept in the field of psychology which covers the satisfaction of affection, behavioural confirmation and status relating to age, physical loss and subjective well-being. In Maslow's five-stage hierarchy, they can be seen in the interactions between people and place, in which there are environmental opportunities regarding what people do to and receive from the environment. Social psychological needs belong to the higher levels of human needs regarding affiliation needs (belonging, acceptance), esteem needs (status, education, ownership) and self-actualisation needs (artistic fulfilment, expression) (Carmona, 2010, p. 134; Maslow, 1968). Carmona (2010, p. 136) citing Lang's hierarchy of human needs, notes that affiliation, self-actualization and esteem needs are associated in a complex system, linking with each other in the social dimension of the

environment. The present research tests the association between psychological need satisfaction and general wellbeing (Milyavskaya, Philippe, & Koestner, 2013), especially social psychological need satisfaction (Steверink & Lindenberg, 2006). As Steверink and Lindenberg (2006) have shown, social psychological needs do not become less important with advancing age, so social psychological needs are a critical factor to assess in examining the effects of social dimension of the neighbourhood park for the elderly.

4.2.2.5 Social interaction

Social interaction refers to interactive behaviour with social intent in the environment, and is assessed in the social dimension in relation to housing (Farida, 2013), the neighbourhood environment (Alidoust & Bosman, 2015), urban environmental risk and urban green infrastructure (Duan, Wang, Fan, Xia, & de Groot, 2018) as well as engagement with urban open space across age groups (Askari et al., 2014). Social interaction is an important indicator of the social dimension of the urban open space. The potential benefits of enhancing social interaction to promote quality of life for older people has been noted by previous research (Askari et al., 2014), but the ways in which people engaged in their social interaction have been underexplored.

4.2.2.6 Interaction relationship

Interaction relationships in this research emphasise the continuing two-way process by which people modify a space while at the same time being influenced by the space and the results of behaviour in it. The attributes of the environment shape people's behaviour under the influence of their particular environment, which provides a range of special opportunities for people to do things. What people actually do is 'resultant' to create space. (Carmona, 2010, p. 134) The processes of people-place interactions include 'cognitive', 'affective', 'interpretative', and 'evaluative' functions, which help to understand the continuing process which links the cognitive with people's behaviour in their environment (Bell et al., 1996, p. 29; Carmona, 2010; Stokols & Altman, 1987, p. 112). Currently, most research focuses on people-place relationships in one way, exploring the influence of the environment on behaviour the benefits of the physical environment (Finlay, Franke, McKay, & Sims-Gould, 2015; Koohsari et al., 2015; Weimann et al., 2015). This research focuses on the interplay between people and place and emphasises the continuity of two-way relationships. A creative approach which has been used to investigate the interaction relationship has allowed concepts of the people-place relationship to be de-constructed and re-constructed into a new potential conceptual framework to express the interaction relationship. This has been used to investigate how the system works and what special impact there is on the psychological benefits and mental health of the elderly. This could be used as a means to manipulate and restore a socially sustainable environment through design in the future.

4.2.2.7 Urban open space

Urban open space is described vividly by Woolley (2003, p.3) who says, 'the city can flow into the park and the park can flow into the city.' Thwaites, Helleur and Simkins (2005, p.525), describe the system of urban open spaces system in a figurative way, as 'mosaics of linked and nested spaces woven into the urban fabric.' Relevance and integrity are reflected clearly in this definition. The term 'urban open spaces' describes a range of open areas, including parks, green spaces, urban green space, street and squares. Some authors describe these areas as 'public open space' (Akpınar, 2016; Fan, Xu, Yue, & Chen, 2017; Kabisch et al., 2015; Koohsari et al., 2015). In this research, urban open space means a range of parks, street and square, especially the target of the study, the neighbourhood park.

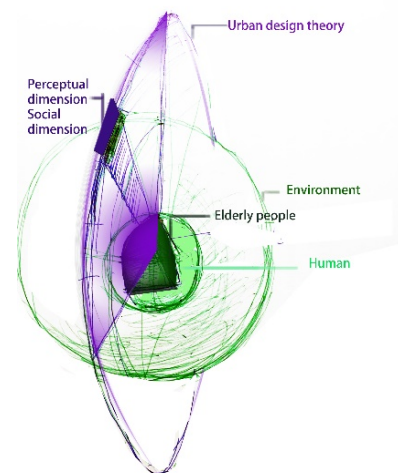
Distance has been highlighted in previous research as an important matter for the elderly in their choice of urban open space (Alves et al., 2008). There is some research focused on local parks in neighbourhoods, which provide evidence of the benefits of local parks for social ties, the coherence of a community and general health (Kaźmierczak, 2013; Parkes & Kearns, 2006; Van Herzele & de Vries, 2011).

4.2.2.8 Neighbourhood park

A neighbourhood park has, ‘for a certain residential area within the scope of the service, a certain concentration of activities and facilities of green space’, as described in the Chinese government’s code of classification of urban open space, CJJT85-2002. A earlier definition was ‘open space developed in residential areas; managed by Park Department as part of zoned open space of cities; may include playgrounds, sports facilities, and so forth (Francis, 1987, p. 78). The neighbourhood park is the most fundamental unit in an urban park system designed to meet the needs of local residents (Huang, 2010; Malek et al., 2012). It has great value in promoting the general health of local residents (Parkes & Kearns, 2006; T. Sugiyama et al., 2016), especially the elderly (Takemi Sugiyama & Ward Thompson, 2008; C. J. P. Zhang et al., 2019). But research on the association between the elderly and neighbourhood parks is insufficient given the current increase in the ageing population. Older research on the associations between the elderly and the neighbourhood park focuses on the physical character of places and physical exercise (Takemi Sugiyama & Ward Thompson, 2008; Ward Thompson, 2013), and there is only limited research on the other dimensions of the neighbourhood park

4.2.2.9 Multiple-dimensions of urban design

Open space is a relatively complex and comprehensive field to research, as the formal frame of open spaces includes six dimensions: ‘the morphological’, ‘the perceptual’, ‘the social’, the visual’, the functional’ and the temporal dimension’ (Carmona, 2010). To research every dimension of open space would provide a broad picture, but it is difficult to cover all dimensions at a deep level of research because it is a huge system. This research focuses directly on the perceptual and social dimensions of open space and aims to contribute to its development and design for the elderly. The main emphasis is on ‘holistic human-environment relations integrating human behavioural and psychological functioning with spatial and material world’ (Thwaites & Simkins, 2007, p. 35). An integrated view of the multiple dimensions of space can provide a holistic view from which to investigate the interactional relationship.



4.2.2.10 The perceptual dimension of urban design

The perceptual dimension is defined as the perception and experience of ‘place’, reinforced by studies focusing on experiential ‘sense’ of place’ (Carmona, 2010). The basic components of the perceptual dimension are ‘cognitive’, ‘affective’, ‘interpretative’, and ‘evaluative’, providing the basis for an understanding of the stimuli from the environment in the field of environmental psychology (Carmona, 2010, p. 112). There are two important concepts within the perceptual dimension of urban design: a sense of place; and place attachment. Place attachment describes the cognitive-emotional bonds

between humans and a particular place, a human-oriented concept (Scannell & Gifford, 2017). A sense of place is a conceptual reflection in urban design (Montgomery, 1998). Expressions of place attachment may change considerably over the course of a life (Livingston et al., 2010). In recent years, place attachment has been investigated in relation to health benefits and well-being at a neighbourhood scale, but there are only limited studies which focus on ageing people (J. L. Wiles et al., 2017; Y. Zhang, van Dijk, Tang, & van den Berg, 2015). To improve the perceptual dimension of neighbourhood urban open space is a critical basis for achieving sustainably healthy ageing.

4.2.2.11 The social dimension of urban design

The social dimension of urban design incorporates a range of concepts which together describe the relationship between society and space (Carmona, 2010, p. 133). The social dimension covers human needs in space, its creation or modification, and other social contexts. The social behaviour of people can create a particular setting in space, one part of the social dimension of place. This research focuses on the social dimension of neighbourhood parks investigating how the psychological needs of the elderly relate to place. The study of this social dimension is limited because of the different ages of people studied. In the past two years, a study by E. H. K. Yung et al. (2017) focused on the social dimension of the environment relating to elderly satisfaction with public parks, emphasizing the contribution of social interaction to environmental satisfaction. But there is still a range of questions which are underexplored, such as 'are the social interaction and social psychological needs of the all elderly the same, despite their different gender and age?'; and 'if different, does it influence their behaviour and psychological benefit, including the emotional bonding with the park, which provides engagement for the elderly'?

4.2.2.12 The physical dimension of urban open space

The term 'physical dimension' as it is used in this research refers to the physical attributes of the environment of the neighbourhood park. The effects of the physical attributes of urban open space on well-being are evidenced by a body of studies (Hadavi, 2017). The physical attributes of the environment affect the inclusion of the elderly in activities (Parra, Gomez, Fleischer, & David Pinzon, 2010), especially walking patterns (Gomez et al., 2010), and their psychological well-being (Parra, Gomez, Sarmiento, et al., 2010; C. J. P. Zhang et al., 2019). The physical attributes are investigated by score measurement (C. J. P. Zhang et al., 2019), the positive and negative attributes of environment depending on distance and barriers to use (Hadavi, 2017), (Hadavi, 2017), and pathway design characters (Zhai & Baran, 2017). The physical dimension of urban design is fundamental to attracting and restoring the healthy perceptual and social dimensions, as well as supporting mediation and intervention. There is limited research on the character of behavioural spatial distribution in neighbourhood parks, and the gaps between usage and their current state requires improvement.

4.2.2.13 Emotional bonding

Lewicka (2011, p. 208) reviewed publications about place attachment over the last 40 years, and argued that the various definitions of place attachment make it like a jigsaw puzzle. Several different models have been used to conceptualize place attachment and its dimension or components. Bradley S. Jorgensen and Stedman (2001) say that place attachment is a subordinate concept coordinating with place identification and place dependence, which are expressions of sense of place. Raymond et al. (2010) suggest that place attachment is a synthesis of place identity and dependence, social bonding and nature bonding. A clearer and more logical model has been conceptualized by Scannell and Gifford

(2010), which divides place attachment into three dimensions with sub-dimensions: person (culture/group and individual), place (social and physical) and process (affect, cognition, behaviour). Scannell and Gifford (2017) define place attachment as a cognitive emotional bonding between individuals and their important places, saying that it is a common human experience which influences their well-being. This triple model has been used as the foundation for understanding place attachment in a number of studies which develop the measurement scale (Hidalgo, 2014) (Moulay et al., 2018; Scannell & Gifford, 2017). This research uses Scannell and Gifford (2010); (Scannell & Gifford, 2017) to investigate the association between emotional bonding with neighbourhood parks and their benefit for the mental health of the elderly.

4.3 Literature review

‘Reviewing the literature is an essential part of the research process’ (Robson & McCartan, 2016, p. 82), which can build the essential theoretical foundation for a study and ‘establish convincing evidence to answer the study’s question’ (Li, 2015, p.15). It is a significant tool in understanding research topics and an essential approach in revealing the critical issues to research. It helps to establish a foundation for deductive inference, developing new understanding of research based on current theory. It has been argued that:

Some critical literature reviews go beyond seeking answers to the research question. They may produce a new model or theory or interpretation, or develop an existing one. (Robson & McCartan, 2016, p. 84)

In this research, critical review of the literature is one of the primary research methods, addressing ageing people, urban open space, relationship and method as detailed below:

- To explore the characteristics of ageing people in China.
- To explore the current development of urban open space in Chinese cities used as means to determine the type of open space focused and the study sites in Beijing for this research.
- To explore the understanding of the interaction relationship on the physical and psychological dimension and produce the initial conceptual framework.

The first sub-objective is to investigate the social, cultural, historical, political, physical and psychological characteristics of ageing Chinese people, by using keywords in context, secondary data analysis, theme analysis, qualitative comparative analysis (Peter et al., 2017). This work aimed to explore the personal backgrounds of ageing people, combining the results with observation data in later analysis to discover and help explain their opinions.

The second sub-objective aims to determining the nature of the public spaces available to the elderly in China. Through literature review using key words in context, component analysis, thematic and secondary data analysis, this study deals with particular neighbourhood parks most closely related to the elderly’s daily lives.

The third sub-objective aims to develop a conceptual framework by deconstructing the understanding of current theories of people-place relationships by a critical literature review and a creative approach. The conceptual framework will be used to direct this research, especially the seven associations in stage 2.

The literature review contributes to addressing research methods, which dealt with the use of urban open space, urban neighbourhood parks, older people using the park, the wellbeing of older people, their health and emotional bonding (place attachment). It provides support for research on design in this study and to identify the strengths and limitations of frequently used research methods in these areas.

This study uses mixed methods which support each other to reduce the limitations of a single research method.

4.4 Documentary analysis

Documentary analysis is a qualitative research method that has been widely used in textual analysis. (Charmaz & Belgrave, 2012) It has been applied to understanding a diversity of public, policy, social issues. Its functions are collecting standard and official resource, rich and supplementary information for research and conclusions.

In this thesis, documentary analysis is used as one of the primary data collection tools, with the application of the analysis approach of keywords in context, and comparative analysis (Onwuegbuzie et al. 2012) to achieve the sub-objectives in stage 1.

The documentary analysis in this thesis consists primarily of a literature review, mainly focused on policy towards the ageing population in China, policies on the planning of urban design in Beijing and design guidance about urban open spaces. The state of population ageing in China is addressed, and then the development of ageing friendly policies in China and the political background to the development of urban open space in China. It has also determined the study sites for this research. The documents listed in table 2.1.

Table 4-1 the list of documents reviewed

<p>The documents of Ageing people in China: policy, statistics reports by government.</p>	<p><i>The people’s Republic of China Yearbooks (from 2013 to 2017)</i> <i>‘Construction Plan of Social Endowment Service System’ (2011-2015)</i> <i>Twelfth Five-Year Plan’for the Development of the Service Industry for The Elderly in China’</i> <i>‘Construction Plan of Community Service System 2011-2015’</i> <i>‘Decision of the Central Committee of the Communist Party of China on Some Major Issues Concerning Comprehensively Deepening the Reform’</i> <i>‘Opinions on Accelerating the Development of the Endowment Services Industry’</i> <i>‘Opinions on Further Strengthening Preferential Treatment Work for the Elderly’</i> <i>‘Opinions on Accelerating the Accelerating the Development of the Endowment Services Business’</i> <i>‘China Report of The Development on Aging Cause 2013’</i> <i>‘Guiding Opinions on Strengthening the Standardization of Endowment Service’,</i> <i>‘Guiding Opinions on Advancing the Liability Insurance Work of Endowment Institutions’,</i> <i>‘Notice on Promoting the Work of Endowment Service Facilities in Towns’,</i> <i>‘Opinions on Accelerating the Training of Talents in Endowment Service Industry and Accelerating the Promotion of Health and Endowment Service Engineering Construction’</i> <i>‘Beijing Home-based Endowment Service Regulations’</i> <i>‘Rules for the Implementation of Community and Home-based Endowment Service Standards’</i> <i>‘The 13th Five-Year Plan Outline of National Economy and Social Development’</i></p>
<p>The documents of Urban open space in China: policy and regulations</p>	<p><i>‘Law of the People’s Republic of China on City Planning’,</i> <i>‘City Green Ordinance’ (),</i> <i>‘City land classification and land use planning and construction standards’ (GBJ 137),</i> <i>‘Park design code’(CJJ 48),</i> <i>‘Standard for calssification of urban green space’ (CJJ/T 85-2002)</i> <i>‘City residential distric planning and design code’(GB 50180) and</i> <i>‘City road greening planning and design standard’ (CJJ 75).</i> <i>The provisions of construction of the index of city greening and planning’(The Ministry of Urban Construction of China, 1993, No. [1993] 784)</i> <i>‘Standard for calssification of urban green space’ (CJJ/T 85-2002)</i> <i>‘Code for calssification of urban land use and planning standards of development land’ (GB50137-2011’</i> <i>Code for the design of urban green space’ ((GB50420-2007),</i> <i>‘Standard for calssification of urban green space’ (CJJ/T 85-2002) , combined</i> <i>‘Code for urban residential district planning and design’ (GB 50180-93(2002)),</i></p>

4.5 Research survey: questionnaire

According to a systematic literature review on human-environment interactions in 219 publications (Kabisch et al., 2015), questionnaire surveys were used in nearly 40% of all studies, and interdisciplinary research was especially needed for megacities in developing countries. Most recent studies have focused on the benefits of green exposure, eco-system, and natural settings on the general and mental health of residents. (Aspinall et al., 2010; "Correction: Social participation and the prevention of decline in effectiveness among community-dwelling elderly: A population-based cohort study (PLoS ONE (2015) 10:9 (e0139065) DOI: 10.1371/journal.pone.0139065)," 2016; Dadvand et al., 2016; T. Sugiyama et al., 2016; Takemi Sugiyama & Ward Thompson, 2008) There is little research exploring interactional relationships for ageing people in China in a holistic way, and only limited research on the social dimensions of the urban open space, especially the social psychological benefits of neighbourhood parks.

The design of this study is step by step and can be broadly divided into four steps. The first and most important step is chapter 3 in LR, which reconstructs the conceptual framework of this study. This conceptual framework guides 4.5.2, 4.5.3, and 4.5.4 of this section, and they are Step 2 Step 3 Step 4 respectively. The second step identifies the framework to transform the components, the third step determines the conceptual definition and dimensions of the components, and the fourth step determines the description of the measurements in this study based on the definition and dimensions of the third step, thus finally forming a functional questionnaire.

4.5.1 The aim and scope of the questionnaire

The questionnaire was used in stage 2, 'to test'. It was designed to investigate two sub-objectives as below:

- To discover the inner structure and key features of the dynamic system of interactional relationships;
- To uncover the usage features and personal opinions of ageing people

The questionnaire was used to test the associations in the proposed conceptual framework, which impacted on the elements and indicators in the questionnaire design. The questionnaire covers five main components including people, place, behaviour, emotional bonding and psychological issues.

4.5.2 The outline of the items and indicators of key concepts in survey

Based on the discussion and summary, 4.5.3 shows the special definition and dimensions covered in concepts, built a fundamental base for the outline of items embedded in this survey. The outline of the items of questionnaire and the descriptions used for indicators shown in Table 4-2. This outline shows in three levels, top level is facets which are the key components in initial conceptual framework (see Figure 3-8 and Figure 3-9). The middle level is elements, the sub-level of facet, reflecting the structure of data survey (see Figure 4-2) and the dimensions and definition decided in 4.5. Because some study applied different measurement of indicator with different description of items, it leads different result. The indicators used in this study are described as measures that are consistent with the concepts discussed in the previous paper, so that greater consistency between the accuracy of the conceptual measures and the theoretical echoes is preserved. **错误!未找到引用源。**

Table 4-2 The outline of item and description design of questionnaire

Table 4.2 outline of questionnaire design					
Facets	Elements	Items	Descriptions		
Ageing people	Characteristics	Gender	Socio-demographic Character		
		Age	Malek et al., 2015		
		Marital			
		Income			
		Education level			
		Occupation			
		Living arrangement	Chen et al., 2014; Aspinnall et al., 2010		
		Living alone			
		Social relationship	Friends in park and Neighbourhood Family	Social	Chen et al., 2014, p.1598
		In lowest wealth group	Toma et al., 2015		
		Difficulty to seeing	Aspinnall et al., 2010		
		Difficulty to moving			
		Difficulty to hearing			
Means to go this park	Aspinnall et al., 2010				
Distance to local park					
Frequency of visits to local parks					
Frequency of visits this park					
Previous Experience	Culture/ religion				
	Previous occupation				
Environment	Spatial design				
	Social Characteristics				
	Attractive environment	Spencer, B. et al., 2013; Hilder ,2001; Bowling et al. ,2006; WHO, 2007; Sugiyama et al. ,2009; Sugiyama and Ward Thompson, 2008			
Facilities for socialising					
Activities	Pattern	Group / personal	Malek, N.A. et al., 2015		
		Static / dynamic			
	Length to stay				
	Extent of prefer area				
	Opportunities for socialising	Spencer, B. et al., 2013 Hilder ,2001; Stevens , 2006; Peace et al. ,2006; Bowling et al. (2006) WHO, 2007; Sugiyama et al. ,2009			

	Friend from activates			
Emotional bonding (Place attachment)	Person dimension	Group level	People like me come to here.	Adapted from Hidalgo, 2013; Scannell & Gifford, 2010
			Most of my friends are in some way connected with my use of the place.	Williams, 2000
	Place dimension	Social level	I identify with the people of the neighbourhood.	Hidalgo, 2013; Bonaiuto et al., 2003
			People I am attached to are mostly from this place.	Adapted from Scopelliti & Tiberio, 2010
			I never feel alone here.	Scopelliti & Tiberio, 2010
		Physical level	I have a special connection to the people from this place	Hidalgo, 2013; Kyle et al., 2005
			This park always makes me feel strong emotion.	Adapted from Scopelliti & Tiberio, 2010
			I have attached to this physical place.	Hidalgo, 2013; Adapted from Hammit et al., 2006; Scannell & Gifford, 2010
	Psychological processes dimension	Emotional level	I am attached to this place which is suitable for special activity	Auther
			I miss this place when I am away.	Hernandez et al., 2007; Lewicka, 2010; Hidalgo, 2013; Nielsen-Pincus et al., 2010
			I am very attached to this place.	Williams, 2000; Kyle et al., 2005; Scannell & Gifford, 2010
			I am rooted here.	Lewicka, 2010
			I feel connected to this place.	Scannell & Gifford, 2010
			This place is very special to me.	Williams & Vaske, 2003
		Cognitive level	This place is part for me.	Hidalgo, 2013
			This place reflects the type of person who I am.	Lewicka, 2010; Scopelliti & Tiberio, 2010;
			This place means a lot to me.	Williams, 2000; Williams & Vaske, 2003; Kyle et al., 2005 Hammit et al.,
			I feel I can really be myself when I am here.	Jorgensen & Stedman, 2006;
		Behavioural Level	This is my favourite place to be.	Hidalgo, 2013; Nielsen-Pincus et al., 2010 ; Jorgensen & Stedman, 2006;
			This is my favourite place to go during my free time.	Williams, 2000;
This is the best place for what I like to do	Hidalgo, 2013; Nielsen-Pincus et al., 2010 ; Jorgensen & Stedman, 2006;			
I would prefer to spend more time here if I could.	Williams, 2000; Hidalgo, 2013;			
Wellbeing	Psychological well-being	I have my children around which is important	Bowling, A., 2009; Chen et al., 2015	
		I tend to look on the bright side		
		I get pleasure from my home		
		I am happy much of the time		
		I enjoy my life overall		
		I feel lucky compared to most people		
		I look forward to things		
		Life gets me down		
Loneliness	UCLA Loneliness scale		Russell et al., 1978; Russell et al., 1980; Weeks et al., 1980 ; Russell et al., 1996;	

The units of measurement in this research include the nominal variable, ordinal variable and interval

variable. The nominal variables are exhaustive and mutually exclusive in attributes, as classification and categories groups, (Abu-Bader, 2016, p.8) covering the social-demographic characters of the participants and the habits of their daily activities. The ordinal variables are measured on the ordinal level, like environmental satisfaction, emotional bonding, wellbeing and loneliness, which can be rank-ordered. In this research, the five-point Likert scale (Abu-Bader, 2016, p.9, Vaus, 2014, p.181) (attribute: 1 = strongly agree, 2 = agree, 3 = neither agree nor disagree, 4 = disagree, 5 = strongly disagree) is used to rank the extent of emotional bonding and environmental satisfaction, which are identified as equal distance between each attribute, which is explained to participants. These variables can also be analysed as ordinal data and interval data in a different context.

Vaus (2014, p.47) suggests that 'where possible it is best to use well-established indicators'. In this research, the indicators of emotional bonding (place attachment) are formed of the items used most frequently, according to Hernandez et al. (2013), Hidalgo (2013) and Lewicka (2011) based on 'PPP model' (Scannell and Gifford, 2010). The indicators of psychological issues are taken from the Longitudinal Healthy Longevity Survey (CLHLS), a large-scale national survey which covered 23 provinces in China, rather than the short-form nine items of the UCLA loneliness scale tried in a pilot study, because of the length of the text and the lack of a national reference standard relating to the elderly.

- Reliability

'Reliability' means the extent of random errors in the results of study, whether a test applied repeatedly to the same subjects or objects would yield the same results each time. (Abu-Bader, 2006, p. 11) This addresses the consistency of people's responses and provides a measure of the overall reliability of the scale; a higher Cronbach's alpha coefficient indicates the more reliable data. (De Vaus & de Vaus, 2013, p. 184) Vaus (2013, p.184) said that the rule of thumb alpha should be at least 0.7 before we say that the scale is reliable.

The Cronbach's Alpha of each dimension is over 0.7, which is considered sufficient. The reliability Cronbach's Alpha scale devised by Westergaard et al. (1989, p.93) refers to 0.70 as a 'satisfactory level'. According to Berthoud (2000, P.169) cited in Bryman (2008, p.151) in *Social Research Methods*, 'a minimum level of 0.60 is 'good' which means that in dealing with a different national cultural background, the alpha level varies in a relatively fixable acceptable range over 0.6.

In this study, Table 4-3 shows that the Cronbach's alpha of each dimension of emotional bonding is greater than 0.7 in the pilot study, so their reliability is sufficient. Emotional bonding is defined by three dimensions and five aspects, a total of 18 items (Cronbach's alpha = 0.97), meaning that the items performed well in the survey in Chinese cities

The best items in each group were selected on the basis of criteria related to the performance of each item in response rate (valid data) standard shown in Table 4-3. deviation, scale, Cronbach's alpha if item deleted. The extent of the understanding participants has been assessed in the final questionnaire survey, which satisfies the reliability measurement (Cronbach's alpha=0.689) in total item considered as one concept.

The indicators of wellbeing and loneliness are cited from the Longitudinal Healthy Longevity Survey (CLHLS), a large-scale national survey covering 23 provinces in China. According to Vaus (2014, p.47), it is easy to compare the results from different studies when questions have been asked in the same way in different surveys, even with changed conditions. The data for this research, collected in neighbourhood parks, represents the mental health condition of the elderly who responded, compared with the normal average mental health condition of national elderly surveyed by CLHLS between 2008 and 2011. The reliability of these indicators has widely evaluated and used in a questionnaire survey of old Chinese people.

- Validity

Validity refers to ‘whether the observed scores in a study precisely reflect the true scores of the concept or variable under investigation’. (Abu-Bader, 2006, p. 13) The indicator items have been selected and cited from published research and articles about place attachment, to ensure the validity of the measurements in this questionnaire. (Hidalgo, 2013; Scannel and Gifford, 2010; Nielsen-Pincus et al., 2010, Hernandez et al., 2007) The structure and indicator items with citations are listed in Appendix. The indicators of psychological issues correspond with a national survey (CLHLS) to avoid the the risk of invalidity arising from the use of a new measurement. ‘Face validity’, a way of establishing validity through empirical confirmation of the suitability of items, has been used in this research for the pilot version and the final version of the questionnaire.

Table 4-3 the performance of each item of dimensions of emotional bonding (missing value, Std., Reliability scale - Cronbach’s Alpha, and Cronbach’s Alpha if Item Deleted) (a on the question number means the final indicator)

Number	The dimension of Emotional bonding	Item description of emotional bonding	Valid	Missing	Std. Deviation	Cronbach’s Alpha	Cronbach’s Alpha if Item Deleted
Q3.5	emotional bonding (place attachment)	People like me come here	15	0	0.70373	0.781818	
aQ3.6	person dimension-group level	Most of my friends are in some way connected with my use of the place	15	0	0.88372		
Q3.7	emotional bonding - place dimension	I identify with the people of the neighbourhood.	15	0	0.94112	0.875678	0.936
aQ3.8	social level	People I am attached to are mostly from this place.	15	0	0.72375		0.786
aQ3.9		I never feel alone here.	15	0	0.81650		0.788
Q3.10		I have a special connection to the people in this place	14	1	0.74495		0.845
aQ3.11	emotional bonding - psychological processes	I miss this place when I am away.	15	0	0.89974	0.939109	0.902
Q3.12		I am rooted here.	13	2	0.86972		0.890
Q3.13	dimension - emotional level	I feel I’m closely connected with this park	13	2	0.85485		0.890
Q3.14		This place is very special to me.	14	1	0.89258		0.986
aQ3.15	emotional bonding - psychological processes	This place is part of me.	15	0	0.63994	0.793003	0.764
Q3.16		This place reflects the type of person who I am.	9	6	0.92796		0.596
Q3.17	dimension - cognitive level	This place means a lot to me.	11	4	0.78625		0.784
Q3.18		I feel I can really be myself when I am here.	12	3	0.52223		0.776
Q3.19	emotional bonding - psychological processes	This is my favourite place to be.	15	0	0.82808	0.87956	0.901
aQ3.20	dimension - behavioural level	This is my favourite place to go during my free time.	15	0	0.82808		0.791
aQ3.21		This is the best place for what I like to do	15	0	0.48795		0.858
Q3.22		I would prefer to spend more time here if I could.	15	0	0.74322		0.820

4.5.3 Sample size and selection of participants

According to Abu-Bader (2016, p.15), ‘the main purpose of scientific research is to examine the relationships between two or more variables and whether these relationships can be generalized to the

population.’ This section is designed to examine interactional relationships and to explore the characteristics and habits or general rules evident in the ageing population in Beijing. Due to budgetary constraints and time limitations, this research selected a single district of Beijing for study, Chaoyang, which has the highest population of older people.

So far as the sample size is concerned, the number of older people in Chaoyang district is 454,000, 23% of the district’s total population. (Beijing working committee office on elderly, 2013) Using a calculation formula of the sample size, the sample size is 384. (This calculation uses confidence level = 95%, the confidence interval is identified as ≤ 5 , the sample size calculated through this formula ≥ 384 for Chaoyang district elderly citizens).

The total number of the respondents is 418. Because 418 is greater than 384, satisfying the confidence condition of the sample survey. (The larger the sample size, the more reliable the results and a reflection of the population studied.) Given the time limitations of this PhD study, this sample size is sufficient to represent the target population.

4.5.4 Translating the questionnaire

- **Translating the questionnaire and information material**

The questionnaire and interview questions were originally drafted in English, then translated into standard Mandarin Chinese following comments from supervisors. The Chinese and English versions were checked and evaluated by four native Chinese speaker colleagues. Only minor changes as a result.

- **Translating the results of the questionnaire and interview survey**

For the pilot study, the data was translated from Chinese into English and entered into an Excel form for analysis. To deal with problems emerging in the analysis of the pilot study, the researcher summarized the necessary modifications. Both supervisors viewed the new version in English of the questionnaire, and the final version was translated into Chinese.

As regards the quantitative data, the result and indicators of the questionnaire was coded by number, and special letters for SPSS analysis and statistics, the figures and graphs from the analysis are shown in English.

For the qualitative data for analysis, the original data was gathered first. In order to explore the feelings and responses of ageing people in greater depth, the original qualitative data was imported to NVivo. The voice media was analyzed with codes and notes in English and the results shown in English. Some key points and the main opinions of the participants will be fully translated into English.

4.5.5 The pilot study and amendment of the questionnaire

The pilot study was conducted in two different stages to establish the feasibility of the selected sites and the effectiveness of the questionnaire in data collection. The pilot study lasted from 4 January to 4 February 2016 and from 25 June to 20 August 2016.

There were a few problems with some descriptions of items which emerged in the pilot study of the questionnaire, which was modified as described below.

- Problems emerging in the pilot study of the questionnaire and its modification

‘Pilot study’ is used in two different ways in social science research. The term can refer to a feasibility study, which is a ‘small scale version done in preparation for the major study’ (Polit et al. 2001). The identification of potential practical problems in a small scale trial is a considerable contribution of the

This study's questionnaire applied the short-form nine items of the UCLA loneliness scale, a professional psychological measurement of loneliness used in later life studies. (Shankar et al., 2011) In the pilot study, the elderly participants still felt it was relatively long for them, even though this short-form with nine items is relatively short compared with the UCLA version 3 edited by Russell in 1996. The item descriptions are relatively simple compared with those in the 1998-2010 the Chinese Longitudinal Healthy Longevity Survey (CLHLS), which included self-reported life satisfaction, feeling of anxiety, feeling of loneliness and isolation, psychological well-being expressed in straightforward Chinese.

In order to get a more effective comparative analysis and to optimize the time spent on administering the questionnaire, the parts on psychological well-being and loneliness were changed to those of the CLHLS. Horizontal and vertical comparisons were applied in the analysis step. Comparative analysis using CLHLS as a general standard for ageing Chinese people is relevant to the psychological well-being, life quality, and loneliness has limitations because of the date of the survey (2012, 4 years earlier than this research) the CLHLS still has considerable value as comparator.

◦ Long time for a questionnaire survey

The time it took to carry out each questionnaire survey was rather longer than expected, to some extent because of age-related slowing and the sprawling chat habit of the elderly. Some participants felt that the questionnaire was a little long for them. The questionnaire was considerably shortened to improve the quality of response. Some indicators with multiple item descriptions were cut to one or two items per indicator, the selection depending on their performance in the pilot study. The item which generated the greatest level of inspiration (the elderly talked more about their feelings when asked about them) and highest response (easy to understand for the respondents) remained in the final questionnaire. These are the indicators of emotional bonding. Table 4-5 shows the summary of results of these question, there are no empty answers, which means the all older participant could clearly understand and give response and feedback for these questions. This illustrate the viability of this range of indicator for Chinese older people.

Table 4-5 the positive performance of some indicators in pilot of questionnaire

[Purple Bar]		[Pink Bar]		[Orange Bar]		[Blue Bar]		[Light Purple Bar]	
result	comments	result	comments	result	comments	result	comments	result	comments
								go during my free time.	This is the best place for what I like to do

The comments and feelings of the elderly were recorded in the process of the questionnaire survey. There was an unexpectedly positive response which provides reliable qualitative data. This is a good example of obtaining richer information through a qualitative approach, giving a more comprehensive understanding of the feelings of ageing people, and validating the time spent on the questionnaire.

• The extremely hot summer

While the pilot study was carried out, between 25 June and 20 August 2016, there were 6 days when

there was a high temperature yellow alert (the temperature in Beijing reached 36-37 degrees Celsius) and 3 days with high temperature red alert (the temperature peaked at 38 to 39 degrees Celsius). The high temperature affected the work of the researcher as well as the activities of those being studied. The majority of the elderly avoided staying outside once the alert had been published, so the time for carrying out the questionnaire was shortened.

4.5.6 Limitations of the questionnaire

The tool used for collecting quantitative data for this study was a questionnaire. Because of the condition of the elderly participants, including difficulties in seeing or illiteracy, the researcher combined self-completion questionnaires and structured interviews, avoiding the disadvantages of only using a self-completion questionnaire in these circumstances, like missing data and lower response rates.

There are still some limitations applying to the questionnaire as data collection methods adopted for this research, briefly outlined as follows:

- Lack of vulnerable elderly group

Only a few respondents to the questionnaire were vulnerable. They are too easy to neglect. Some suffer from difficulties with seeing and hearing, so that the researcher cannot communicate effectively, but the absence of a vulnerable group in the sample was also caused by the inadequate design of access to the neighbourhood park for the disabled, which meant that some parks exclude elderly people who have difficulty with physical conditions.

However, inclusive design for the disabled has been considered in the observation of the sites. For those sites designed to give access to the disabled, the activities information for this vulnerable group could be complemented by observation method to reduce the impact of this limitation. The researcher has also been able to interview five of the oldest, those using wheelchairs and their helpers to reduce this limitation; the information collected has been used in the interview analysis, but not in the questionnaire.

- Cultural issues

Older people were more likely to reject the questionnaire survey to avoid the risk of fraud in the current society in China. This impacted on the rate of response and the time it took to carry out the survey. During the survey the researcher kindly and patiently explained the aim of this research and gave details of the university, showing a student card and pictures to dispel their doubts.

- Social desirability bias

As Bryman (2008, p. 211) said, ‘the social desirability effects refer to evidence that some response’ answers of questions related to their perception of the social desirability of those answers ... this phenomenon has been demonstrated in studies on mental health using psychiatric inventories.’ In this questionnaire, the questions about mental health of elderly were cited from a national survey, and comparing them with a data set with the same bias will, to some extent, reduce the impact on the result.

4.5.7 The compilation of data collection

Data collection for this study was through an on-site face-to-face questionnaire, delivered in five neighbourhood parks over one and a half months (22 February to 30 March 2018). 418 participants contributed material for analysis. The demographic profile is shown in Table 6-1.

The research sites were Tuanjiehu, Qingfeng, Beixiaohu, Cuicheng and Side parks in Beijing’s Chaoyang district. Lidu park was selected for the pilot study stage but then eliminated when work on a new subway line turned Lidu park into a construction site. The final data site number reduced from 6

sites to 5, retaining the sample size calculated by population.

4.5.8 The quantitative data analysis methods in this research

Quantitative data analysis uses IBM SPSS Statistics 24.0 to explore the relationships and to study the characteristics of the variables. The analysis addressed three elements: descriptive statistics, inferential statistics and comparative analysis. Different methods were applied to achieve different outcomes for different measure levels of variables. (Vaus, 2014, p.203) This section outlines the main methods with functions, assumptions, and application described in Chapter 6.

4.5.8.1 Descriptive statistics

Descriptive statistics explore the description, characteristics or classification of the data by summarising them into understandable terms, including a summary table, graphics, frequencies, percentages.

The description of data in the overview is an essential foundation for discovering the characteristics of the habits of the elderly, exploring the differences by comparative analysis, and then predicting trends in future demand by comparing age groups across different dimensions.

4.5.8.2 Inferential statistics

Inferential statistics consists of parametric statistical techniques and nonparametric statistics techniques. (Vaus, 2014, p.16) For this research, the main approach employed is nonparametric statistics, in Goodman and Kruskal's gamma analysis. Its function is to make generalizations about a population's characteristics by studying a sample from the population, which can then act as a base for inferences. (Vaus, 2014, p.16) In this research, Goodman and Kruskal's gamma, Spearman's rho is used to measure the associations between the variables of interactional relationships.

- **Goodman and Kruskal's gamma analysis**

Pearson and Spearman's correlation coefficient analysis is normally used for ordinal data in human-environment research, to investigate associations in the social-demographic and behaviour in urban open space (place attachment). (Allerhand et al., 2014; Askari et al., 2014; D. Wang et al., 2017; L. Yu & Kang, 2008) This research applied gamma correlation coefficient as a main statistic approach to test the associations, as the advantages of gamma coefficient have been identified by statistical research in simulation (Göktas & Isçi, 2011, p. 36):

Gamma coefficient is good when the table dimension is small for relatively small sample sizes. It increases and overestimates as the sample size increases for any certain type of table dimension. In overall, for square tables Gamma presents the best estimation of the actual degree of the association in average.

In this research, the result of comparing the test results of the gamma test, Spearman and Pearson's shows the better performance of gamma in ordinal data compared with the other two. There are few applications in urban studies and social aspect of landscape research, but good performance in small sample ordinal data analysis than Spearman's correlation. The big gap between statistics techniques and social aspect of landscape research.

Goodman and Kruskal's gamma (G or γ) aims to measure the strength and direction of association that exists between two variables measured on an ordinal scale, Field (2013, p.879) said it 'measures the proportional reduction in error that is achieved when membership of a category of one variable is used to predict category membership of the other variable'. Goodman and Kruskal's gamma is appropriate and recommended when data has many tied ranks. (Laerd statistics, 2018) This study uses Likert scales (5-point scale) for some indicators such as emotional bonding, environmental satisfaction, loneliness

and wellbeing, awareness of achievement, and the research applies Goodman and Kruskal's gamma to measure their relationship.

The assumptions of gamma analysis include: 1. Two variables should be measured on an ordinal scale; 2. There needs to be a monotonic relationship between the two variables. In this study, the variables used in this test meet these two assumptions, and the results of the data analysis are valid. The analysis test approaches have been discussed with and supported by the researcher's professional statistics tutor in 301 Mathematics and Statistics Help Centre in the University of Sheffield.

In details of interpretation, according to Laerd statistics (2018) say that Goodman and Kruskal's gamma is presented in the 'gamma' row of the 'value' column and is shown in this test. This indicates either that the variables increase in value together or that as one variable value increases, the other variable value decreases. It also shows how much and to what extent there is an influence on the association. The 'approximate significance' column shows that the statistical significance value (that is, the p -value. If the 'approximate significance' (p -value) is less than 0.05 ($p < 0.05$) the association between two variables is statistically significant.). If the 'approximate significance' (p -value) is less than 0.005 ($p < 0.005$), it means it is strongly statistically significant.

The applications in the data analysis include association 2, to explore the relationship characteristics of participants and the extent of emotional bonding (see section 6.2.3 in Chapter 6) a part of H5 and H6, to test links between the duration and frequency of activity and psychological issues (wellbeing and loneliness) (see section 6.3.6 in Chapter 6), association 7, to measure the association between the extent of emotional bonding and mental health levels (see 6.3.7 in Chapter 6).

Comparative analysis

The comparative analysis is based on descriptive statistics. These aim to explore the different habits and rules hidden in daily phenomena. The differences discovered could contribute to making more specific designs to target people in an ageing-friendly project, perhaps a community for the elderly. It also provides a future trend with the ageing generation. Comparative analysis can help us to find the potential impacts which cannot be exposed by statistics alone.

The applications of comparative analysis include: A1 people-activity; A3 place-activity; A4, place and emotional bonding; a part of A5 and A6, activity versus psychological issue; A7, activity versus emotional bonding; and compare the mental health level of the survey in the neighbourhood park and national average levels. Comparative analysis is widely used in this research to find the characteristics and rules of behaviour and perceptual feelings of the elderly as impacted by the physical and social environment.

- **The weighting rate analysis**

The calculation approach to quantitative analysis is widely used in current social science. The Likert scale has established itself as the leading way to get a response from social surveys, and has been used to compare mean, regeneration, constructing models; the Likert scale has been identified as equal distance and used as an interval variable. (Yung et al., 2017; Weijs-perree, et al., 2017; Ramkissoon and Mavondo, 2015; Ramkissoon et al., 2013; Coombes, et al., 2010; Kyle, et al., 2004). Some authors of statistical studies argue that ordinal variables as a ranked scale with ambiguous distances between the categories across the range. (Bryman, 2008, p.321) The calculation is still a significant approach to help social science research to explore a deeper understanding of the real world.

In this research, variable-oriented comparative analysis is based on a weighting rate calculation analysis depending on the definition of equal distance between each category in a 5-point Likert scale. The score rank from 'strongly agree' as '1' to 'strongly disagree' as '5'. The sum of the product of the percentage of each option of indicators multiplied by each score has been used to compare the performance of

indicators, and then rank them to get final results.

This approach is used to compare the different extent of emotional bonding between the elderly in the different parks. It is also used to explore the different preferences of people engaged in different patterns of activities across a range of indicators of emotional bonding and psychological health. This approach is the best way to subtly resolve the difficulty of cross analysis between options of multiple-choice statistics with Likert scale indicators.

The author analyses the results obtained through these statistical methods and offers the explanations in Chapter 6, and then integrates the quantitative and qualitative findings in Chapter 7 to show how they answer the research questions, and discusses how they apply and can be interpreted in future design and planning work in Chapter 8.

4.6 Extended survey: semi-structured interview

4.6.1 The role of extended survey and design of semi-structured interview

Many researchers have utilised interviews to identify the drives and limitations on issues including health, experience, identity and the attachment of users of urban green space. (Annear, Cushman and Gidlow, 2009; Morgan and Paul, 2010; Garvin et al., 2013; Tsitoura et al., 2014; Davis and Andrew, 2016; Ottoni et al., 2016; Hong et al., 2018) The major advantage of the interview is that a qualitative approach, compared with a quantitative survey, can bring rich and deep data to give us a deeper understanding of an ageing population's personal thoughts and their experience and drives. The second distinct advantage of using interviews is from the contrast between qualitative and quantitative approaches. Bryman (2016, p.401) points out that quantitative analysis employs theory and concepts tested in research, but that qualitative has theory and concepts which emerge from data. It supplements the gap between current understanding of usage and need of the elderly and the changing thoughts of ageing people. The interview is applied to new concepts and ideas emerging during the in-depth face-to-face interview.

To ensure the advantages of the semi-structured interview and to achieve the aims above, the design of the questions comprise a mixed-use of close-ended and open-ended questions, keeping a balance between attitudes to issues and the informative richness of the data, benefiting on reducing the bias caused by subjective of research (Cohen and Crabtree, 2006).

A semi-structured interview is adopted to gain a detailed understanding of these issues:

- To supplement the understanding of the conceptual framework of interaction relationships and how they work, especially in social and perceptual dimensions;
- To uncover the usage features, preferences and personal views of the elderly;
- The analysis result of the semi-structured interview has been integrated with findings from the questionnaire survey to obtain information:
- To discover the internal structure and key features of the dynamic system of interaction relationship;
- In detail, from literature review the themes collected in a semi-structured interview include:
- Attitudes to the local social atmosphere (social environment, activities) in the neighbourhood park;
- The friendliness of social atmosphere (group activities) (the friendliness of the local social

environment);

- The social life;
- The attractive elements for the elderly users;
- The area most frequently used by the elderly;
- Relief from the effects of loneliness;
- A place where the elderly feel relief loneliness;
- The limitations of current neighbourhood parks;

This application of interview means that this research is a project that needs to consider ethical issues. The University of Sheffield approved this study, reviewed by the professional ethics administrator, through the ethics application system:

- University research ethics application 004370. (approved: 21/07/2015)
- University research ethics application 012040. (approved: 21/02/2018)

4.6.2 Pilot study and amendments of interview questions

The pilot study was conducted in three stages, including research site collection, piloting the questionnaire form and the semi-structured interview. The pilot study for the interview took place between 25 June and 20 August 2016, engaging with 20 elderly interviewees. Depending on the responses of interviewees to the pilot study, some amendments were made, including the adjustment of the position in the questionnaire and the expression of some questions to make it more practical and straightforward. I deleted the part of the circle in the park map (the initial version of questionnaire), which caused the majority of elderly interviewees to have difficulty in reading it.

4.6.3 Selection of respondent samples and sample size

McCormack et al. (2010) pointed out that among 22 qualitative pieces of research they reviewed, the smallest size was 11 interviewees and the largest was 132. Two recent studies focusing on the elderly person and their well-being in using urban infrastructure and community green space were designed with interview samples of 28 (Ottoni et al., 2016) and 19 interviews of older adults respectively (Pleson et al., 2014). For this research, there were 418 interview participants, which is larger than the sample size (384) calculated depending on the target population and calculated with 95% confidence level to give firmly reliable support. The demographic profile of interview participants is shown in table 6.1.

Criteria for selecting the participants for this study were as follows: the participant selected should be on site when interviewed; the selected participants must be elderly, in the empirical judgement of the researcher. Age does not always match appearance, so the minimum age to be interviewed was based on the retirement age. And the participant should also participate in the questionnaire survey, with the interview starting after the questionnaire had been completed. The data from semi-structured interview could then be associated with data from a questionnaire to explore the hidden links between the two.

4.6.4 Limitations of the semi-structured interview

It was not possible to investigate the significant relationships of the very elderly people with difficulties in hearing and seeing, and their experience and thought further because there was only limited time for the study. These very older people were hard to talk to without the help and official letters from the

relevant Chinese authorities. Due to their physical difficulties, their defences were heightened, and they were reluctant to agree to interviews with strangers like a researcher. Future research in this area could be conducted in collaboration with local research institutions to reduce the above limitations.

4.6.5 The compilation and analysis of qualitative data obtained from semi-structured interviews

In this research, the main approach in applying in this section has been through narrative analysis. According to Bryman (2008, p.553), 'Narrative analysis is a term that covers quite a wide variety of approaches that are concerned with the search for an analysis of the stories that people employ to understand their lives and the world around them. Narrative analysis contributes to a deeper understanding of ageing people's usage traits, preferences and personal views, and is also significant in identifying the limitations and drives of the elderly and ageing people in neighbourhood parks now. The two ways of applying narrative analysis in this section include:

- Thematic analysis: an emphasis on what is said rather than on how it is said. The thematic analysis is structured according to key themes as mentioned above (see page **)
- Structural analysis: an emphasis on the way a story is related. Issues of content do not disappear, but there is an emphasis on the use of narrative mechanisms for increasing the persuasiveness of a story. The structural categories include
 - Gender comparison;
 - Age group comparison;
 - The association between relief loneliness of elderly users and social and perceptual dimensions of neighbourhood park;
 - The relationship between the indicators of self-rated psychological issues and the attitude about the social and perceptual dimension of a neighbourhood park.

The semi-structured interview offers a comprehensive approach to obtaining in-depth understanding of the desires of the ageing people for the neighbourhood park, not only in the physical dimension but also in social and perceptual dimensions.

Processes and outcomes based on grounded theory

Grounded theory is one of the most widely used frameworks for analysing qualitative data. It gives a necessary theoretical foundation and process to outline new concepts. Bryman says that 'grounded theory often entails the search for themes and equally when conducting qualitative data analysis, researchers invariably use the basic operations of qualitative data analysis, many of which were developed in the context of grounded theory', so grounded theory gives essential support in the thematic analysis of interview data.

- Processes

'Coding in grounded theory' (Bryman, 2016, p.572) is a critical central process used in this research analysis. A simple description says, 'Codes...as shorthand devices to label, separate, compile, and organize the data' (Charmaz, 1983, p.186), so the interviewing data are treated as potential indicators of concepts in the coding process. Strauss (1987, p.25) pointed out that 'many indicators (behavioural actions/events) are examined comparatively by the analyst who then "codes" them, naming them as indicators of a class of events/ behavioural actions.' This is an essential process in this study and carried out in NVivo software. There are six types of coding mentioned in Social Research Methods Book.

(Bryman, 2016, p.574). In this study, the main application is ‘open coding’ and ‘focused coding’.

- Open coding:

‘the process of breaking down, examine, comparing conceptualizing and categorizing data’ (Strauss and Corbin, 1990, p.61) This process of coding identifies ‘concepts which are later to be grouped and turned into categories’ (Bryman, 2016, p. 574) It is an initial process to treat the qualitative data with flexibility and a high level of reality. The concepts are coded in NVivo as a node, and then the range of nodes are categorised into a logical hierarchy presented in results.

- Focused coding:

‘As a result of doing initial coding, the researcher will eventually ‘discover’ the most significant or frequent initial codes that make the most analytic sense. In focused coding, the researcher uses these codes, identified or constructed as focused codes, to sift through massive amounts of data’ (Thornberg and Charmaz, 2014, p. 158). This coding process cooperates with the function of NVivo software, which can query the ‘word cloud’ in selected materials. It contributes to clarifying the most frequent concepts emerging in each question of the interview and gives support in comparative analysis for exploring the difference in different groups.

- Outcomes

Qualitative research is a part of this study. It plays an exploring and supplementary role in this research; integrated with the results from quantitative analysis, it gives an effective, comprehensive, and in-depth understanding of the interaction relationship. In qualitative analysis, the outcomes based on grounded theory are as following:

- Concepts—refers to labels given to discrete phenomena; concepts are referred to as the ‘building blocks of theory’ (Strauss and Corbin, 1998, p.101). These concepts are produced through open coding. (Bryman, 2016, p.575) These concepts, derived from the perceptions and language of ageing people, provide a new way to understand the attraction and integration of older people in neighbourhood parks while providing new insights for the interaction between the elderly and the park.
- Categories—‘a category is a concept that has been elaborated so that it is regarded as representing real-world phenomena.’ (Bryman, 2016, p.575) Concepts were subsumed into a category as a higher level of abstraction than concepts. In NVivo, the categorizing process was done after the coding in Node based on the constant comparison.

4.7 Non-participant observation

4.7.1 The design of the non-participant observation

Non-participant observation is the term used to describe a situation in which the observer observes but does not participate in what is going on in the social setting. It is a method widely used in urban studies, especially in urban open spaces aimed to gaining a direct understanding of a phenomenon in space. (Barbara et al., 2010, Catharine, 2013, Askari et al., 2014) 16% of recent studies used an observation approach to explore human behaviour in landscape and urban planning. (Matsuoka and Kaplan, 2008, p.9) A main advantage of observation as technique is its directness. (Robson and McCartan, 2016, p.320) It can avoid bias in the sampling process of questionnaire and interview to obtain an overview of the behaviour of older park users. These advantages makes it suitable for use in this research.

In this research, non-participant observation is one of the primary data collection tools, mainly for two

purposes:

- To uncover the usage features of the elderly in neighbourhood parks;
- To produce behaviour maps of ageing people.

These two purposes determined that the non-participant observation should be structured observation. Structured observation is a method which entails the direct observation of behaviour of individuals and recording of that behaviour in terms of schedule of categories. (Bryman, 2008, p.254) The data from structured observation have been used to analyse the patterns of usage, numbers of participant, and spatial distribution of the park usage of the elderly.

4.7.2 Field work and pilot study

The pilot study of observation was used to achieve two aims. First is select the final research sites from eight potential parks selected from 40 parks listed on the website of Chaoyang district agency of Beijing Municipal Bureau of Afforestation. The selection criteria designed based on literature review. Second is to design the route of structured observation. This fieldwork for pilot observation is in the period time from 16th January 2016 to 24th January 2016.

As result, the number of research sites revised from 8 to 5, these two deleted because in pilot study researcher found the occupation of private hospital and restaurant in the two parks. Another park added to the research site is Cuicheng Park, which is introduced by local resident as a popular place for the elderly to exercise and it is not in the official list of park. In this step, the research sites selected is six neighbourhood parks, but one of them occupied by new subway station after half year. Thus, the result for first aim is that the final research sites are Cuicheng Park, Tuanjiehu Park, Beixiaohe Park, Qingfeng Park, Side Park.

It takes about 20 to 40 minutes to walk along the main road in each park. Some elderly park users told the researcher that they exercised for one to two hours at park in most times through general talking. The time available to photograph the park was 2 hours, not enough time for the researcher to record photos but also help to avoid repeat record of participants. In the pilot, there was no significant difference in the use of the park by the elderly on weekends and workdays, since the most of the older park users have retired. Table 4-6 shows an example of camera points of observation in route in the Tuanjiehu park, and the 360 view photography of the camera point.

Table 4-6 example of camera site and photography record

FINAL SITES SELECTED	SITES	CUICHENG PARK, TUANJIEHU PARK, BEIXIAOHE PARK, QINGFENG PARK, SIDE PARK
TIME FOR PHOTOGRAPHY		2 hours once, from 7 am to 9 pm, two days each site.

THE EXAMPLE OF CAMERA POINT MAP
(THE FULL SIZE OF 5 NEIGHBOURHOOD PARK CAMERA POINT MAP IN APPENDIX.)



Tuanjiehu Park Camera Point Map

● Camera point

THE EXAMPLE OF PHOTOGRAPH ON CAMERA POINT



There are two limitation identified in some studies, observer bias and consumption of time (Li, 2016, p.18) Limitation of observer bias could be avoided by the use of 360 degree panoramic photography by iPhone to record the life as it happened on site. Using a time schedule helped to improve the effective use of time. But observation cannot recognise the demographic of older people sufficiently well to explore the differences in usage of different older park users. It could be supplied by questionnaire, which helped to explore the features of usage of the elderly. This information included the time over which the park was used, who came with, rest places, dependence of park and place, most using place, means to go, distance from home. Compared with observation, the questionnaire shows a major advantage in recognising the visual characteristics of the elderly. The questionnaire could collect the multi-dimension data of individuals to analyse their motivations and behaviours. Observation could fill the gap in spatial distribution of their behaviour and avoid the bias of the sampling process of questionnaire. Observation could get at ‘real life’ in the real word. (Robson and McCartan, 2016, p.320)

4.7.3 The compilation and analysis of observation data

Observation was carried out from 1 August to 16 August 2016. In total there were 10 observation days, not counting the rainy days. The time arrangement of observation and weather conditions shows in Table 4-7.

Table 4-7 the time arrangement of observation in sites and weathers of the recording days

Date	Weather	Temperature	Place	Observed time
1st august 2016	Cloudy	32□/25□	Side park	8.00am-20.00pm
2nd august 2016	Sunny	33□/24□	Cuicheng park	8.00am-20.00pm
3rd august 2016	Sunny	34□/25□	Tuanjiehu park	8.00am-12.40pm
4th august 2016	Sunny/cloudy	33□/24□	Beixiaohe park	8.00am-20.00pm
5th august 2016	Cloudy	32□/25□	Qingfeng park	8.00am-20.00pm
7th august 2016	Cloudy/ sunny	29□/23□	Beixiaohe park	8.00am-20.00pm
8th august 2016	Cloudy	30□/23□	Tuanjiehu park	14.00pm-20.00pm
9th august 2016	Sunny/ cloudy	31□/24□	Cuicheng park	8.00am-20.00pm
10th august 2016	Cloudy	33□/26□	Qingfeng park	8.00am-20.00pm
13th august 2016	Cloudy	33□/24□	Tuanjiehu park	8.00am-20.00pm
14th august 2016	Cloudy	32□/24□	Side park	8.00am-12.40pm
16th august 2016	Sunny	31□/22□	Side park	14.00pm-20.00pm

4.7.3.1 Data analysis of observation

The two aims of this observation were achieved by two approaches to analysis. The patterns of behaviour and number of participant were coded by NVivo, and the spatial-distribution and density of usage by older people was mapped in a new online platform to visualize the digital map and mapping data. This avoided a conflict between national security of GIS database in China and the open publication. Mapbox provided a new approach to visualizing mapping spatial data in simple form. The output of mixed-use NVivo and Mapbox equals traditional mapping in the GIS. The combination of questionnaire and observation provided more features detailed of usage by different participant compared with mapping in GIS, such as the difference of usage in difference ageing steps.

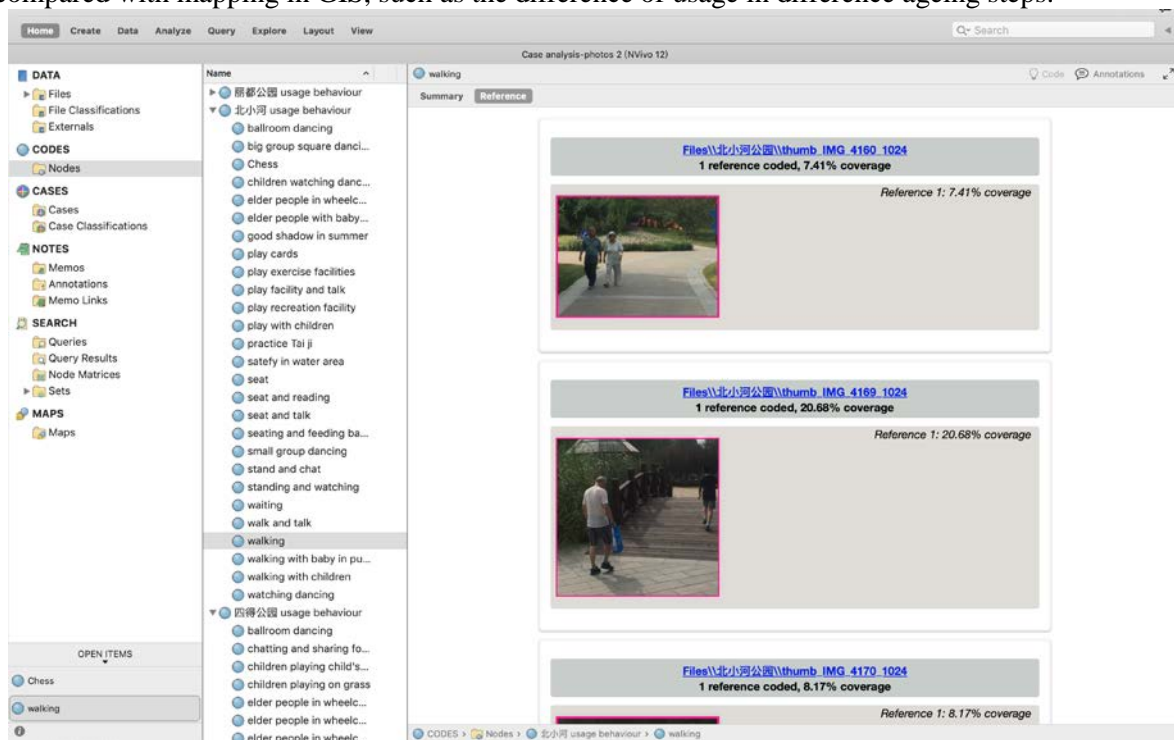


Figure 4-3 The example of coding behaviours based on photographs from observation in NVivo

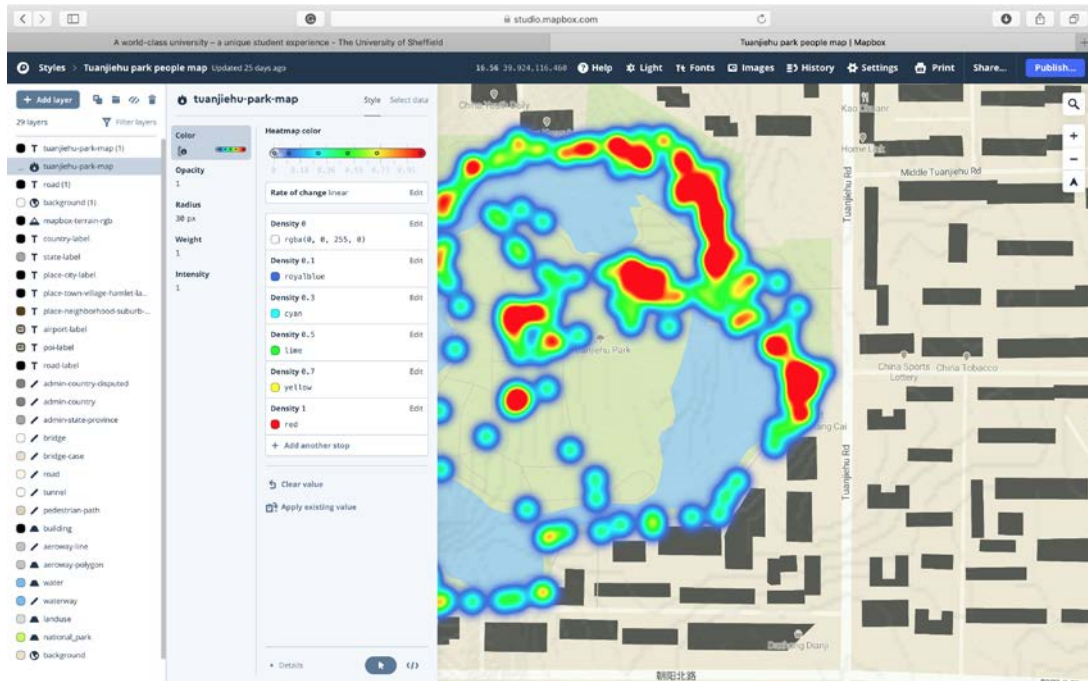


Figure 4-4 The example of mapping in Mapbox

4.7.3.1.1 Nvivo

The photograph has been imported into NVivo (version 12.0) to code the patterns of usage behaviour as nodes, which have been categorised into main groups belonging to each sites. The coding note was exported with references, and then the numbers of participants were manually counted for each node.

4.7.3.1.2 Mapbox

Two function of Mapbox used to map and visualize the location of older park users. In studio-Mapbox, mapping spatial distribution was applied in the datasets function. The size of the park and the length of the main footpaths could be measured in datasets function by drawing a polygon. The location of older park users was mapped by drawing points. After dataset was edited, the dataset was saved and exported, then used in Styles function to visualise the mapping data by adding a layer to a map.

Chapter 5 Selection of Study Sites

5.1 Introduction

This chapter presents a literature review and documentary analysis to explore understanding of the current development of urban open space, and to determine the types of open space and range of Beijing sites selected for this study.

The benefit of urban open space has been proposed on well-being (Artmann et al., 2017; Douglas, Lennon, & Scott, 2017; Schram-Bijkerk, Otte, Dirven, & Breure, 2018; White et al., 2018), health (Akpinar, 2016; Akpinar et al., 2016; Astell-Burt et al., 2016), and mental health (Beyer et al., 2014; Willis, Crabtree, Osman, & Cathrine, 2015). The impact of urban open space on the elderly people has been investigate in recent years (Gomez et al., 2010; Mathis, Rooks, Tawk, & Kruger, 2017; Todd et al., 2016) focusing on walking pattern, quality assessment, walkability and physical activity. The types of urban open space regarding to the older people include local parks (Alves et al., 2008), urban parks (Dzhambov & Dimitrova, 2014), blue and green spaces (Finlay et al., 2015; Ode Sang, Knez, Gunnarsson, & Hedblom, 2016), built environment (L. Cheng et al., 2019) neighbourhood (Michael et al., 2006), and neighbourhood green space (Pleson et al., 2014). The different types of open space leads different emotional bonding between the people and place.(Scannell & Gifford, 2017) Thus, this chapter used to select the appropriate type of urban open space closing linking with Chinese ageing people in their daily life and to determine a range of sites for this research in Beijing.

5.2 The typologies of urban open spaces

There are several kinds of typologies and hierarchies of urban open spaces in urban planning and design theory which help this research to select its target sites.

According to Lynch (1981), the types of urban spaces are regional parks, squares, plazas, linear parks, adventure playgrounds, wastelands, playgrounds and playing fields. Woolley (2003, p. 55) focuses on spaces in the hard landscape, while other studies have examined small and larger local parks, district parks, metropolitan parks and linear open spaces based on the land use service size (Llewelyn-Davies Planning, 1992). Urban open spaces can also be classified by function, so by provision for relaxation, recreation and conservation as well as by their ecological benefits. An urban public open space categorisation has recently been proposed as shown in Table 5-1 (City of London, 2015), which classified them in terms of their size and distance from homes. Depending on the discussion in chapter2, this study focuses on neighbourhood park which is the closest linking with daily life of elderly. table 5.1 shows neighbourhood park named as local park is the open space sized 2 hectares, and distance to home is 400 meters. It provide to reference standards is the size of park and the distance to home, which contribute to the criteria design of site selection in this research.

Table 5-1Public Open Space categorization , Source: *LONDON PLAN* 2011)

Open Space Categorisation	Size Guideline	Distance from homes
Regional Parks	400 hectares	3.2 to 8 km
Metropolitan Parks	60 hectares	3.2 km
District Parks	20 hectares	1.2 km
Local Parks and Open Spaces	2 hectares	400 m
Small Open Spaces	Under 2 hectares	Less than 400 m
Pocket Parks	Under 0.4 hectares	Less than 400 m
Linear Open Spaces	Variable	Wherever feasible

According to Woolley (2003), the typologies of urban open spaces fit into a hierarchy, domestic urban open spaces, neighbourhood urban open spaces and civic urban open spaces according to their users' perceptual views and based upon the concept of home range. This grouping not only depends on physical characteristics, but relates to social level (familiarity, sociability and anonymity) and time for daily life. It illustrates social level is another important standard to identify a the categories of urban open space.

In conclusion, depending on the discussion above, three standards has been clarified as size, distance to home, and social level. They composed the three main aspects of the criteria of site selection. In Figure 5-1, they formed the three axes of this selection criterion and followed the division interval given above.

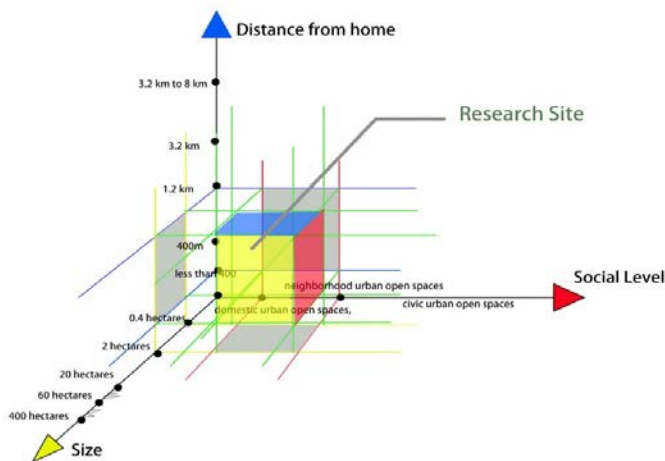


Figure 5-1 the selection criteria of research sites in Beijing

5.3 The categories of urban opens space in China

Some regulations for statutory compliance have been published by the Chinese government and relevant planning organizations which deal with urban green space. The main laws, planning codes and standards listed in methodology.

The typologies of urban green spaces have been categorized into a three level hierachy, with 5 categories, 13 classes and 11 small classes. (The Ministry of Construction of China, 2002, p.2) The five categories are park green spaces, productive plantation area, green buffer and others. Because this research focuses on urban open spaces serving aging people, this research relates to the category of park green spaces. In 'The provisions of construction of the index of city greening and planning' (The Ministry of Urban Construction of China, 1993, No. [1993] 784), the concept of public green space lists these categories: municipal, district, residential district park, small garden, square, green space of street, botanic garden, zoo and special parks. The concept of public green space has been changed to park green space as a main category of green space in the new document for planning, 'Standard for classification of urban green space' (CJJ/T 85-2002) and 'Code for classification of urban land use and planning standards of development land' (GB50137-2011)'. In GB50137, park land includes park green space, green buffer, and square land. It is different in CJJ/T 85-2002. In 'Code for the design of urban green space' ((GB50420-2007), it is called urban green space. The categories of green space in 'Standard for calssification of urban green space' remain the authoritative standard for urban open spaces in Chinese cities, and they apply to the majority of official documents used in urban planning.

So this research will apply the category of 'Standard for classification of urban green space' (CJJ/T 85-2002) with 5 main categories. The park green spaces are separated, depending on their main function

and context, into 5 middle classes, including comprehensive park, community park, theme parks, linear park and roadside green space. (see table 4-2) Empirical study of the elderly impacted by walking distance and preference, suggests that community parks are the main urban green spaces linking closely with aging people. In relation to community park as one middle class of park green space category and has two smaller classes, parks in residential areas, and parks in residential communities. The illustration of the community park in ‘Standard for classification of urban green space’ (CJJ/T 85-2002), and ‘Code for urban residential district planning and design’ (GB 50180-93(2002)) shows the attributes of this kind of green space, which are closely related to the daily life of residents, so community parks should be planned and construction matching the development of a residential community. In the ‘Code for urban residential district planning and design’ (GB 50180-93(2002)), the residential district park belongs in public green land use, and the parks in a community belongs in residential land use. The parks in living communities as a part of residential land will be removed from city land statistics.

Table 5-2 G1 in Code of classification of urban open space, 2002. CJJT85-2002

Class code		Name of category 类别名称	Content and scope 内容和范围	Remarks 备注	
category	Middle class Small class				
G1		Park green space 公园绿地	Open to the public, the main function is for the public recreation, and play significant role in ecological, landscaping, disaster prevention and other aspects.		
	G11	Comprehensive Park	Rich in content with corresponding facilities, larger green spaces suitable for the public to carry out all kinds of outdoor activities.		
		G111 The city park	Serving all citizen, rich content and improved facilities		
		G112 Regional park	Serving urban residents in a certain area, with a rich content of activities and facilities to improve the green.		
	G12	Neighbourhood Park	For a certain residential land within the scope of the service, with a certain concentration of activities and facilities of green space.	Exclude living group green space	
		G121 Parks in residential area	Serving resident of certain residential area, with a certain content of activities and facilities for residential areas supporting the construction of a concentrated green space	Service radius: 0.5-1.0km	
		G122 Parks in living community	Service for a residential community, supporting the construction of a concentrated green space	Service radius: 0.3-0.5km	
	G13		Theme park	With specific content and form, there is a certain recreational facilities of green space	
		G131 Children's Park	Set up, to provide children with the game and carry out science and sports activities, consider about safety, improve the facilities of green space		
		G132 Zoo	Under the condition of artificial feeding, the wild animals were moved to protect the wild animals, and to popularize scientific knowledge, to carry out scientific research and animal breeding, and have good facilities of green space		
		G133 Botanical Garden	Plant science research and introduction and domestication, and for viewing, recreation and to carry out the activities of the green space		
		G134 Historic Garden	With a long history, high visibility, embody the traditional gardening art and has been approved as the garden of cultural relics protection units		
		G135 famous scenic park	Located within the scope of urban construction land, with the function of the city park, which is the main form of cultural relics, historic sites and scenic spots (areas).Green land		
		G136 amusement park	With large recreational facilities, set up a separate, better ecological environment of green space	Green land area ratio should be greater than or equal to 65%.	
		G137 The other special park	In addition to the above all kinds of special parks with a specific theme of the content of the green space. Including sculpture garden, bonsai garden, sports park, Memorial, Office and so on	Green land area ratio should be greater than or equal to 65%.	
	G14		Linear Park	Along the city roads, walls, water, there is a certain type of green recreation facilities	
	G15		Roadside green space	located outside the city road, the relatively independent piece of green space, including street square green, small green land along the street and so on.	Green land area ratio should be greater than or equal to 65%.

5.4 The criteria and sites selection

These typologies of urban open spaces describes the range of sites from which this research has selected examples to study. Distance and accessibility have been identified as key issues impacting the engagement of the elderly. (McCormack et al., 2010) Neighbourhood parks help the elderly in their daily life because they are within a short distance from their home. Moulay et al. (2018) pointed out that ‘despite being regarded as foundational social spaces in city planning, neighbourhood parks in the context of planned residential area are not fully utilized to the benefits of the users.’

The target sites of this research were selected in relation to three dimensions, the distance from home, social level and park size, which referred with Table 5-1 and Table 5-2. The selection criteria shows in Figure 5-1 the selection criteria of research sites in Beijing.

The park list of Chaoyang District, Beijing Gardening and Greening Bureau (Capital Greening Office). Possible sites were identified in Table 5-3, then parks with ancient buildings and historical protection were de-listed. This research chose a range of modern comprehensive service-oriented neighbourhood parks. A field trip to the potential sites helped in the choice of the final research sites, because the information recorded on management systems was not always up to date. One park had been replaced by a new subway station and a new restaurant (a horizontal line crosses out the park that was deleted after field trip). Five final research sites were chosen: Cuicheng, Tuanjiehu, Side, Beixiaohe and Qingfeng parks.

Table 5-3 the potential sites selected by criteria

Name of Park	the district	Area (hectare)	Information recording (from residents comments, observation, and websites)
Cuicheng Park	Chaoyang District	Not recording at system, rough measurement 3	Elderly activities are very much in the evening even in the coldest day in the winter, at night there are around one hundred people in a small park for activities, music staggered. the distance between the park and residential neighborhood is just 20 meters. the lack of lighting in the evening leads to dance groups need to bring their own lamps. some elderly came from far resident area by bicycle or scooters. The open space become a interactive performing space and attracting people to join the public life.
Tuanjiehu Park	Chaoyang District	13.8	many aging people walk in this park and do exercise. In the winter, some children play ice games on the lake. Some aging people organize singing group in the arbor. A typical small Chinese park. It is nearby residential areas.
Side Park	Chaoyang District	16.7	some people do morning exercises and walk in this park
Lidu Park	Chaoyang District	17.33	It is a good place for young people to have a date. There are some restrants inside.
Wanghu Park	Chaoyang District	21.7	Some residences said it was a good place for local residence to have exercise before the Private maternity hospital, furniture company built inside.
Beixiaohe Park	Chaoyang District	24.8	There are several groups of aging women have square dancing. There are also some basketball courts, bridges with small lake. Some people would like to play chess here.
Qingfeng Park	Chaoyang District	26.7	Residents Comments: located in the downtown, the small park! Park, there are a lot of people practicing their musical instruments, good atmosphere. There are also dance practice uncle aunt

5.5 Introduction of study sites

Through a selection criteria screening and field work in Beijing, finally, this study selected five

neighbourhood parks with general characters and popular reference. Because the general applicability of such findings is stronger, they are more applicable to other planning and design projects relevant to neighbourhood park in urbanizing cities and urban regeneration process.

This section set out to introduce the information of these five study sites, including the location, spatial layout, facilities, which give this research a basic image of sites.



Figure 5-2 the location of study sites selected in Chaoyang district in Beijing

Side Park



Figure 5-3 Side park map

Sade Park is located in the Jiuxianqiao area of Chaoyang District, Beijing (No. 9 Jiangtai West Road, Chaoyang District, Beijing), on the east side of the Suyuanqiao Bridge, adjacent to the Airport Road Auxiliary Line to the east, Airport Expressway to the west, Xiba River to the south and Jiangtai Road (formerly Zhaojiu Road) to the north.

It is a public welfare free park with the theme of ‘sports, leisure and entertainment’ and provides

entertainment for tourists. The park has an area of 16.7 hectares, including more than 7,000 square metres of water. In 1993, Side Park was included in the urban greening and beautification project. In 1998, in addition to the infrastructure and supporting projects, the entire park was largely completed in greening and road construction. Due to institutional adjustment, Side Park was handed over from the former District Agriculture and Forestry Bureau to the Chaoyang District Greening Bureau. In January 2003, in order to improve the service function of the park, the park adhered to the principle of ‘making tourists get the fun of natural freshness, getting physical and mental exercise, getting certain plant knowledge, getting healthy and longevity’, and making overall adjustments to the park. The park reconstruction focuses on infrastructure construction and environmental landscape reconstruction, completes the construction of the holy fire, the five rings, and the sunset red square; transforms the four lakes; develops fishing water surface, puts grass carp, squid, and deploys various fishing gears; an advanced ‘little country’ children’s playground.

Tuanjiehu Park

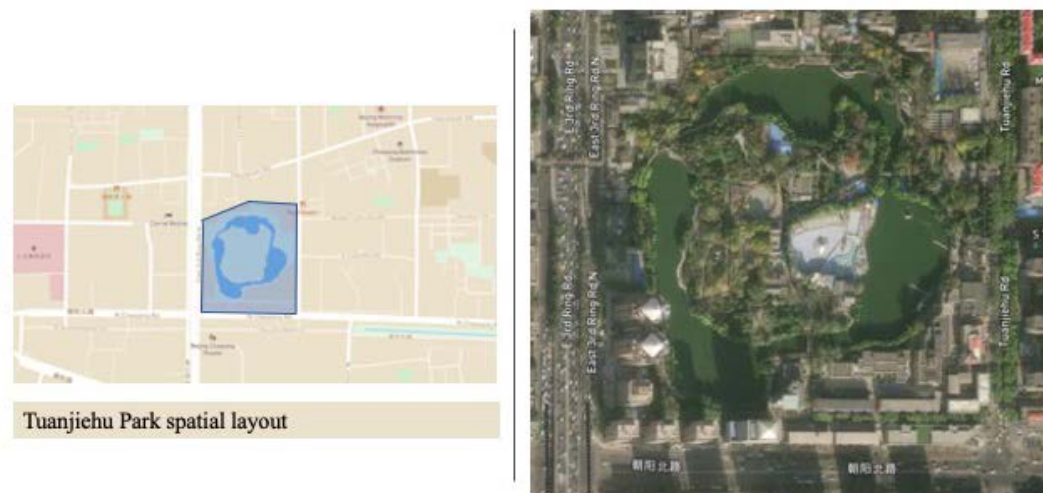


Figure 5-4 Tuanjiehu Park Map

It is about 8 kilometers from the centre of Beijing, located on the East Third Ring North Road of Chaoyang District, Beijing. It is an urban park with the characteristics of Jiangnan classical gardens. In 1958, the mass transformation was completed, hence the name ‘Unity Lake’. After years of development and construction, it was completed on September 26, 1986 and officially opened to tourists. Unity Lake is 1,200 metres in a circle. Tuanjiehu Park is located in the southwest of Tuanjiehu Residential Area in Chaoyang District. The entrances and exits of the tourists are the East Gate of Tuanjiehu Road and the West Gate of East Third Ring Road. The park covers an area of 277 acres and the lake is 67 acres. The total area of the park is 138,000 square metres, including 46,000 square metres of water surface. It was approved in 2002.

Qingfeng Park



Qingfeng Park spatial layout



Figure 5-5 Qingfeng Park Map

Qingfeng Park is located on the south bank of Tonghui River, on the south side of Beijing CBD, west to Lingtongguan Bridge, east of Qingfeng Bridge, north to Jingtong Expressway and south of the railway line. It has a total length of 2,300 metres and a width of about 70 to 250 metres, with a total area of about 26.7 hectares. On September 28, 2009, Qingfeng Park officially opened and was open to the public free of charge. Qingfeng Park is named after Qingfeng Gate. The site of Qingfeng Gate is located in the north of Park East Park, on the bank of Tonghui River. Beijing East Third Ring Road spans the park from north to south, and divides the park into Dongyuan and West Park. The West Park is mainly composed of green landscape belts, which are divided into Taoliu Yingan, urban towers, and so on; Dongyuan has Qingfeng Ancient Gate, Jingyu Qinhuai, and There are 8 attractions including Shuihuaxi and Yinfeng Glen. The water in the park is from the Tonghui River.

Beixiaohe Park



Beixiaohe Park spatial layout



Figure 5-6 Beixiaohe Park Map

Beixiaohe Park is located in the East Lake area of Chaoyang District, covering an area of 22.8 hectares, including 0.7 hectares of water. Beixiaohe Park was formerly known as Greenland. In 2005, Chaoyang District Committee and District Government invested in the construction of Chengbei Xiaohe Park for

private people. On May 1, 2006, it was officially opened to the public free of charge. In March 2007, Beijing Beiyanghe Park Management Office was established in Chaoyang District, and was named a boutique park in September of the same year. Beixiaohe Park is divided into several functional areas such as Binhe recreation area, children’s activity area, forest theatre, sports and fitness area and mountain forest activity area. The construction concept of the park is to strive to provide more and better green leisure places for the surrounding residents.

Cuicheng Park



Figure 5-7 Cuicheng Park Map




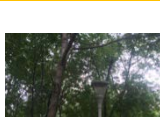
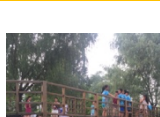





Cuicheng Park covers an area of 3.3 hectares based on a map, a rectangular community park. There are pavilions, green areas, children’s areas, leisure squares, tables and chairs in the park. The east-west side is adjacent to the Cuicheng residential area of Shantou, adjacent to Shantou Road in the north and the primary school affiliated to Capital Normal University in the south. It is a small resident community park. There are many residents in this activity and there are many kinds of activities. Among the active groups, the elderly and the children account for the majority. It is a park with a large number of activities throughout the day.

4.5 Summary

This chapter has described the neighbourhood parks which are the target type of open space studied here, selected in a three step process, applying criteria, control variables and field trip. The sites selected are Tuanjiehu, Beixiaohe, Qingfeng, Cuicheng and Side parks.

The introduction of sites shows a basic image of these neighbourhood park, in order to clarify the characters of them, the physical conditions have been summarised into Table 5-4 as following. It covers park area, footpath design, footpath long, waterfront (including late and water area) design, square, seats design, exercise facilities, building and shelter, planting design, and distance with residential area.

Table 5-4 A summary of physical conditions of five neighbourhood parks selected

	Side park	Tuanjiehu park	Cuicheng park	Beixiaohe park	Qingfeng park	
						
						
The physical conditions of the neighbourhood park	Park area	0.1244km ²	0.1151km ²	0.0358km ²	0.176km ²	0.0972 km ²
	Footpath design	Main footpath +multi-sub footpaths	Main footpath +multi-sub footpaths	Only main footpath	Main footpath +multi-sub footpaths	Main footpath +multi-sub footpaths
	Footpath long	0.975km	1.24 km	0.666km (close to the wall)	1.4 km	2.05km
	Waterfront, lake, water area design	Lake + lakeside pavilion	Lake + lakeside pavilion +lake long corridors + bridges	No water area design	Lake + lakeside bridge + lake pavilion	Park designed along a river +bridge + landscape water pool on entrance area
	Square	Entrance square, 2 big square, 2 small square	Entrance square, 2 big squares, 2 small square	Entrance empty place, 1 main square, 3 big flat and open places	Entrance square, one big main square, one small square	3 big square, and some small flat and open space.
	Seats design	Seats around square with sun shade, seats on main footpath	Seats on the main footpath around the lake	10 sets of stone seats and table under trees, seats in a long corridor, no space for seats for the walking route.	Seats on the main footpath, seat and table with chess, mains seats on the entrance square	Seats along the riverside and a few seats around square.
	Facility	One big exercise facilities area and 6 table tennis set in a square, 2 toilets, one children playing facilities area	Two areas with exercise facilities, two toilets, no children playing facility area	One area of exercise facilities, one toilet, one children playing facilities area	Big good quality of children playing area, one area of exercise facilities. Two toilet	One good children playing facility area, no area of exercise facility
	Building, shelter	3 pavilions, and one rain shelter around main square	No special rain shelter, one big set of long corridor and pavilions	One long corridor	One pavilion, no special rain shelter	One pavilion, no special rain shelter
	Planting design	Good planting design, high green coverage rate, modern design	Good planting design, Chinese traditional design	Green land coverage is low, vegetation is relatively simple	Good planting rate, very high green coverage rate	Good planting, relatively high green coverage rate
	Distance with residential area	The park is separated from the residential area by traffic road	Very close, This park is connected with residential buildings.	Very close, This park is connected with residential buildings.	The park is separated from the residential area by traffic road	This park is not closely with residential area.

PART II TO TEST AND ANALYSIS

PART □ is the data analysis part, which aims to achieve the three objectives of the second stage (see Figure 4-1 for details). The process of data analysis is relatively complex, some parts are used independently to achieve a research purpose, sometimes combined to achieve a research purpose, the nature of the data to serve and research purpose, and sometimes the qualitative nature of the analysis is changed by processing the different coding methods to achieve quantitative analysis. Overall, these complex structures and processes are designed to explore, to the fullest extent possible, the relationship of older people to their environment, and the underlying conceptual systems that explore the intrinsic connections within complex relationships.

I will next elaborate on the importance of the four chapters of data analysis and their inherent relationships through: data types, data sources, structural roles, and application of results to purpose.

In terms of data type, in Chapter 6 data analysis type is quantitative, and the whole chapter explores the relationships in the seven associations behind the data through different quantitative statistical methods. Whereas in Chapter 7 data type is qualitative, the entire chapter is a qualitative data analysis with typical topic-centered analysis. Chapter 8 is then actually a chapter in which some of the qualitative data is transformed into a quantitative coded form into a combined analysis of quantitative data with other quantitative data, a quantitative analysis of statistical means based on the transformation. Chapter 9 is a chapter that encompasses both types of data analysis with the concept of 'behaviour' at its centre, including the quantitative analysis of 'behaviour' in the first half and the qualitative observation of the essence of the data in the second half, which is transformed by means of quantitative coding, and also presents part of the data analysis in a qualitative way.

In terms of data sources, the data sources in Chapter 6 are questionnaires, the data sources in Chapter 7 are extension studies, the data sources in Chapter 8 are questionnaires and extension studies, and finally the data in Chapter 9 are questionnaires and observations.

In terms of the role of structure, Chapters 6, 7, and 9 are a juxtaposition of relationships, and Chapter 8 is a further statistical analysis of the data from Chapters 6 and 7.

In terms of outcome purposes, Chapter 9 accomplishes Objective 2-1 independently, while Chapters 9 and 7 jointly accomplish Objective 2-2, and finally Chapters 6 and 8 jointly accomplish Objective 2-3. (See Figure 4-1 for details.) Further, the combination of results for the purpose of the second stage completes the purpose of the third stage.

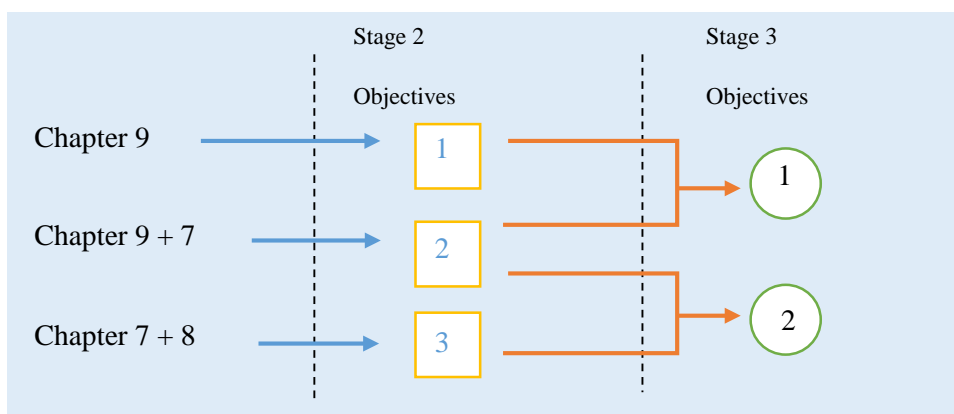


Figure 5-1 Data analysis chapter structure workflow diagram

Chapter 6 Data analyses for associations and comparison

6.1 Introduction

This chapter to investigate the interaction relationship between ageing people and the neighbourhood park through questionnaire data analysis. There are three aims of this chapter include:

- To discover the inner structure and key features of the dynamic system of the interaction relationship;
- To uncover the most influential factors for the well-being and mental health of the ageing people;
- To produce an effective conceptual framework of interaction relationship between ageing people and the neighbourhood park.

Thus, this chapter was divided into two sections:

The first analysis section is the tests for the seven pairs of associations of the potential conceptual framework among ageing people, place, behaviours, emotional bonding, and self-rated psychological states. The purpose of this section is to test the effectivity of the conceptual framework and to further understanding how it works, in order to achieve the first and second aims.

- The comparative descriptive data analysis, Goodman and Kruskal's gamma, comparative weighted score analysis were used to achieve these research goals.

The second analysis section is a supplement and continues of the previous section. The first section discovered the inner structure and relationship of interaction between ageing people and the neighbourhood park. This section gave an overview assessment of the effects of using a neighbourhood park on psychological states. Moreover, the second section is a continuation of association 1 and association 6 to investigate the gender differences in the impact of behavioural activities on mental state and to investigate the differences of demographics on the self-rated psychological states of the ageing people.

- A series of comparative analysis approaches, such as cross-table figures, One- way ANOVA, Tukey HSD test, and Goodman and Kruskal's gamma test were used to achieve these aims based on the data from the questionnaire.

The data analysis applied in this section is based on the questionnaire survey in 5 neighbourhood park in Beijing (Chaoyang district), including Cuicheng park, Beixiaohe park, Side Park, Qingfeng Park, Tuanjiehu park. The sample size of this study was 418 ageing participants, including 222 females and 195 males. The demographics of the sample shows in table6.1. This sample size meets the requirement of a confident level of 95% and a confident interval <5. The answers truly reflect the ageing population in Chaoyang district in Beijing.

The findings were integrated as a series of conceptual framework contributing to achieving the third aim of this chapter and discussed with the outcomes of the other three chapter later.

6.2 Demographic profile of sample

For successfully achieving the research objective (see figure 2.10), selection criteria are set as same with questionnaire that the participant should be selected from amongst the on-site users across all the 5 neighbourhood parks, who identified as retired people or elderly people with ability of talking in empirical experience, after they have completed the questionnaire and then start the semi-structured interview.

Table 6-1 The demographic profile of the respondents in the questionnaire

Variable	N ^a	Weighted % ^b
Gender		
Male	195	46.7%
Female	222	53.2%
Age		
45-55	120	28.8%
56-65	163	39%
66-75	101	24.2%
76-85	32	7.7%
86-95	0	0%
95+	0	0%
Marital status		
Married/ Cohabiting	378	90.3%
Not married/ widowed	35	8.6%
Retirement		
Yes	387	92.6%
No	26	6.2%
Native place		
Beijing	318	76.1%
The other province	98	23.4%
Education level		
Primary school	78	18.7%
Middle school	162	38.8%
High school	100	23.9%
College or university	71	17%
Master and above	4	1%
Living arrangement		
Own home	376	90%
Own home with care support	30	7.2%
Care-home accommodation	8	1.9%
Living alone		
Alone	59	14.5%
With spouse	219	52.4%
With children	94	22.5%
With spouse and children	32	7.8%
With someone	2	0.5%

*The sample respondents are randomly selected in 5 research sites in parks

*^A Some sample size may not add total due to missing values

*^B Estimates are weighted to be representative of the total data of older users and are adjusted for complex survey design effects

A total 418 sample (see Table 6-1 table 6.1), including 222 females (53% of the total participants) and 195 males (47%). The social-demographic profile of the elderly participant in questionnaire survey

shows in Table 6-1. The age distribution chart of the sample of questionnaires shown in Figure 6.1 displays that the sample is generally normally distributed. The majority participant is aged around 56-65 occupied 39% of the total; the participant over 66 years old is over 30% of the total. The details of the demographic profile of the sample are shown in **错误!未找到引用源。** .

Table A. 1 cross-tabulation of age group and retirement

shows that 85.7% participants between the ages of 45-55 have retired; 95.1% of the participants aged between 65-75 have retired, and only one participant in groups over 66 have not retired. This situation in line with the current statement of the Chinese population, and has significance in reference for future trend analysis depending on the new retirement policies and ageing trend in China. Table A. 2 statement of physical difficulty the respondents in case study sites

shows the physical conditions of the participants in this survey.

However, the sample of this study was satisfactory, and components of the sample were consistent with normal distribution and observed phenomena in the park. The findings have a good representation of the ageing population.

6.3 The tests for 7 pairs of associations of the potential conceptual framework

This section aimed to test and analyse the seven pairs of associations (see Figure 3-9) in the initial conceptual framework delivered from critical literature review (see **错误!未找到引用源。**).

6.3.1 Association 1 (people – behaviour): ageing people with different characteristics prefer different activities in neighbourhood parks.

This section of analysis aimed to investigate the effects of demographics of the ageing people on their using behaviours in the neighbourhood parks. It is contributing to further understanding the people-behaviours relationship. The three aspects of analysing behaviour in this chapter include patterns of activities, frequency, and duration of use. The comparative cross-table figures were used to achieve this aim, based on the descriptive statistics data analysis from questionnaire.

6.3.1.1 Patterns of activity in different demographics of ageing people

In this study, the preference comparison of activities (depending on responses to question 1.1 in part A of questionnaire) is categorized by social –demographic variables (responses to question 1 to 11 in part D of questionnaire) of the participants. The questionnaire data provide the differences which have been supplemented with observation data in the next section to explore the comprehensive understanding of the featured habits of the daily life of the different Chinese ageing people.

- **Gender**

Figure 6-1 shows that, in general, walking is the most popular activity in both elderly male and female.

Notably, the social and groupmate activities are more attractive and popular in elderly females, such as 1(Chat with others), 3 (playing poker, chess), 4(Dancing, exercises with music) and 8(Singing, singing opera). More elderly males enjoy the relatively individual activities, such as 2(Walking, jogging), 5(Enjoy the scenery), and 11 (sitting in the sunshine).

- **Age**

Figure 6-2 shows that some difference:

Younger ageing group (45-55 and 56-65) are more prefer entertainment activities and group activities. Group activities provide opportunities for social life and performance, which contribute to achieving self-esteem and psychological satisfaction. Moreover, the younger elderly bear more duty in looking after their grandchildren.

The elder elderly has more percentage of walking and exercises. Meanwhile, they spend more time in static activities, such as 11 (sitting in the sun) and 13 (reading newspaper, listening ratio). The entertainment becomes less than the younger elderly.

- **Retirement or not**

The retired people have more social and group, entertainment activities, such as chatting and dancing, playing poker and chess. The elderly participant not retired have more percentage of looking after grandchildren. (Limitation of this comparison is the sample size of two groups existing big difference, in this sample, retired participant was 378, non-retired participant was 26. This limitation existing on the comparisons in 6.3.1.1, 6.3.1.2, and 6.3.1.3 (details in Appendix see Figure A. 2))

- **Native**

Figure 6-3 shows that the elderly people came from the other provinces have less social activities and fewer group activities than local people, such as chatting, dancing. More of them choose walking as exercise and spend more time on entertainment acts, such as playing poker. Besides, they bear more duty of looking after grandchildren, which is a representation of the current society in China. The lack of social relations, caused by leaving hometown to their children's place to help them fight with busy time pressure, heavily impact their loneliness and mental health.

- **Education**

The elderly people with higher educational level has fewer entertainment activities such as playing poker and chess, the group, social activities and individual exercise have a certain percentage in each educational level. Tue to the number of the participants with highest educational level as master and above is 4, which exiting big difference in sample size with the other group, so that it is ignored in this comparison. This section considers the comparison among the other groups. (details see Figure A. 3)

- **Living alone or not**

Figure 6-5 shows that the elderly participant living with children are more prefer to chatting with others, playing poker and chess, sitting in the sun, and looking after grandchildren. The elderly participant living alone has more awareness of protecting the health, through walking and exercise.

- **Living arrangement**

Figure 6-6 shows that ageing people who were living in their own home had more social activities and walking exercise than the ageing people who were living with care support. This difference, to some extent, is caused by the extent of degradation of the body function of the ageing people, who need care support is due to pooling body condition.

Meanwhile, the comparison of them with the other two group is not significant due to the number of participants with this character is small, which could not represent this group very well. However, the drives of them could be identified. Depending on this figure, the main aim of the ageing people who

are living in care-accommodation coming to neighbourhood park is to do walking exercise and entertainment activities, group activities, enjoy the sun, and playing with children.

- **Difficulty in seeing, moving, and hearing**

Figure 6-7 shows that the elderly participants with difficulty seeing, moving (see Appendix Figure A. 4) and hearing (see Appendix Figure A. 5), who desire more communication with others in the neighbourhood park through chatting with others. This is an approach to help them to achieve self-esteem and enhance the feeling of belonging. (The limitation of this result is that there are too few elderly people participating in the survey who have great difficulty in hearing and action. There are only one or two people, which does not have universal significance. However, the sample size of the two groups without difficulty and slightly difficult is not much different, and still has great reference value. This limitation existing on the comparisons in 6.3.1.1, 6.3.1.2, and 6.3.1.3)

The supplement of observation in some sites, physically disabled and elderly senior citizens in wheelchairs are also active in parks, mostly sunbathing, watching singing, watching dancing, and watching people playing poker. Similarly, this watching behaviour is also a kind of participation in the activities of the park.

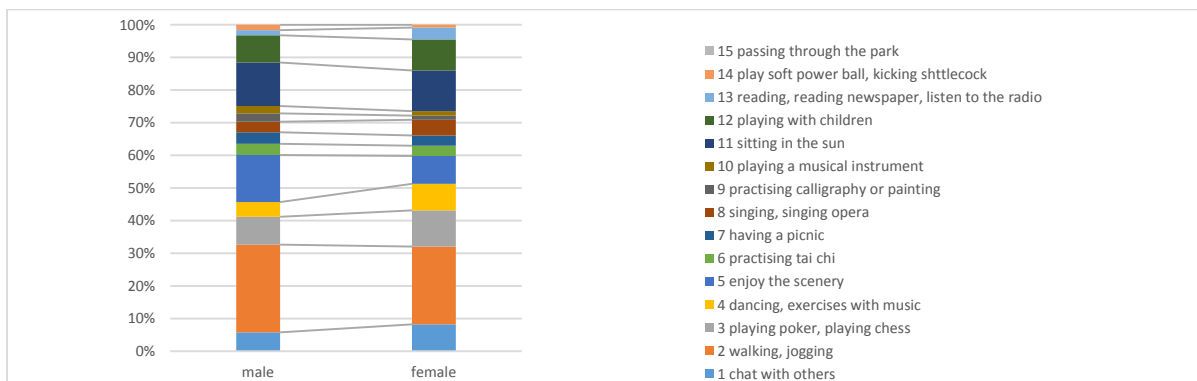


Figure 6-1 the comparison of activities chosen by elderly male and female

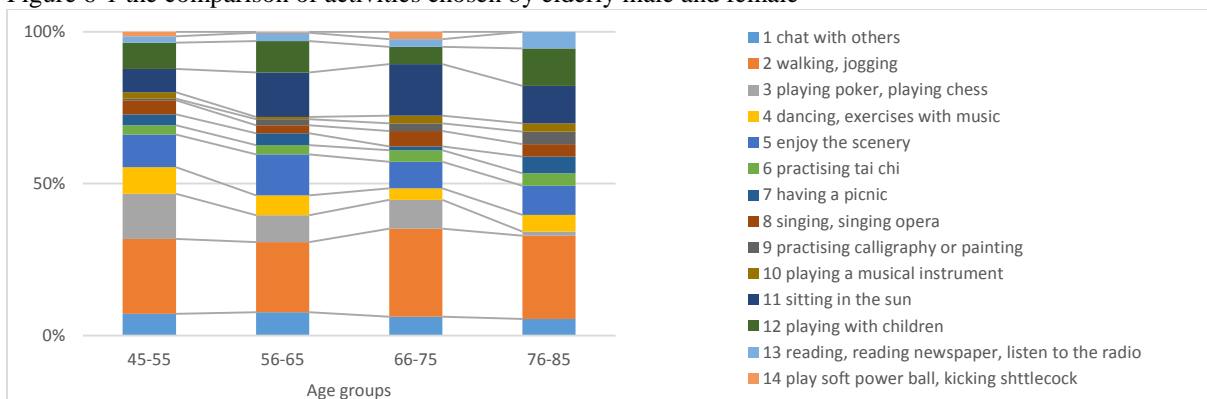


Figure 6-2 the comparison of activities chosen by different age range

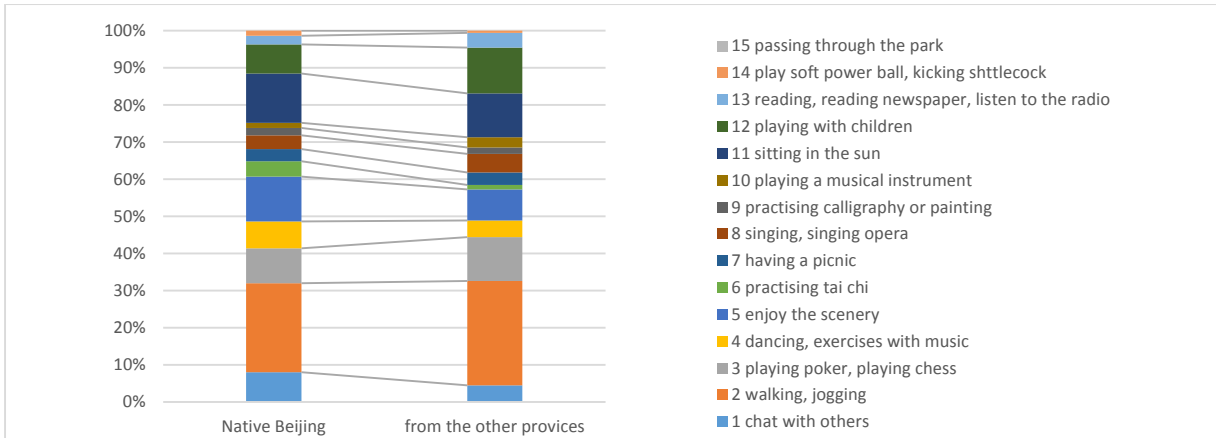


Figure 6-3 the comparison of activities chosen by native ageing people and not native ageing people

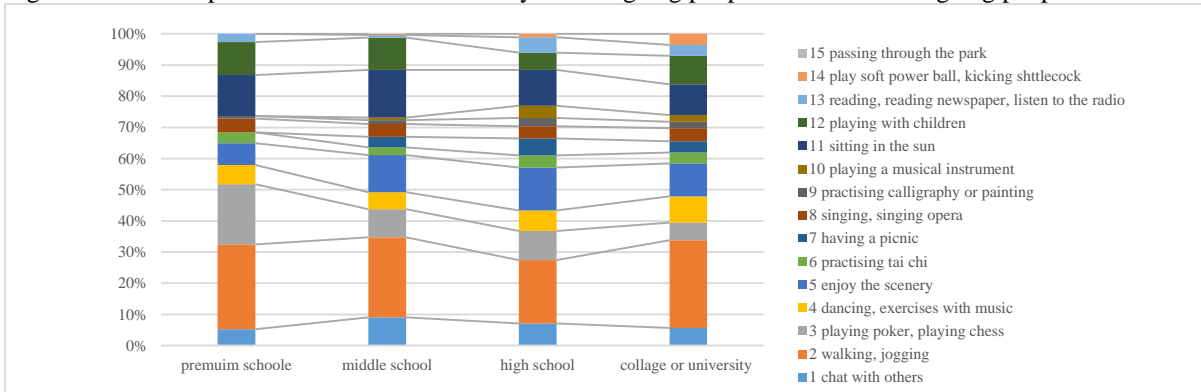


Figure 6-4 the comparison of activities chosen by different education level of ageing people (sample size of the participant with master and above of their educational level is smaller than other group, so ignored here)

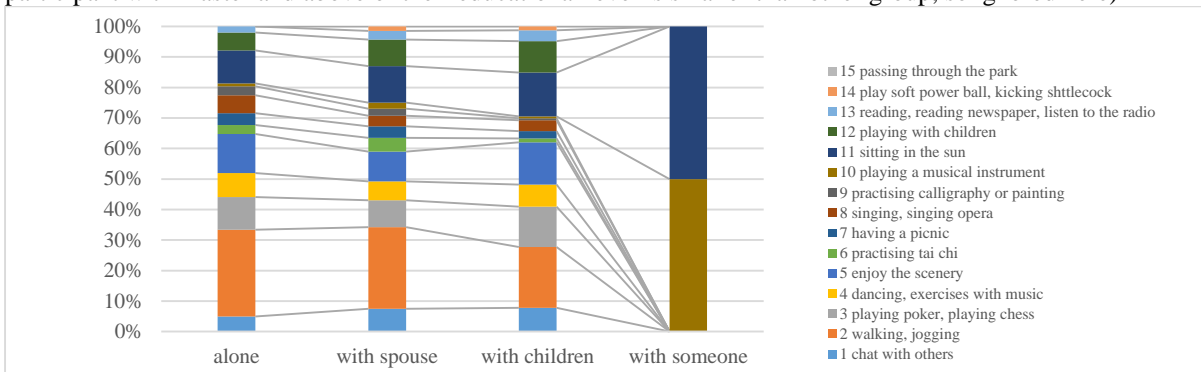


Figure 6-5 the comparison of activities chosen by ageing people living alone or not

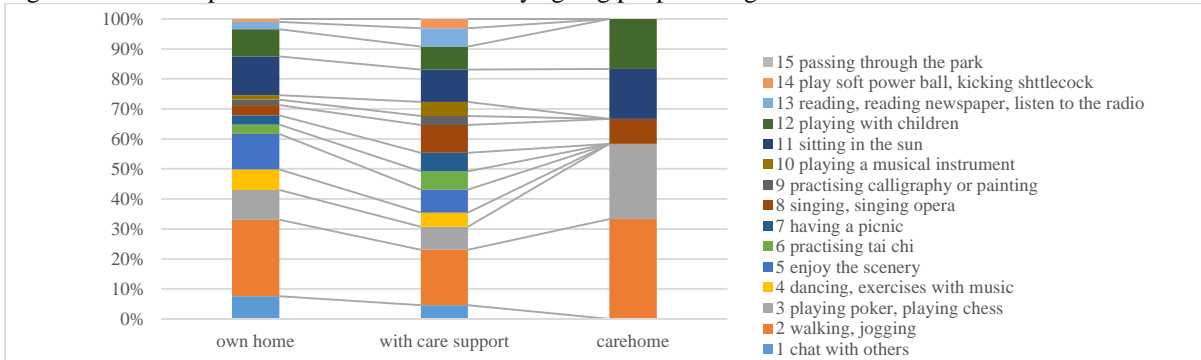


Figure 6-6 the comparison of activities chosen by ageing people with different living arrangement

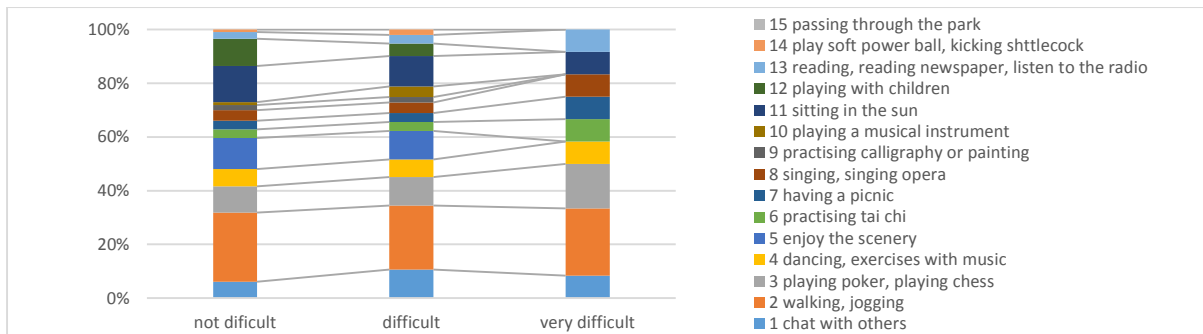


Figure 6-7 Activities selection of ageing people with different extent of difficulty in seeing

6.3.1.2 The frequency of using park in different demographics

A range of comparison set out depending on the responses from participant to Question 1.8 in Part A of questionnaire and demographic questions in Part D of questionnaire.

- **Gender**

Figure 6-8 shows that male and female shows the similar trend that the most of them prefer come to park once every day more than once a week. Regard to multi-times every day, number of elderly female are slightly higher than elderly male.

- **Age group**

Figure 6-9 shows that the ageing people aged in 46-55, 66-75, and 76-85, are prefer to go to park once every day. Compared with these age groups, the age group 56-65 elderly people is lower in the frequency of use in parks than other age groups. The frequency of park use in this group of seniors is mainly concentrated two or three times a week instead of going every day.

In the three comparisons of the elderly, marriage or not, retirement or not, whether they are locals, we can find that the frequency of park use is very similar.

- **Marital or not and native or not**

Figure 6-10 and Figure 6-11 show very similar trend.

- **Retired or not**

Figure 6-12 shows that the proportion of retired people coming to the park every day is 55%, and the proportion of people who don't retire to the park every day is about 33%. The frequency of retired old people coming to the park is significantly higher than that of those who are not retired. The old man who comes to the park once a day is the main body, accounting for nearly half of the proportion. (Limitation of this comparison is the sample size of two groups existing big difference, in this sample, retired participant was 378, non-retired participant was 26.)

- **Educational level**

Figure 6-13 shows that as the level of education rises, the frequency of use of the park shows a slight upward trend. (due the huge difference in sample size of the 'master and above group', ignore the result

of 'master and above' group.)

- **Living arrangement**

Figure 6-14 shows that the group living in their own home and the group living in the elderly apartment have a large number of parks per day, but they do not appear in their own homes with care services. It may be because the elderly who use the care service mostly have a certain degree of action or audio-visual difficulties, and travel needs to be accompanied by the payer. Due to the inconvenience during travel and the use of the park, they cannot come to the park many times.

On the other hand, the elderly living in elderly apartments have a large proportion of low-frequency sub-uses. They come to the park once a week. This may be because some elderly apartments are far from the community park, which is not conducive to the elderly. Affected their frequency of use.

- **Living alone**

Figure 6-15 shows that elderly people living alone and those living in spouses and children, we found that their use of parks was similar in frequency.

- **Difficulty in seeing**

Figure 6-16 shows that elderly people with difficulties in vision have a higher frequency of coming to the park than those with good vision. Older people with very difficult eyesight have come to the park several times a day to reach 20%.

Most of the old people in the three groups come to the park once a day or several times a week.

- **Difficulty in moving**

Figure 6-17 shows that the elderly who have difficulties in moving compare the elderly who have no difficulty. Their parks are used at a similar frequency, but the proportion is lower than that of the elderly.

- **Difficulty in hearing**

Figure 6-18 shows that the elderly who have difficulties in hearing compare the elderly who have no difficulty. Their parks are used at a similar frequency, but the proportion is lower than that of the elderly.

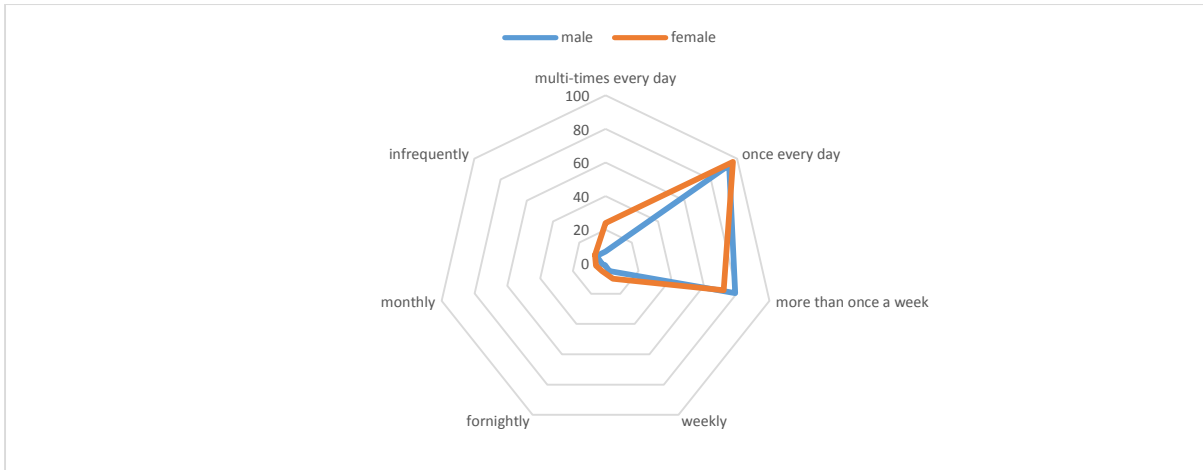


Figure 6-8 the comparison of the frequency of using a neighbourhood park by different gender

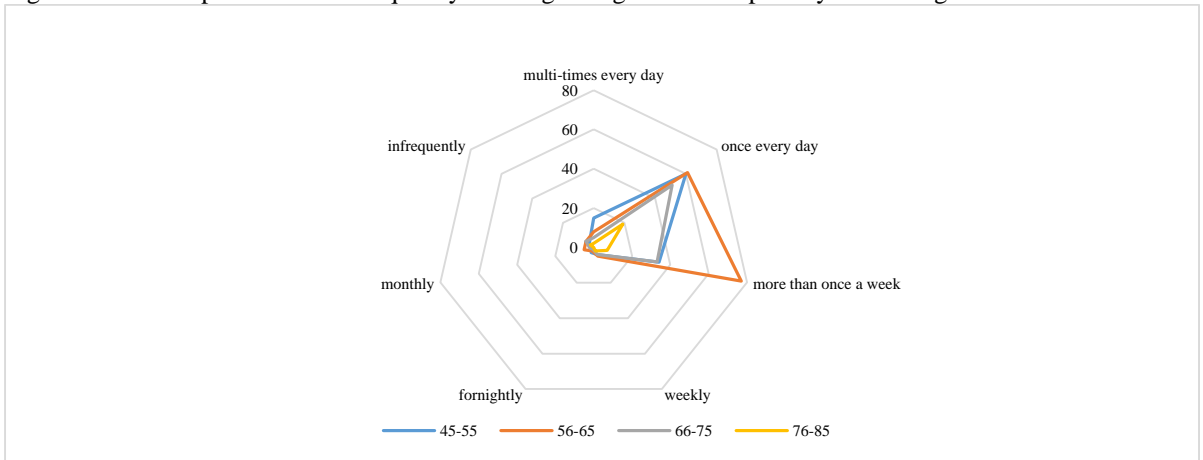


Figure 6-9 the comparison of the frequency of using a neighbourhood park by different age group of ageing people

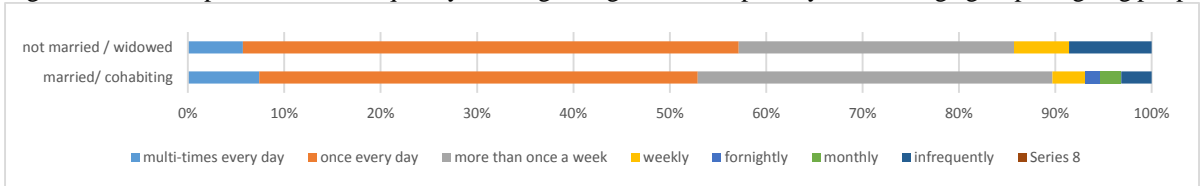


Figure 6-10 the comparison of the frequency of using a neighbourhood park by marital statement

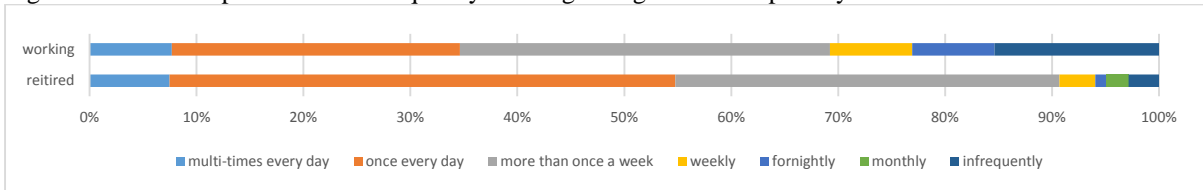


Figure 6-11 the comparison of the frequency of using a neighbourhood park by retired or not.

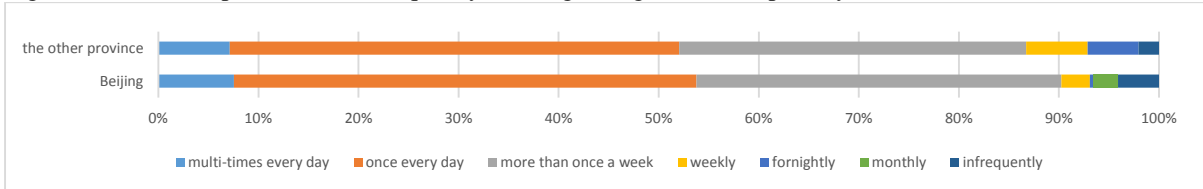


Figure 6-12 the comparison of the frequency of using a neighbourhood park by native or not

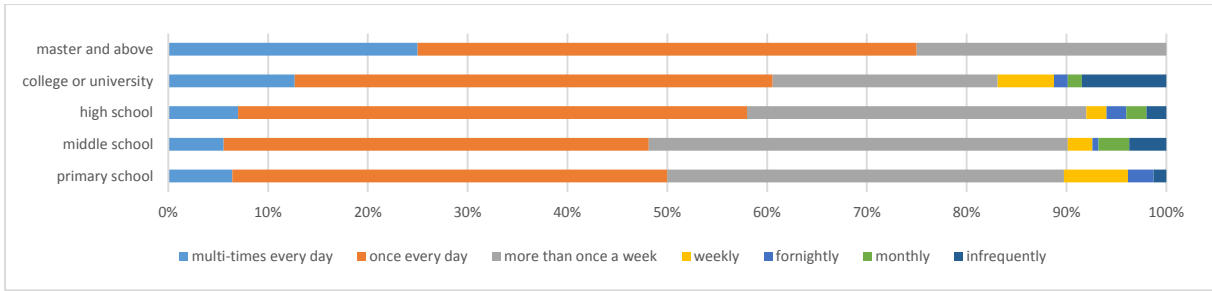


Figure 6-13 the comparison of the frequency of using a neighbourhood park by different educational level

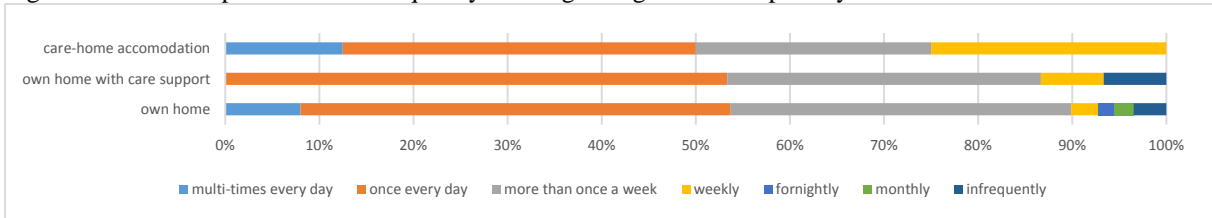


Figure 6-14 the comparison of the frequency of using a neighbourhood park by different living arrangement

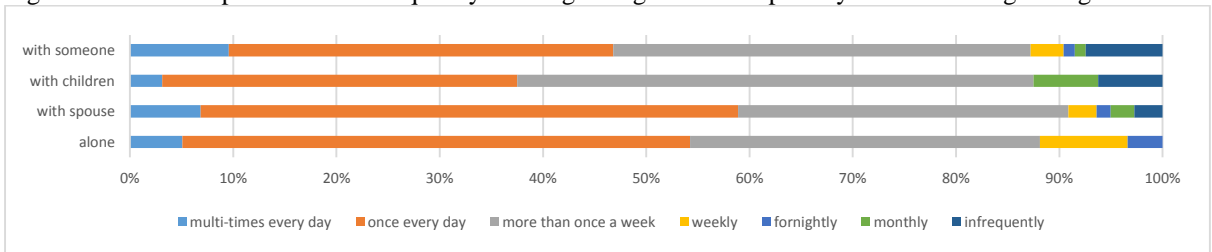


Figure 6-15 the comparison of the frequency of using a neighbourhood park by living alone or not

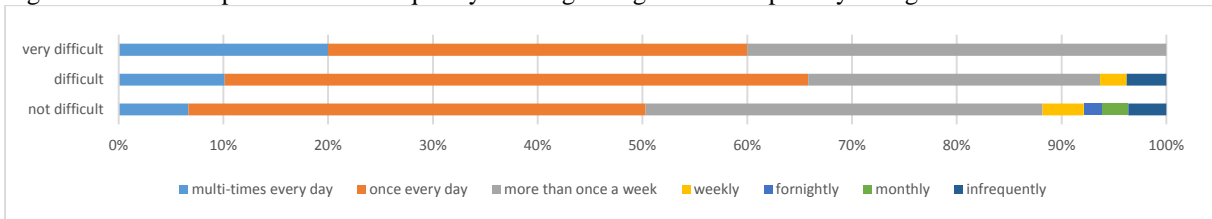


Figure 6-16 the comparison of the frequency of using a neighbourhood park by different extent of difficulty in seeing

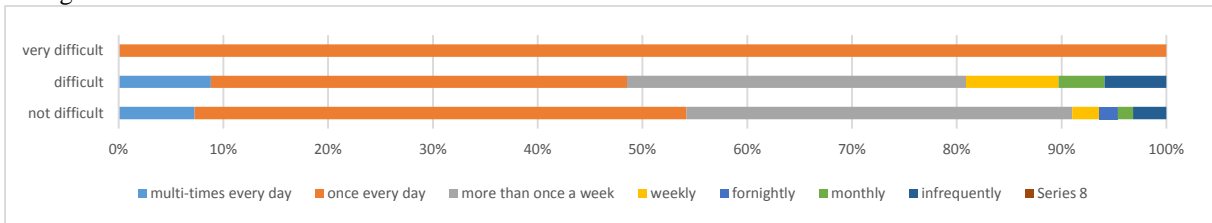


Figure 6-17 the comparison of the frequency of using a neighbourhood park by different extent of difficulty in moving

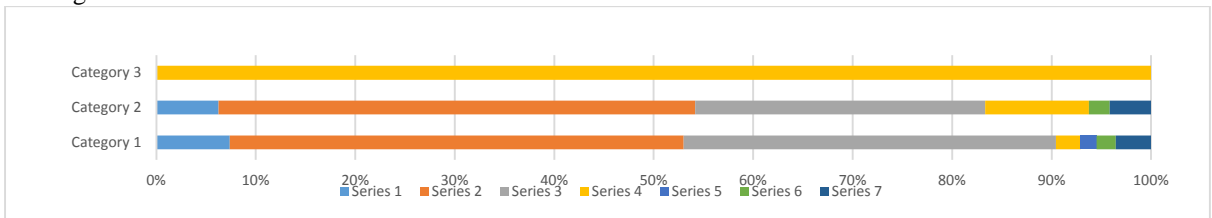


Figure 6-18 the comparison of the frequency of using a neighbourhood park by different extent of difficulty in hearing

6.3.1.3 Duration of using park in different demographics

A range of comparison set out depending on the responses from participant to Question 1.9 in Part A of questionnaire and demographic questions in Part D of questionnaire.

- **Gender**

Figure 6-19 shows that the elderly men and women showed a very similar trend, and the vast majority of people chose to move 1-2 hours each time. Compared with older men, older women have a slightly more prolonged park activity overall. Most people spend 1-2 hours per park activity accounted for more than 50% of the total. Secondly, some elderly people choose 30-60 minutes for each activity, and they account for nearly 30% of the total.

- **Age group**

Figure 6-20 shows similar trend, but younger ageing people are more inclined to go to park activities for a longer period of time overall.

- **Marital**

Figure 6-21 shows that married and unmarried people, locals and foreigners, present a similar proportion of park use time, most people choose 1-2 hours using park each time.

- **Retired or not**

Figure 6-22 shows that they are shows the similar trend.

- **Native or not**

Figure 6-23 shows that the ageing people moving from the other provinces were spending more time in the neighbourhood park than the native ageing people.

- **Educational level**

Figure 6-24 shows that they have similar trend.

- **Living arrangement**

Figure 6-25 shows that the proportion of parks used by elderly people living in their own homes and those living in elderly apartments is relatively longer than that of the elderly who are being cared for. More people are now active in parks for a longer period of time, 1-2 hours. The elderly who are being cared for have increased the number of short-term activities. The proportion of elderly people who have 30-60 minutes of activity is 10% higher than that of the elderly who live in their own homes. Old people living in elderly apartments have only two activities, 85% choose to live for 1-2 hours, and the rest choose activities for about 4 hours.

- **Living alone**

Figure 6-26 shows no obvious difference.

- **Difficulty in seeing, moving, hearing**

Figure 6-27, Figure 6-28 and Figure 6-29 shows similar trend.



Figure 6-19 the comparison of duration of using a neighbourhood park by different gender

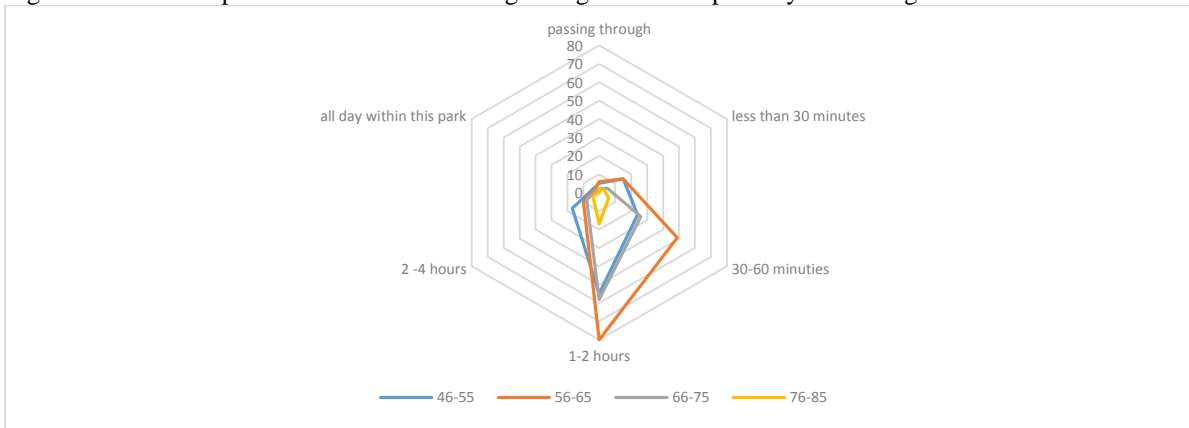


Figure 6-20 the comparison of duration of using a neighbourhood park by different age group

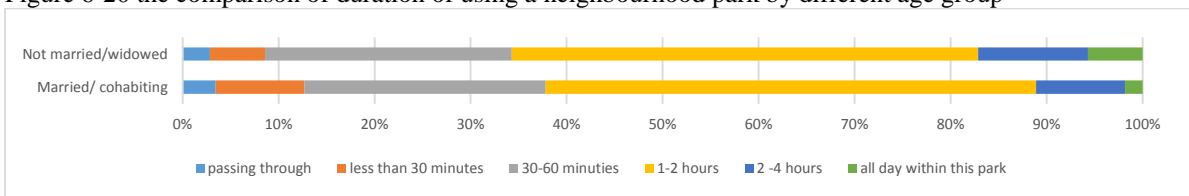


Figure 6-21 the comparison of duration of using a neighbourhood park by different marital statement

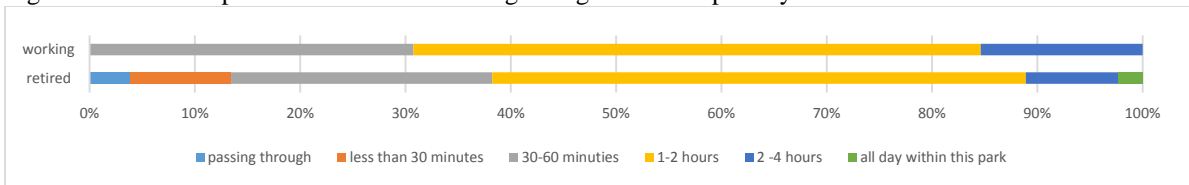


Figure 6-22 the comparison of duration of using a neighbourhood park by retired or not

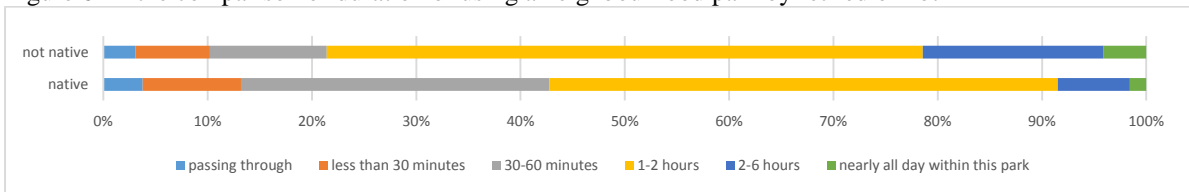


Figure 6-23 the comparison of duration of using a neighbourhood park by native or not

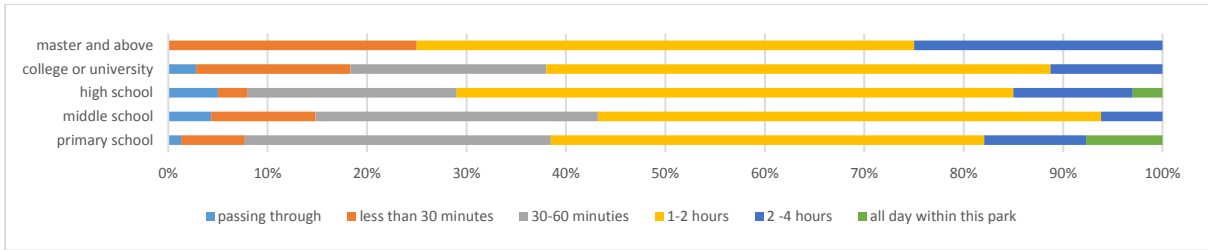


Figure 6-24 the comparison of duration of using a neighbourhood park by different educational level

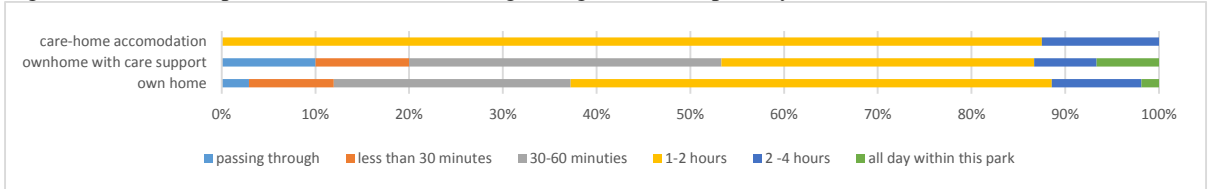


Figure 6-25 the comparison of duration of using a neighbourhood park by different living arrangement

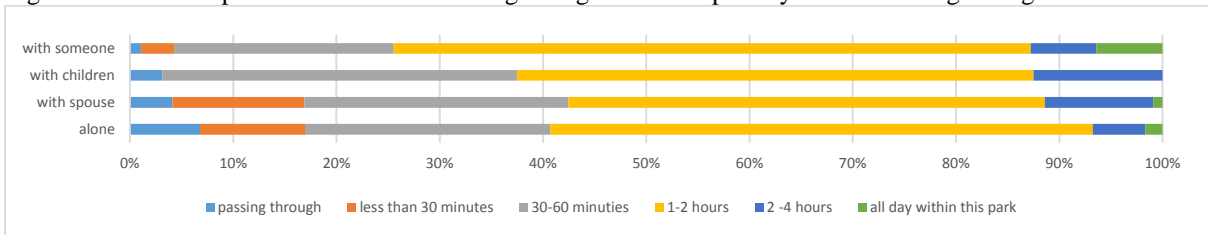


Figure 6-26 the comparison of duration of using a neighbourhood park by different living arrangement

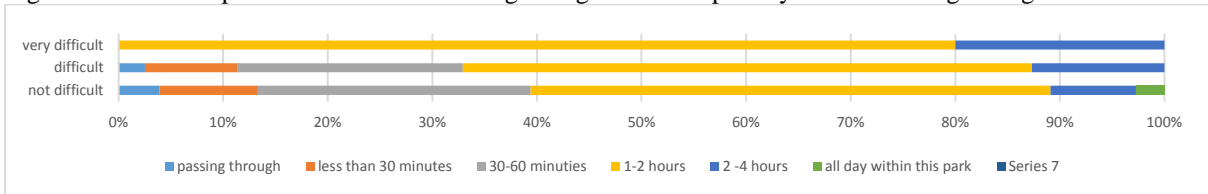


Figure 6-27 the comparison of duration of using a neighbourhood park by different extent of difficulty in seeing

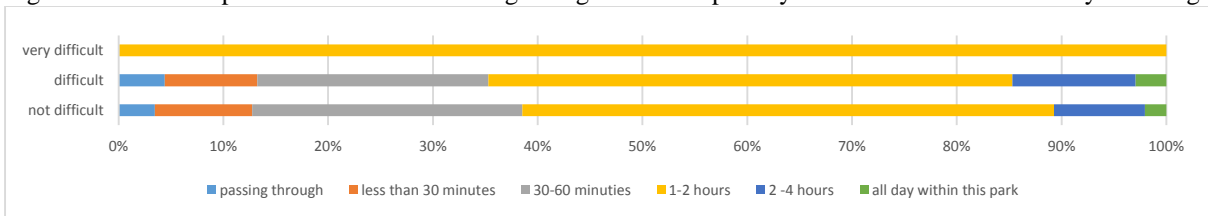


Figure 6-28 the comparison of duration of using a neighbourhood park by different extent of difficulty in moving

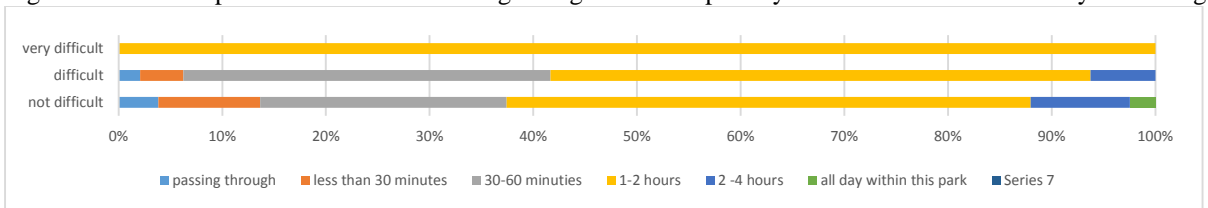


Figure 6-29 the comparison of duration of using a neighbourhood park by different extent of difficulty in hearing

6.3.1.4 Summary:

The section of the study aimed to investigate the effects of the demographics of the ageing people on their usage and behaviours in the neighbourhood parks. Some key points are emerging from the analysis as follows:

- Based on the crosswise comparison of the demographic characters of the ageing people, the activities distribution shows a relatively similar trend in general view in different groups.
- In general, walking is the most popular activities of all ageing people exclude some of them with significant difficulty in body function.
- However, there are some important features of usage of the ageing people could be identified in different groups shown as Table 6-2.

Furthermore, the characters of frequency and duration of using the neighbourhood park of the ageing people with different demographics contributed to:

- The integrated conceptual framework of **frequency** of usage, emotional bonding with park, self-rated psychological issues and characters of ageing people; (Table 6.22)
- The integrated conceptual framework of **duration** of usage, emotional bonding with park, self-rated psychological issues and characters of ageing people. (Table 6.23)

For the analysis of association 1, these findings concluded are essential for a more comprehensive and in-depth consideration of the behavioural preferences of older people and to expand the understanding of the connections between people and behaviours for older people. Some studies have compared the differences between older and younger, which is relatively obvious, but few have been studied for specific characteristics in different groups of older people. So the above findings can make up for this gap. At the same time, the above findings can help the future ageing design to more targeted design of the needs of different elderly people, in order to improve the overall experience of the elderly community park use, thereby improving the quality of life and happiness of the elderly.

Table 6-2 the summary of the different features of activities preferred by ageing people with different demographic characters.

Association 1:	Demographic		Different features of usage
people-behaviour	Gender	→	Elderly female →social and group activate.
	Age	→	Younger ageing group → entertainment activities
			Older ageing group → walking & static activates & rest.
	Retired or not	→	Retired ageing people → social & group activities
	Native or not	→	Native ageing people → social & group activates
			Not native ageing people → entertainment activities
	Education level	→	Low to high education level = entertainment high to low
	Living alone	→	Living alone →walking, high heath protection awareness
		Living with children → entertainment	
		Living with children or spouse →social activities	
	Living arrangement	→	Living own home → social & group activities & walking exercise
			Living in care-accommodation →exercise, entertainment, group, sun, children
	Difficulty in seeing, moving, and hearing	→	More desire for communication and social interaction. Watching is their way to participate in the social environment of the neighbourhood park.

6.3.2 Association 2 (people – emotional bonding): Different characteristics of ageing people have a different extent of emotional bonding with the neighbourhood parks.

This section of the study aimed to investigate the effects of demographics of the ageing people on their emotional bonding with the neighbourhood parks. The emotional bonding indicators calculated by responses on Question C2.1 to Question C2.5.2 in Part C of questionnaire.

Table 6-3 Reference table of indicators and question labels

Question Number in questionnaire	Indicator -item	description of item (question)
C 1	Environmental Satisfaction	I feel comfortable with the whole environment of this park
C2-1	emotional bonding (place attachment) person dimension - group level	Most of my friends are in some way connected with my use of the place
C2-2.1	emotional bonding - place dimension - social level	People I am attached to are mostly from this place.
C2-2.2	emotional bonding - place dimension - social level	I never feel alone here.
C2-3	emotional bonding - psychological processes dimension - emotional level	I miss this place when I am away.
C2-4	emotional bonding - psychological processes dimension - cognitive level	This place is part of me.
C2-5.1	emotional bonding - psychological processes dimension - behavioural level	This is my favourite place to go during my free time.
C2-5.2	emotional bonding - psychological processes dimension - behavioural level	This is the best place for what I like to do

In order to achieve this aim, the indicator of each aspect has been identified as ordinal variables because of the design of 5-Lickert scale of answers. Thus, Goodman and Kruskal's gamma correlational tests were used to analyse the relationship between the demographics of the older people and their emotional bonding with the neighbourhood parks. The results of the tests show in Table 6-6.

In conclusion, the association between the characteristic of ageing people and their environmental satisfaction and a range of dimensions of emotional bonding has been analysed; these findings of the test result could be described as below:

- The participant with **older age** will have a **greater** extent of **environmental satisfaction**.
- The participant with **older age** will have a **greater** extent of **emotional bonding person dimension – group level**.
- **The retired** participant will have a **higher** extent of **emotional bonding person dimension – group level**.
- The **retired** participant will have a **higher** extent of the **emotional level of the psychological process of emotional bonding** with neighbourhood parks.
- **The retired** participant will have a **higher** extent of **cognitive level of psychological process dimension of emotional bonding** with neighbourhood parks.

- **The native Beijing** participant will have a **higher** extent of **group level of person dimension of emotional bonding** with neighbourhood parks.
- **The native Beijing** participant will have a **lower** extent of **behaviour level of psychological processes dimension of emotional bonding** with neighbourhood parks.
- The participant with **higher** educational level has a **lower environmental satisfaction**.
- The participant with **higher** educational level has a **lower** extent of **group level of person dimension of emotional bonding**.
- The participant with **higher** educational level has a **lower** extent of **social level of place dimension of emotional bonding**.
- The participant with **higher** educational level has a **lower** extent of **emotional level in psychological processes dimension of emotional bonding**.
- The participant with **higher** educational level has a **lower** extent of **behaviour level in psychological process dimension of emotional bonding**
- The participant living in their own home have a **higher** extent of **social level and cognitive level of emotional bonding** compared with people living in their home with care support and care-home.
- The participant living with children have a **higher** extent of emotional bonding –person dimension – group level
- The participant living with children have a **higher** extent of emotional bonding – place dimension – social level

Furthermore, some associations in these findings mentioned above are relatively stronger than the others, as a moderate level. Table 6-4 shows as an interpretation of the size Cohen (1992) of the coefficient.

Table 6-4 the interpretation of the size of the coefficient

Correlation coefficient value	Effect size
-0.3 to +0.3	Weak
-0.5 to -0.3 or 0.3 to 0.5	Moderate
-0.9 to 0.5 or 0.5 to 0.9	Strong
-1.0 to -0.9 or 0.9 to 1.0	Very strong

Table 6.7 the interpretation of the size of the coefficient

Table 6-5 shows the stronger significant associations between demographic of the elderly participant and their emotional bonding with the neighbourhood park, some of them, the value of coefficient (G-value) is larger than 0.3, the effect size is moderate, they have a more strong and considerable impact on the emotional bonding.

Table 6-5 The important influence links and the values of the coefficient.

Characteristic	Dimensions of emotional bonding	G-value and P-value
Retirement or not	Group level-person dimension	G=0.45, p=0.001
	Social level-place dimension	G=0.466, p=0.07
	Emotional level-psychological	G=0.409, p=0.011
	Cognitive level-psychological	G=0.374, p=0.019
Native or not	Behavioural level- psychological	G=-0.332, p=0.000
Educational level	Environmental satisfaction	G=0.376, p=0.000
	Group level-person dimension	G=0.309, p=0.000
Living arrangement	Social level – place dimension	G=0.307, p=0.024

Table 6.8 The important influence links and the values of the coefficient.

The above results can be understood as follows:

- The retired park users have a significantly stronger emotional bonding with the park, especially the social level, group level, emotional level, which are all relating to the social dimension of the neighbourhood park.
- The retired park users also have considerable stronger emotional bonding in cognitive level in psychological progress dimension, which is relating to the perceptual dimension of the park.
- The ageing people moving from the other provinces to Beijing who has stronger emotional bonding in behavioural level in psychological progress dimension with park, which implies they are more desirable to the familiar local environment through seek and follow local activities in the neighbourhood parks.
- The ageing people have a higher educational level who have demand higher quality park experience.
- The ageing people have lower educational level who are easier to build emotional bonding in a group level, which implies they show more desire of social interaction and seek the sense of belonging from the local social environment in the neighbourhood park

- The ageing people living in their own home is easier to build emotional bonding in the social level of place dimension, which implies they are easier to access to the social environment of the local park and build deeper social interaction with others in the park. Thus they have a deeper emotional bonding with the neighbourhood park.

Summary

This section of study set out to examine the relationship between the demographics of the ageing people and their emotional bonding with the neighbourhood park. The association was analysed using Gamma correlational test in SPSS. Some key points were emerging in the results as follows:

- The effects of demographics of ageing people on their emotional bonding are real existing in general.
- There are 4 demographics (retirement or not, Native or not, educational level, living arrangement) of the ageing people shows a considerably significant influence on the social level, group level, cognitive level, behaviour level of the emotional bonding.
- The powerful associations have been identified and summarized into the integrated conceptual framework of usage, emotional bonding, self-rated psychological states and demographics of the ageing people (see table 6.21). It provides a further understanding of the interaction between ageing people and neighbourhood park.
- This section provides a new approach in landscape and urban studies using the Goodman and Kruskal's gamma test which have a more effective and predictable performance compared with traditional correlation analysis in the relatively small sample size in social science.

These findings contribute to discover the inter structure and key features of the dynamic system of interaction relationship between ageing people and neighbourhood park and to uncover the most influential factor of it, which help us to make a deeper understanding of how the interaction works. These findings generalized from invisible phenomenon existing in place, give the direction of the trend changing, shows the key issues that need to be considered in the future research and design.

Especially with the development of society and globalization, the trend of these impacts will become more visible. The conflict between the growing demand of higher quality park experience and the current statement of neighbourhood park will be more serious, which will reduce the satisfaction of the elderly from the environment, unable to meet the psychological needs of them, especially for the retired people.

Table 6-6 Goodman and Kruskal's gamma for demographics of the participants on environmental satisfaction and Emotional bonding

Ordinal by Ordinal, Gamma	Gender		age		Marital status		Retirement		Native or not		Educational level		Living arrangement	
	Val ue	Appro x. Sig.	Valu e	Appro x. Sig.	Valu e	Appro x. Sig.	Valu e	Appro x. Sig.	Valu e	Appro x. Sig.	Valu e	Appro x. Sig.	Valu e	Appro x. Sig.
Environmental satisfaction	.144	.099	-.246	.000***	.078	.600	.307	.054	.116	.257	.376	.000***	.225	.114
EB ^a –person dimension –group level	.046	.538	-.119	.037**	.208	.122	.450	.001***	.161	.049**	.309	.000***	.202	.086
EB ^a – place dimension – social level 1	-.040	.602	-.052	.389	.114	.404	.466	.007**	.033	.714	.206	.000***	.253	.049**
EB ^a – place dimension – social level 2	.019	.810	.064	.319	.219	.095	.294	.099	-.141	.134	.056	.357	.307	.024**
EB ^a – psychological processes dimension – emotional level	.045	.545	-.071	.250	.213	.104	.409	.011**	-.114	.197	.242	.000***	.195	.133
EB ^a – psychological processes dimension – cognitive level	-.058	.461	.035	.561	.128	.342	.374	.019**	-.130	.161	.095	.121	.281	.030**
EB ^a – psychological processes dimension – behaviour level 1	-.075	.334	.031	.608	-.016	.905	.184	.225	-.332	.000***	.131	.026**	.124	.364
EB ^a – psychological processes dimension – behaviour level 2	-.046	.560	-.064	.286	-.112	.404	.141	.316	-.113	.223	.143	.013***	.021	.872

^a EB means Emotional bonding

** means the association shows statistically significant. p -value <0.05

*** means the association shows strongly statistically significant. p -value < 0.001

6.3.3 Association 3 (place – behaviour): Different features of neighbourhood parks impact usage behaviour of ageing people

The association between conditions of a neighbourhood park and activities of ageing people is one way to explore the understanding of featured ageing people’s environmental-behaviour. The character of habits of elderly Chinese users impacting by conditions green space is an important finding echoed with the finding from observation data to uncover the ageing people’s usage features and to build links between behaviours and physical space.

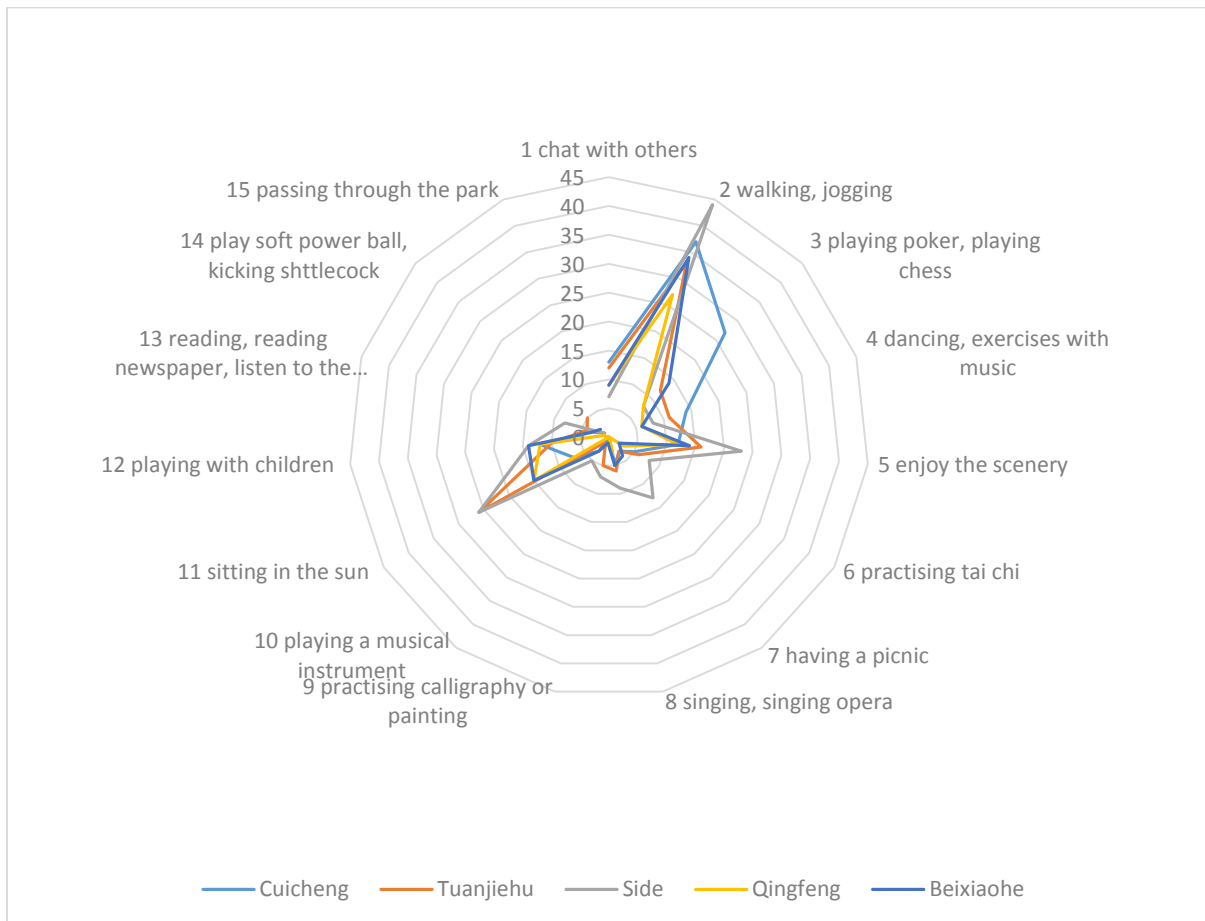


Figure 6-30 the activities distribution of the ageing people in 5 neighbourhood park

Based on the comparison of the usage (depending on response to question 1.1 in Part A of questionnaire) of the ageing people in 5 neighbourhood park (see Figure 6-30), there are some critical points found as follows:

- In each park, the distribution of activities of the elderly is generally similar, indicating that the elderly people have their own inherent characteristics and needs, but a small part is also affected by design condition the site.
- For the activities, the most popular activities of the ageing people are walking (2) and sitting in the sun (11). They are the most acceptable activities for nearly all elderly park users to achieve the aim of protecting health and enjoying the environment of the park.

- For the differences influencing by conditions of parks, the activities are changing and showing the more popular in some parks with better conditions, such as better design condition suitable for these activities, active social environment promoting the activities. These activities and their best suitable parks have been summarized as:
 - Walking → Side Park;
 - Playing poker or chess → Cuicheng Park;
 - Enjoy the scenery → Side Park
 - Singing songs or opera → Side Park;
 - Sitting in the sun → Side Park and Tuanjiehu Park;
 - Playing with children → Beixiaohe Park and Side Park
 - Reading, reading a newspaper, listening to the radio → Side park.

Summary

This section of study set out to investigate the effects of the place on usage behaviours of the ageing people. The comparison of the usage behaviour in 5 neighbourhood parks used to achieve this aim. Some critical points emerged as follows:

- In general, the ageing people have relatively similar usage behaviour in the neighbourhood park depending on their habits.
- The conditions of the neighbourhood park influenced the engagement of some usage behaviours such as, walking, playing poker or chess, enjoy the scenery, singing song, sitting in the sun, playing with children, reading a newspaper. A good special design of a neighbourhood park will engage more ageing people to join the activities in the park.

These findings contribute to make a deeper understanding of the features and trend of usage of the ageing people and uncover the activities of habits of them influencing by the conditions of the neighbourhood park. It gives a direction to compare the conditions of the park where our promotion the elderly people's special activates. In this way, the special conditions could be found and applying to an ageing friendly neighbourhood park in the future to improve the quality of their health and psychological well-being.

6.3.4 Association 4 (place - emotional bonding) : Different features of neighbourhood parks impacting ageing people having a different extent of emotional bonding.

This section of study set out to investigate the effects of a neighbourhood park on the emotional bonding of ageing people have with the park. The comparative ranking analysis was used to achieve this aim.

According to the level of emotional scoring (see Figure 6-31) a comparative analysis of the conditions of the park has been done for exploring hypothesis 4. First, statistics and comparisons were made on the scores of emotional bonding (questionnaire Q-C-1 to Q-C-2 reference table see Table 6-3) of the parks, and differences were found. Then, the parks have been grouped into two groups based on sorting the score from good to bad.

For good-group parks, we compare and analyse to find similar conditions, and these similar conditions may be conditions that affect older people's higher impact. For bad-groups, we look for similar conditions that may cause low scores. Finally, the difference between high and low groups is compared to find different conditions among them, and these different conditions may be the conditions for the

difference in emotional connections. Finally, the above conditions are summarized and classified to give a conclusion. The perceptual feeling of the elderly users is analysed with the impact on behaviours to deliver a comprehensive understanding of the drives and limitation of the interaction in Chapter finding combined with finding from the semi-structured interview and finding from observation.

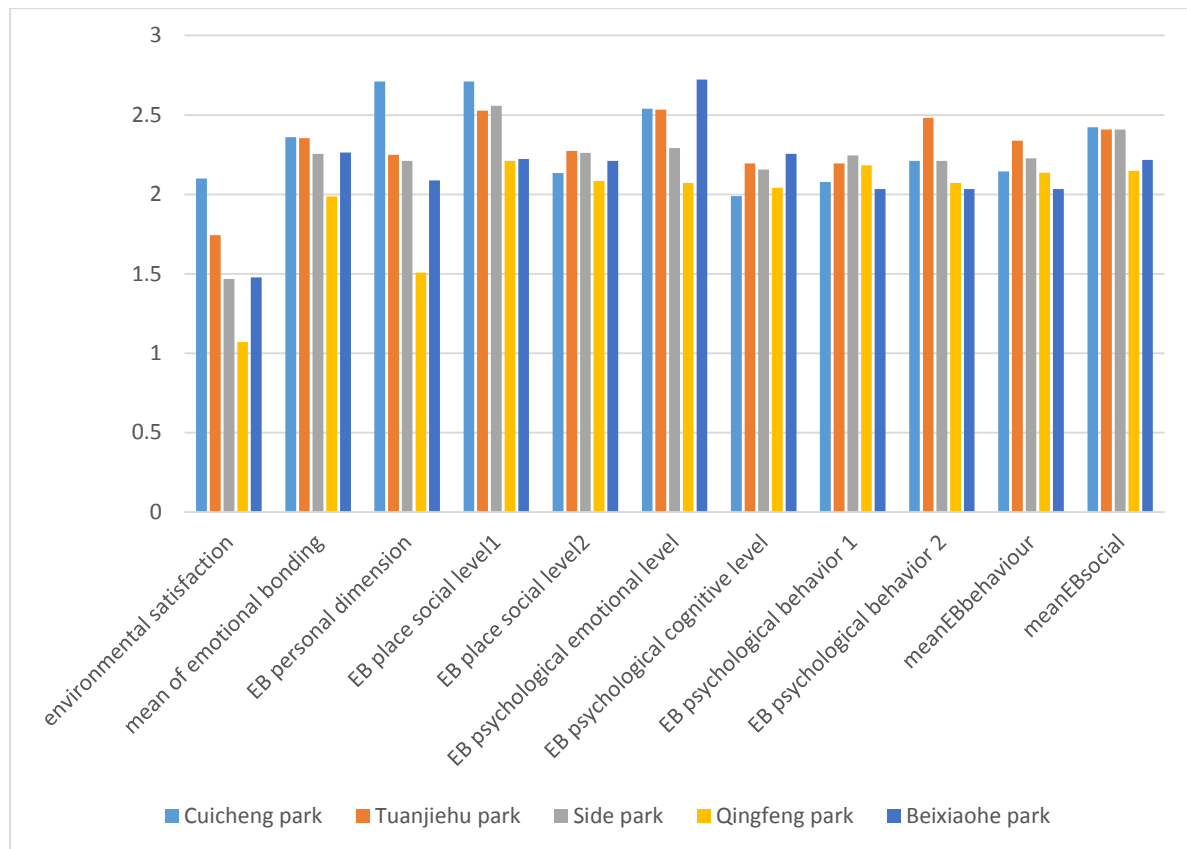


Figure 6-31 the comparisons of environmental satisfaction and indicators of emotional bonding of five parks based on answers of Q-c-1 to Q-c-2.

Table 6-7 rank of parks in the emotional bonding of elderly users.

Indicators	1st	2nd	3rd	4th	5th
Environmental Satisfaction	QINGFENG	SIDE	BEIXIAOHE	TUANJIEHU	CUICHENG
Personal Dimension Of Group Level Of EB	QINGFENG	BEIXIAOHE	SIDE	TUANJIEHU	CUICHENG
Social Level 1 Of Place Dimension Of EB	QINGFENG	BEIXIAOHE	TUANJIEHU	SIDE	CUICHENG
Social Level 2 Of Place Dimension Of EB	QINGFENG	CUICHENG	BEIXIAOHE	SIDE	TUANJIEHU
Psychological-Emotional Level Of EB	QINGFENG	SIDE	TUANJIEHU	CUICHENG	BEIXIAOHE
Psychological Cognitive Level Of EB	CUICHENG	TUANJIEHU	SIDE	QINGFENG	BEIXIAOHE
Psychological Behaviour 1 Level Of EB	BEIXIAOHE	CUICHENG	TUANJIEHU	QINGFENG	SIDE
Psychological Behaviour 2 Level Of EB	BEIXIAOHE	QINGFENG	SIDE	CUICHENG	TUANJIEHU
Mean Of Emotional Bonding	QINGFENG	SIDE	BEIXIAOHE	TUANJIEHU	CUICHENG

Summary

This section aimed to understand the effects of the neighbourhood park on the emotional bonding of the ageing people have with the parks. The outcome of this section is the rank of parks in different dimensions of emotional bonding of the older users. (see Table 6-7) It could be used in two approaches:

- To discuss the potential reasons for high performance in emotional bonding integrated with the outcomes of observation, semi-structured interview, and questionnaire.
- To further understanding of the relationship between place and emotional bonding.

6.3.5 Association 5 (behaviour – emotional bonding): Ageing people do different activities in neighbourhood parks will have a different extent of emotional bonding.

This section of the study aimed to investigate the impact of usage behaviours on the emotional bonding of the ageing people with the neighbourhood park. The aspects of usage behaviours include the patterns of activities and frequency and duration of using the park. The hypothesis is analysed based on the answers of Questions (A1.1, A1.8, A1.9, E2 and C1 to C2-5.2) in the questionnaire. The weighted score analysis and comparative cross-table figures were used to explore the relationship between behaviours and emotional bonding.

6.3.5.1 Patterns of Activities Vs Emotional Bonding

The statement of patterns of activities of older users in neighbourhood parks has been accounted for by the answers of Question A 1.1 (question and options detail see Table A. 4 the statement of Question A1.1 about patters of activities in questionnaire for 5 sites

). This question is a multi-response question, the first three activities chosen by ageing people are walking (42.5% elder users chose); sitting in the sun (21.6%); enjoy the scenery (18.7%).

In order to determine the emotional bonding of elder user of each activity to the place, the questions of emotional bonding (C1 to C2.5.2) needs to be counted one by one according to the patterns of activity and degree of choice of participant, the example shown in the Table 6-8.

The marking and ranking process shows below:

- Firstly, the data of Question A 1.1 (multi responses) has been defined as a variable set (named \$activity) in SPSS, and then use Multi-response crosstabs to account the percentage (how much people joining walking has a high extent of environmental satisfaction and emotional bonding, result shown as the table).
- Secondly, the weighting score method has been applied in this analysis in order to weight the impact of activities and arrange the influence of the activity. In this section, the options are 5-Lickert designed, which is ordinal variable data. We define the distance between the five options is equal and is assigned 1 to 5, depending on the degree of option.
- Finally, we weight the options, then the final score of the environmental satisfaction of the persons who chosen 'talking activity' is 1.795918, calculated as follows:
- Talking activity score= $44.9\% * 1 + 34.7\% * 2 + 18.4\% * 3 + 0.0\% * 4 + 2.0\% * 5 = 1.795918$

According to this calculation method, we can get the following results (environmental satisfaction and emotional bonding within a different pattern of activity):

Depending on the design (strongly agree =1 to strongly disagree =5), the score of activity is smaller means it has better performance in the evaluation of emotional bonding. Thus, we have got the first five activities with better emotional bonding and environmental satisfaction of ageing people.

In conclusion, the extent of perceptual feelings, environmental satisfaction and emotional bonding, shows differences within different patterns of activities of ageing people (Figure 6-32). Thus, the activities (Table 6-9) closer tied emotional bonding has been discovered in this finding, which could be promoted in future design to improving the perceptual quality of older users in neighbourhood parks.

Table 6-8 Question C1 environmental satisfaction and Question A 1.1 patterns of activities crossable statement

		Question A-1 patterns of activities														Total	
		1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00		
Environmental satisfaction	1.	Count	22	90	28	19	43	5	8	14	2	4	57	37	7	4	340
		% within activity	44.9%	52.0%	40.6%	43.2%	56.6%	21.7%	34.8%	51.9%	15.4%	33.3%	64.8%	60.7%	36.8%	50.0%	
	2.	Count	17	59	25	20	27	16	10	10	11	7	23	18	8	2	253
		%	34.7%	34.1%	36.2%	45.5%	35.5%	69.6%	43.5%	37.0%	84.6%	58.3%	26.1%	29.5%	42.1%	25.0%	
	3.	Count	9	22	12	3	5	2	4	2	0	1	6	6	4	2	78
		%	18.4%	12.7%	17.4%	6.8%	6.6%	8.7%	17.4%	7.4%	0.0%	8.3%	6.8%	9.8%	21.1%	25.0%	
	4.	Count	0	1	3	1	1	0	1	1	0	0	2	0	0	0	10
		%	0.0%	0.6%	4.3%	2.3%	1.3%	0.0%	4.3%	3.7%	0.0%	0.0%	2.3%	0.0%	0.0%	0.0%	
	5.	Count	1	1	1	1	0	0	0	0	0	0	0	0	0	0	4
		%	2.0%	0.6%	1.4%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Total		Count	49	173	69	44	76	23	23	27	13	12	88	61	19	8	685

Percentages and totals are based on responses.

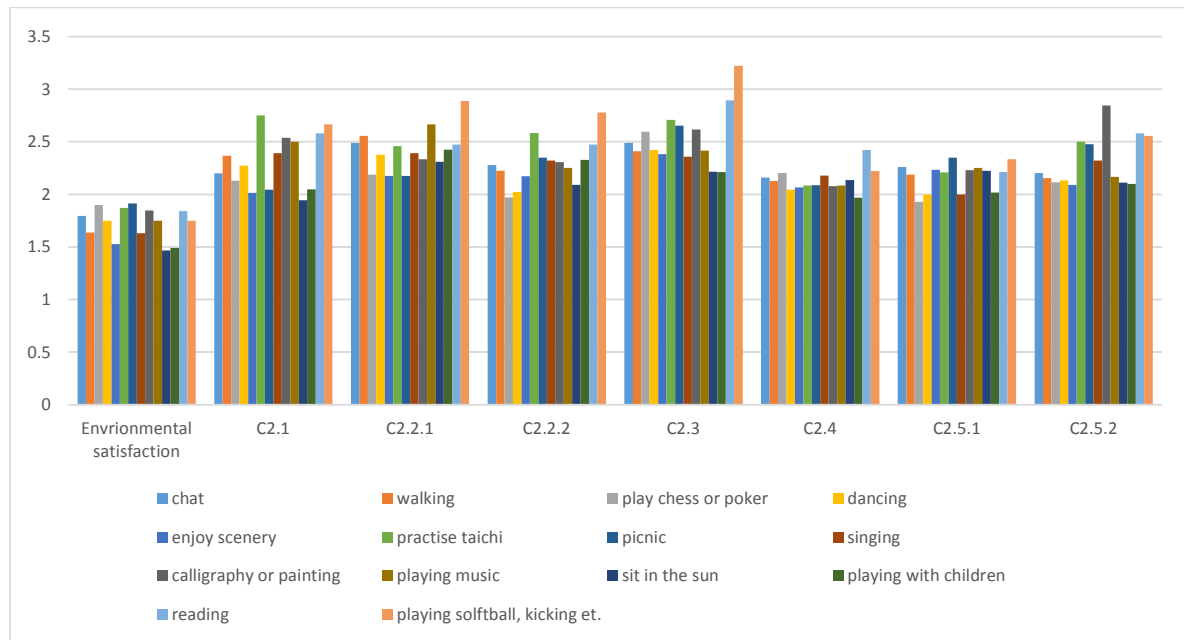


Figure 6-32 the weighting score of environmental satisfaction and emotional bonding within a different pattern of activity

Table 6-9 the first five activities with good performance in indicators of environmental satisfaction and emotional bonding.

Question number	indicators	1st	2nd	3rd	4th	5th
C1	Environmental Satisfaction	Sitting In The Sun	Playing With Children	Enjoy Scenery	Walking	Dancing
C2.1	Emotional Bonding - Person Dimension- Group Level-	Sitting In The Sun	Enjoy Scenery	Picnic	Playing With Children	Playing Chess Or Poker
C2.2.1	Emotional Bonding -Place Dimension- Social Level- 1	Enjoy Scenery	Picnic	Playing Chess Or Poker	Sitting In The Sun	Dancing
C2.2.2	Emotional Bonding -Place Dimension- Social Level- 2	Playing Chess Or Poker	Dancing	Playing With Children	Enjoy Scenery	Walking
C2.3	Emotional Psychological Dimension – Level - Processes emotional level	Playing With Children	Sitting In The Sun	Singing	Enjoy Scenery	Walking
C2.4	Emotional Psychological Dimension – Bonding - Processes Cognitive Level	Playing With Children	Dancing	Enjoy Scenery	Practice Tai Chi	Calligraphy And Painting
C2.5.1	Emotional Psychological Dimension –Bonding - Processes Behavioural Level 1	Playing Chess Or Poker	Dancing	Singing	Playing With Children	Reading
C2.5.2	Emotional Psychological Dimension –Bonding - Processes Behavioural Level 2	Enjoy Scenery	Playing With Children	Sitting In The Sun	Playing Chess Or Poker	Dancing

6.3.5.2 Duration and frequency of activities Vs emotional bonding

The section set out to investigate the effects of duration and frequency of using parks on the emotional bonding of the ageing people. Some interesting points are emerging in these cross-table figures (frequency see Figure 6-33, Figure 6-34, Figure 6-35, Figure 6-36, Figure 6-37, Figure 6-38 and Figure 6-39) (duration see Figure 6-40, Figure 6-41, Figure 6-42, Figure 6-43, Figure 6-44, Figure 6-45 and Figure 6-46). The emotional bonding was changed when the duration and frequency changed. The data illustrates that:

- Frequency of using the neighbourhood parks:
 - The elderly people who were more frequently using neighbourhood park have a higher extent of emotional bonding in personal dimension – group level, place dimension – social level, psychological progress dimension – cognitive level, and psychological dimension – behaviour level than the older people who were infrequently coming to neighbourhood park;

- The older people, who show the highest extent of emotional bonding in psychological progress dimension -emotional level, are the people who came to the neighbourhood park more than once a week and weekly. They are higher than the older people who came to the park multi-times every day.
- The extent of emotional bonding in place dimension – social level, psychological progress dimension – cognitive level, psychological progress dimension – behaviour level is increasing with frequency raised.
- Duration of using the neighbourhood parks:
 - The data results show that most dimensions of emotional bonding were increasing with the time of staying in the neighbourhood park being longer.

Thus, the findings from this analysis could be identified as:

- Using neighbourhood park more than once every week is generally contributing to improving emotional bonding of the older park users;
- The most dimensions of the emotional bonding are raising with the time spending in the neighbourhood parks of the older people.

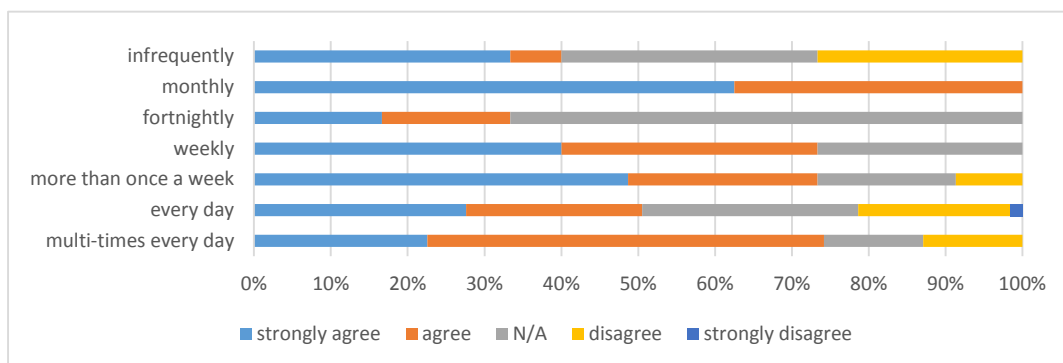


Figure 6-33 frequency of going to neighbourhood park & elderly users' emotional bonding- personal dimension- group level

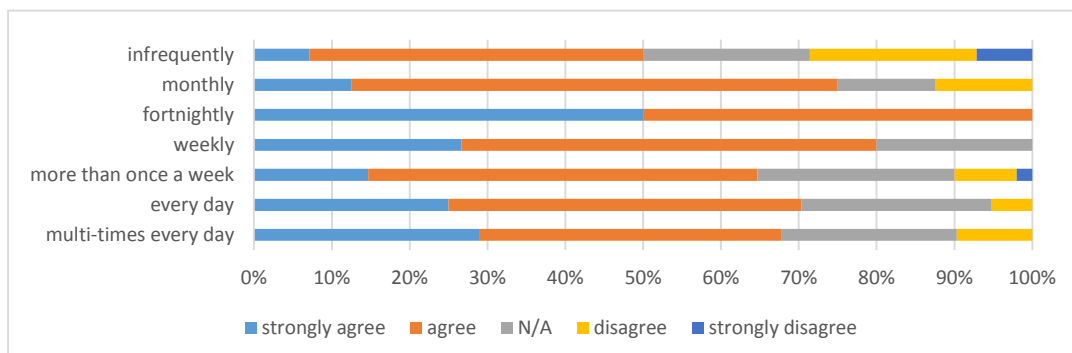


Figure 6-34 frequency of going to neighbourhood park & elderly users' emotional bonding -place dimension-social level

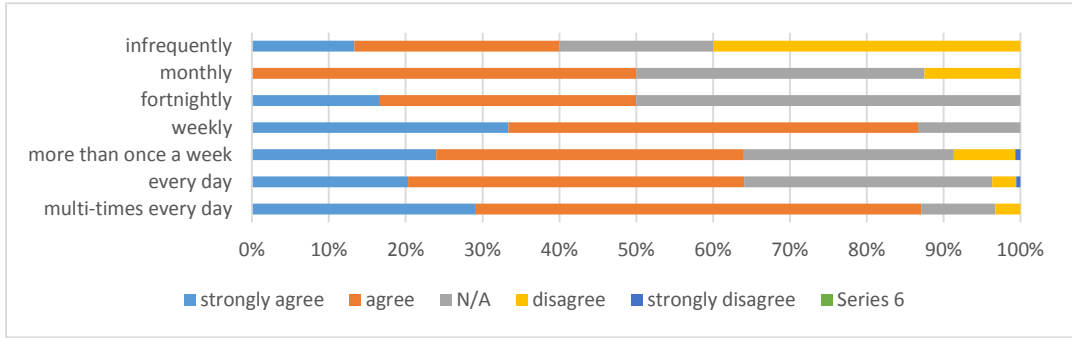


Figure 6-35 frequency of going to neighbourhood park & elderly users' emotional bonding- place dimension - social level2

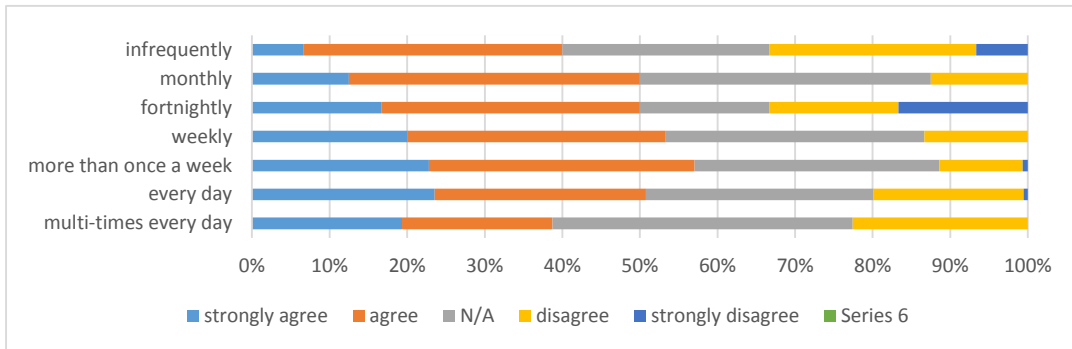


Figure 6-36 frequency of going to neighbourhood park & elderly users' emotional bonding- psychological process dimension- emotional level

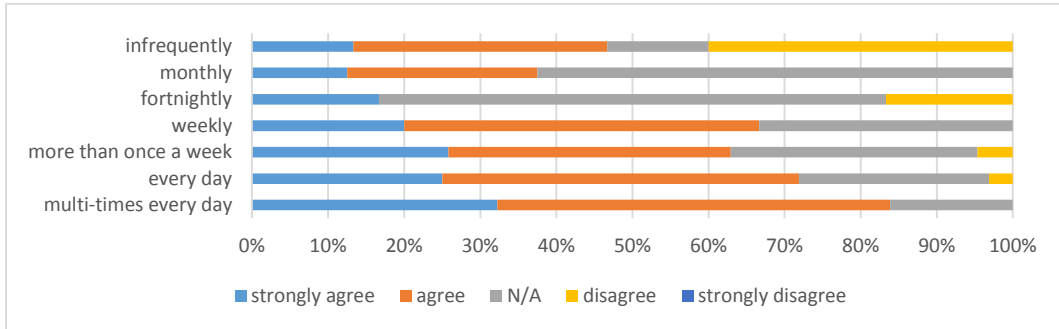


Figure 6-37 frequency of going to neighbourhood park & elderly users' emotional bonding- psychological process dimension- cognitive level

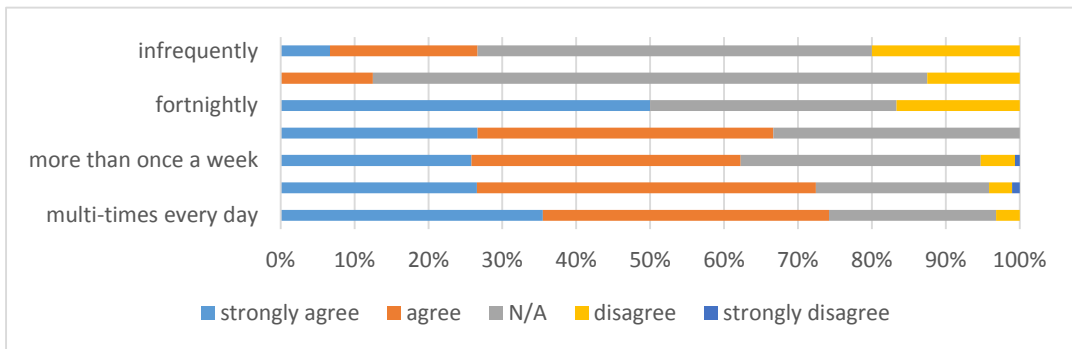


Figure 6-38 frequency of going to neighbourhood park & elderly users' emotional bonding- psychological process dimension- behaviour level1

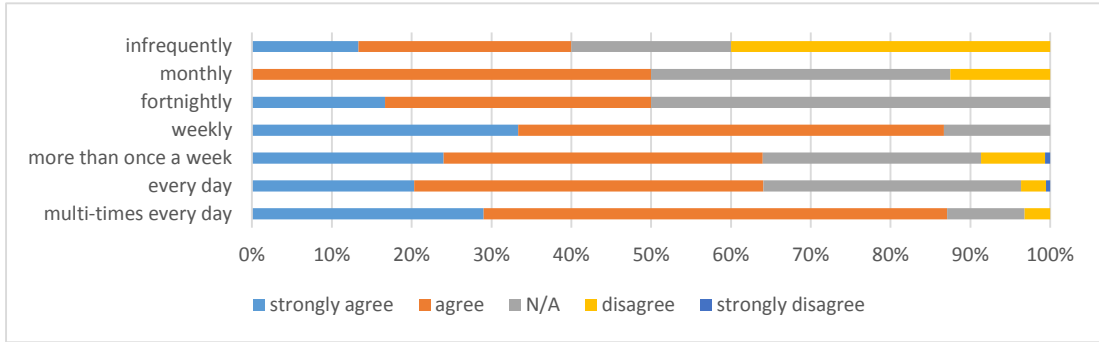


Figure 6-39 frequency of going to neighbourhood park & elderly users' emotional bonding-psychological process dimension-behaviour level2

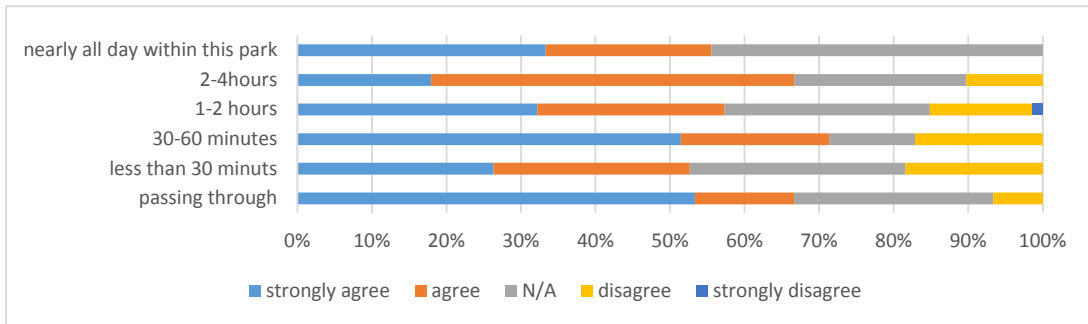


Figure 6-40 time of staying in neighbourhood park & the elderly park users' emotional bonding-person dimension-group level

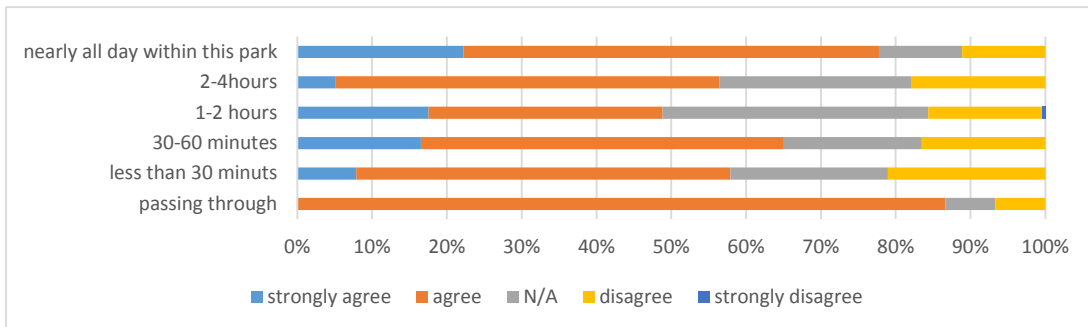


Figure 6-41 time of staying in neighbourhood park & the elderly park users' emotional bonding- place dimension - social level 1

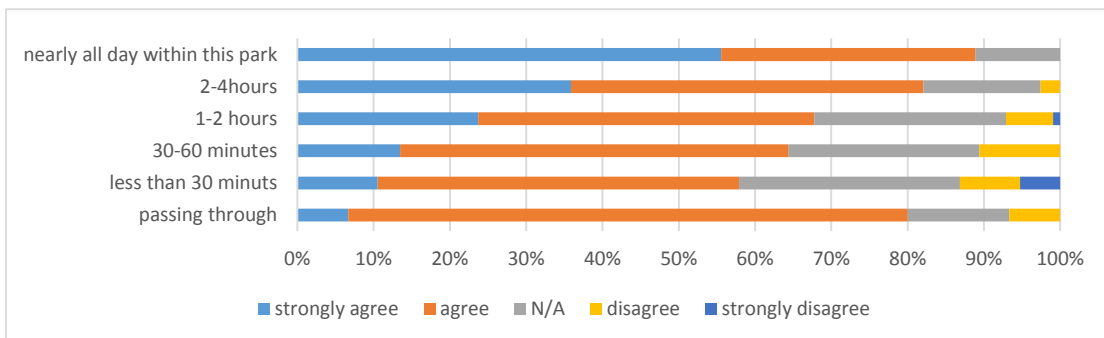


Figure 6-42 time of staying in neighbourhood park & the elderly park users' emotional bonding- place dimension- social level2

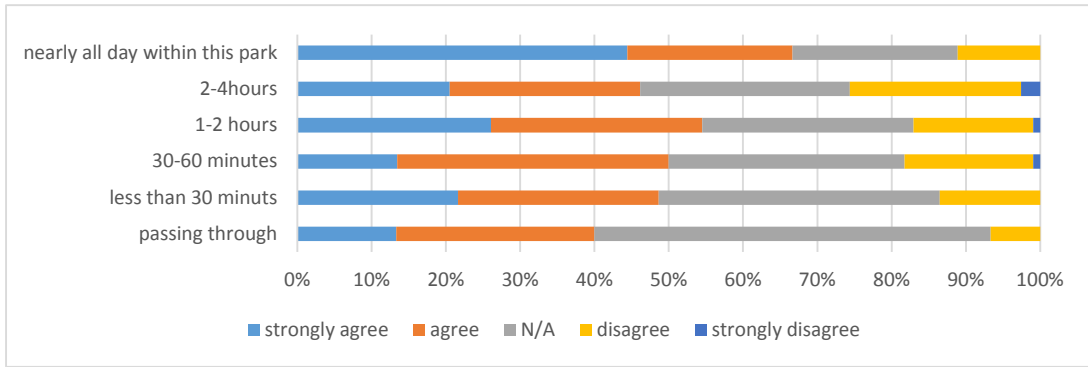


Figure 6-43 time of staying in neighbourhood park & the elderly park users' emotional bonding - psychological processes dimension - emotional level

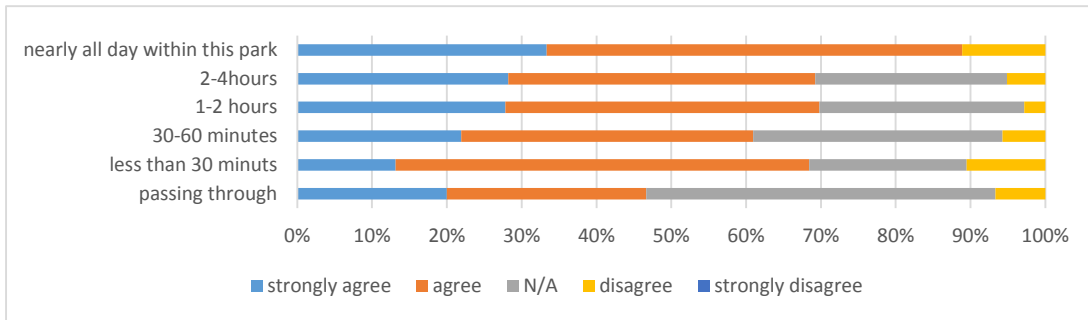


Figure 6-44 time of staying in neighbourhood park & the elderly park users' emotional bonding - psychological progresses dimension -cognitive level

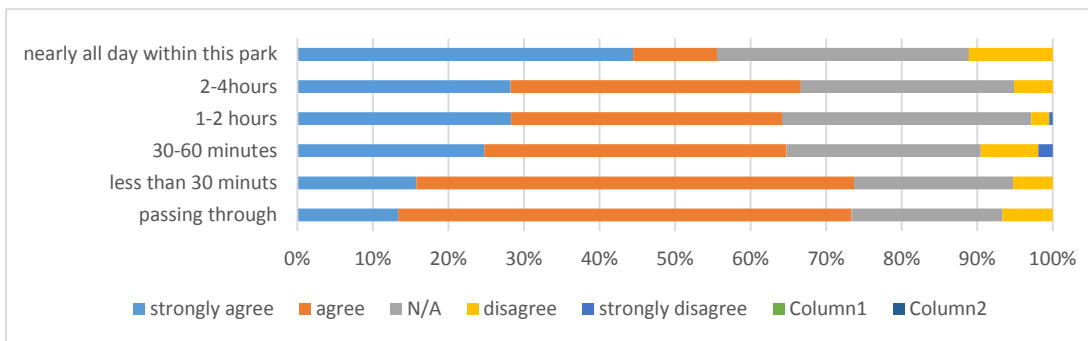


Figure 6-45 time of staying in neighbourhood park & the elderly park users' emotional bonding - psychological processes -behaviour level1

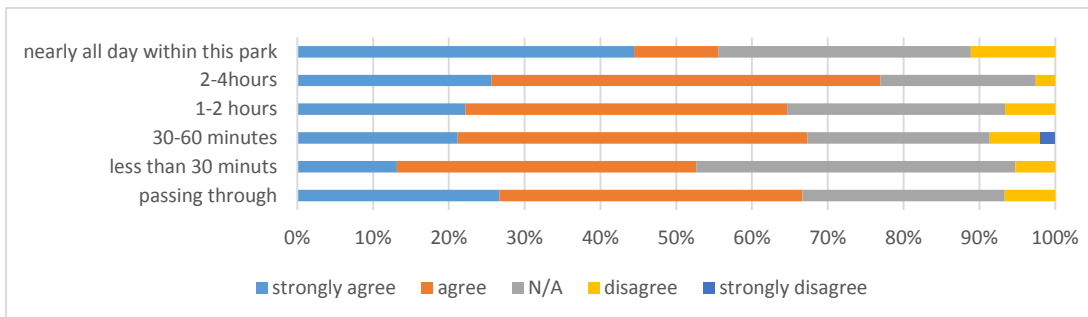


Figure 6-46 time of staying in neighbourhood park & the elderly park users' emotional bonding - psychological processes -behaviour level2

6.3.5.3 Summary

This section of study set out to investigate the effects of the usage behaviours on the emotional bonding of the elderly with the neighbourhood park. The weight score analysis and comparative cross-table figures were used to achieve this aim. Some important points that emerged in this section are:

- Generally, the extent of the emotional bonding of elderly park users has been impacted by the patterns, groupmate, duration, and frequency of activities they had.
- The first five activities with high weighted scores in emotional bonding are:
 - activity is playing with children (7 times),
 - enjoy the scenery (5 times) and dancing (5 times),
 - sitting in the sun (4 times)
 - playing chess or poker (4 times),
 - walking (3 times)
- Frequency and duration of using neighbourhood park were generally positive impact the emotional bonding of the older park users.

6.3.6 Association 6 (behaviour – psychological states): The associations between different activities of ageing people in neighbourhood parks and their psychological statement

This section aimed to investigate the effects of usage behaviours on the self-rated psychological states of the ageing people. The comparative weighted score analysis and cross-table figures used to achieve this aim. The two aspects of usage behaviour mentioned in this section are patterns of activities and frequency and duration of using the neighbourhood park.

Patterns of activities and psychological issues

The relationship between patterns of activities and psychological issues is analysed by the weighting rate score method.

In brief, the process is that the answers of question A.1 has been identified as a multi-response set, and then running crosstabs of multi-response for Question A.1 and Question C4 to C5.4 (questions of psychological issues) in SPSS shows the percentage of each component in each group. Thus, the percentage could be used in the weighting rate calculation. Depending on the context of questions and answers designed, the lower score in question C4.1, C4.2, C5.1 shows better performance; the higher score in question C5.2, C5.3, C5.4 shows better performance.(context of question see Table 6-10)

Table 6-10 reference table for psychological indicator and questions

Question Number	Indicator -item	description of item (question)
C4	Self-evaluation and personality	How do you rate your life at present?
C4-2	Self-evaluation and personality	How do you rate your health at present?
C5-1	Self-evaluation and personality	Do you always look on the bright side of things?
C5-2	Self-evaluation and personality	Do you often feel fearful or anxious?
C5-3	Self-evaluation and personality	Do you often feel lonely and isolated?
C5-4	Self-evaluation and personality	Do you feel the older you get, the more useless you are?

In conclusion, the different score of psychological issues shows a difference in different patterns of activities of the elderly. (Figure 6-47) Based on the conclusion of comparative analysis above, the using of neighbourhood park has positive impacts on psychological issues of the elderly people. The activities with a high weighted score in the range of self-rated psychological states of ageing people were ranked in Table 6-11. It implies that these activities have the most positive impact on improving the quality of life and maintaining mental health for the ageing people.

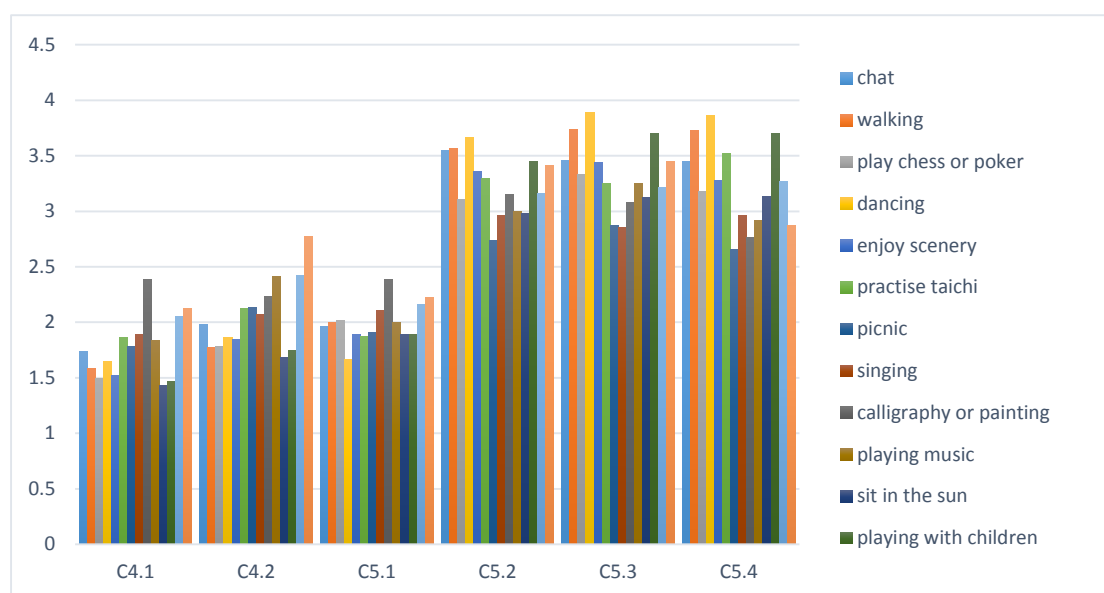


Figure 6-47 the weighting rate score of psychological issues in different patterns of activities calculated based on answers of questionnaire

Table 6-11 the first five activities with good performance in indicators of psychological issues (self-reported quality of life, self-reported health, self-reported positive mental health, self-reported fearful, self-reported loneliness, self-reported useless.

Question number	indicators	1st	2nd	3rd	4th	5th
C4.1	Self-reported quality of life	Sitting In The Sun	Playing Chess Or Poker	Enjoy Scenery	Playing With Children	Walking
C4.2	Self-reported health	Sitting In The Sun	Walking	Playing Chess Or Poker	Playing With Children	Enjoy Scenery
C5.1	Self-reported positive mental health	Dancing	Practise Tai Chi	Playing With Children	Sitting In The Sun	Enjoy Scenery
C5.2	Self-reported fearful or anxious	Dancing	Walking	Chatting	Playing With Children	Playing softball, kicking
C5.3	Self-reported loneliness	Dancing	Playing With Children	walking	Chatting	Playing softball, kicking
C5.4	Self-reported useless	Dancing	Walking	Playing With Children	Practice Tai Chi	Chatting

Duration and frequency of using park VS psychological status of ageing people

The section set out to investigate the effects of duration and frequency of using parks on the psychological state of the ageing people. Some interesting points are emerging in these cross-table figures (duration, see figure 6.57 to figure 6.62). The psychological status was changed when the duration and frequency changed. The data illustrate:

- Frequency of using the neighbourhood parks (Figure 6-48, Figure 6-49, Figure 6-50, Figure 6-51, Figure 6-52, Figure 6-53):
 - The elderly people who were more frequently using neighbourhood park have a better self-rated quality of life and more positive self-rated lonely and self-rated useless than the older people who were infrequently coming to neighbourhood park;
 - The older people who have an outstanding self-rated quality of life are the people who came to a neighbourhood park more than once a week and weekly. They are higher than the older people who came to the park multi-times every day.

These results imply that the neighbourhood park gives positive support to the older people in a general approach for improving quality of life and reducing loneliness and sense of useless. However, the current neighbourhood park is insufficient to meet the huge of the social psychological desire of the older people who have much plant time after retired and try to seek the instead support from the neighbourhood park.

- Duration of using the neighbourhood parks (Figure 6-54, Figure 6-55, Figure 6-56, Figure 6-57, Figure 6-58, Figure 6-59):

- The data results show that the relatively long duration (over 30 minutes) of using park gives a significantly positive impact on self-rated quality of life, health, and positive mental health and contributes to reducing self-rated fearful, lonely and useless.

Thus, the findings from this analysis could be identified as:

- Using neighbourhood park more than once every week is contributing to improving the quality of life and reducing loneliness and sense of useless.
- The current neighbourhood park is insufficient to meet the huge of the social psychological desire of the older people who come multi-times every to seek psychological satisfaction from the park.
- Using neighbourhood park over 30 minutes each time is contributed to improving quality of life and maintain positive mental health, it also helps them to relieve loneliness and useless.

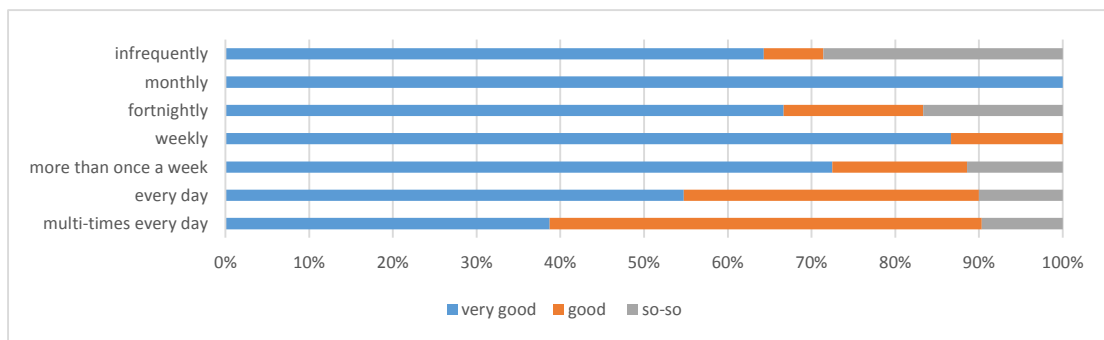


Figure 6-48 frequency of going to neighbourhood park & elderly users' self-rated quality of life

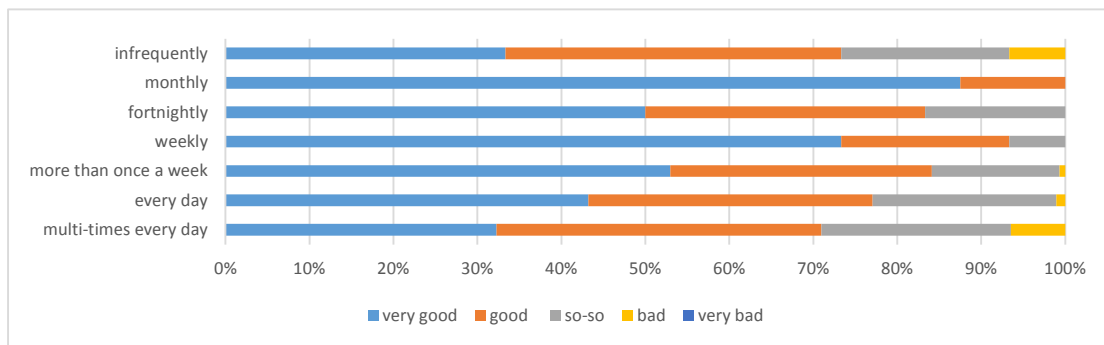


Figure 6-49 frequency of going to neighbourhood park & elderly users' self-rated health

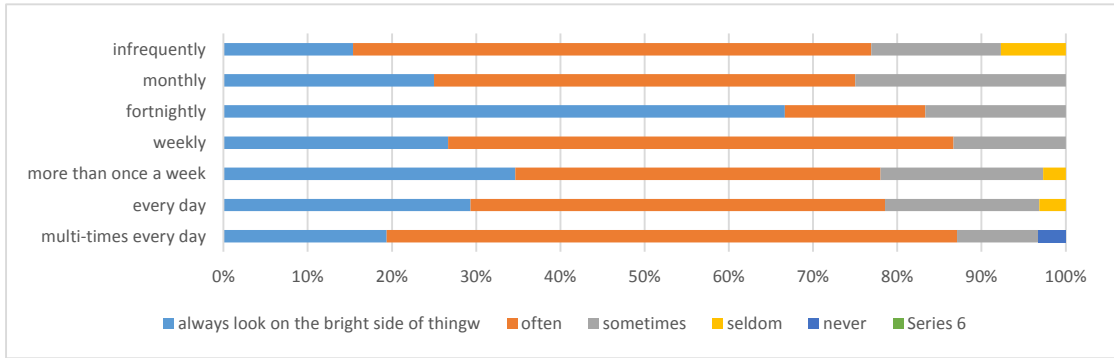


Figure 6-50 frequency of going to neighbourhood park & elderly users' self-rated positive mental health

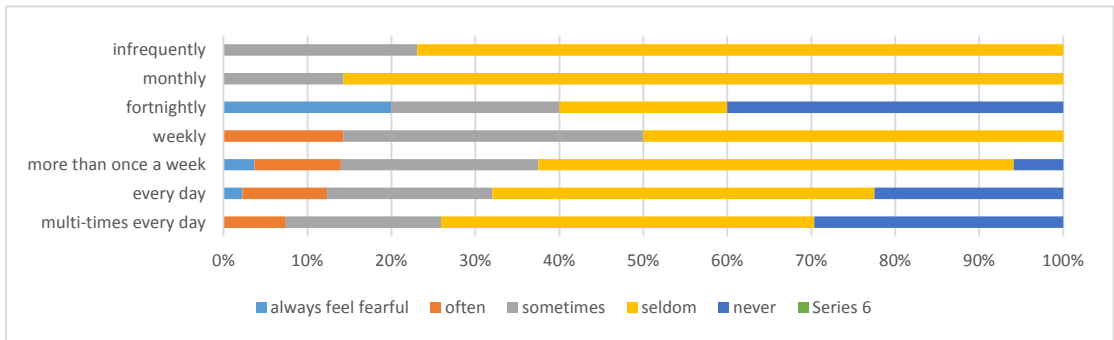


Figure 6-51 frequency of going to neighbourhood park & elderly users' self-rated fearful

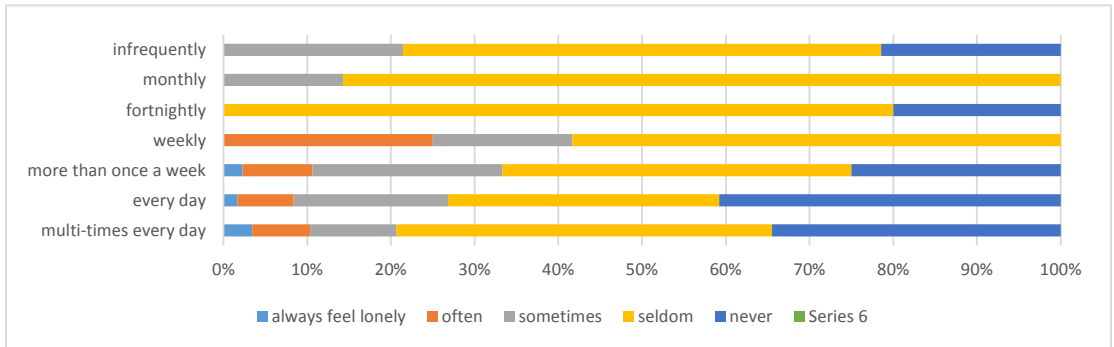


Figure 6-52 frequency of going to neighbourhood park & elderly users' self-rated lonely

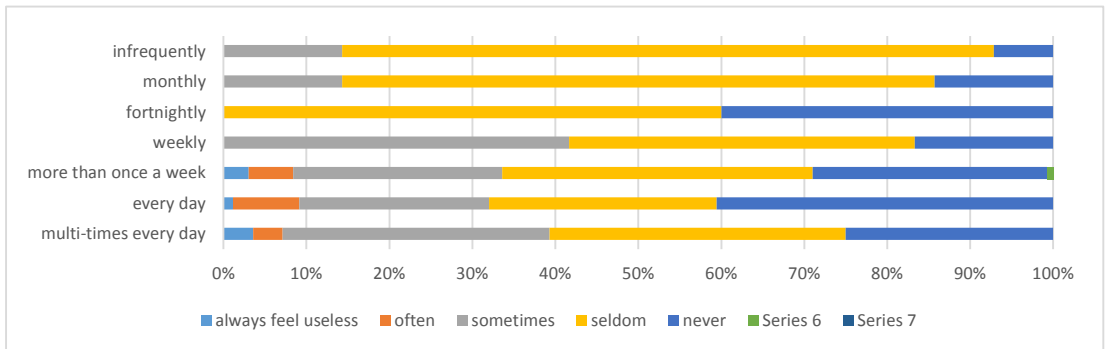


Figure 6-53 frequency of going to neighbourhood park & elderly users' self-rated useless

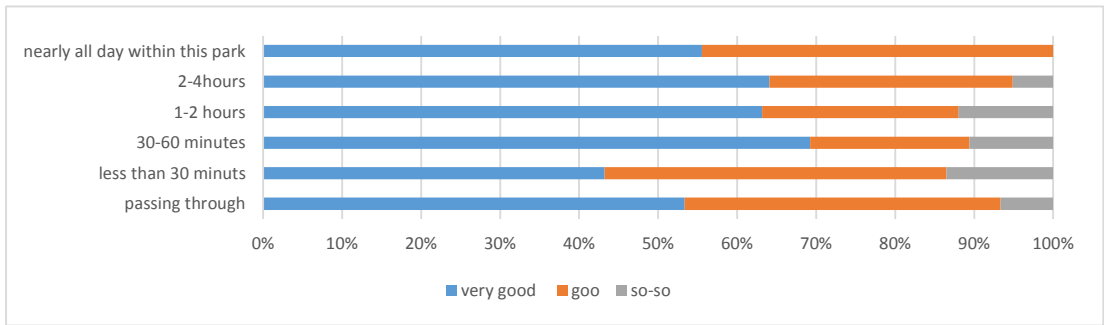


Figure 6-54 time of staying in neighbourhood park & the elderly park users' self-rated quality of life

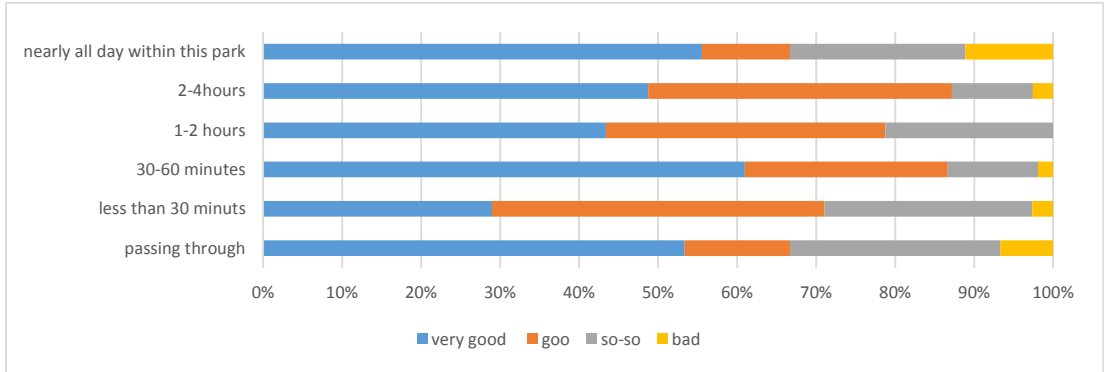


Figure 6-55 time of staying in neighbourhood park & the elderly park users' self-rated health

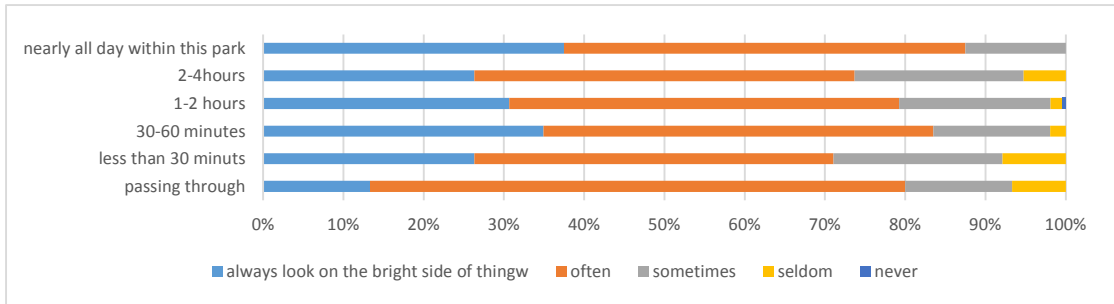


Figure 6-56 time of staying in neighbourhood park & the elderly park users' self-rated positive mental health

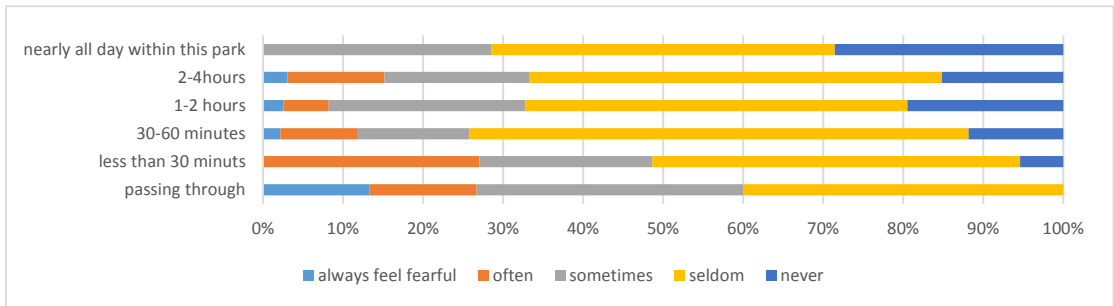


Figure 6-57 time of staying in neighbourhood park & the elderly park users' self-rated fearful

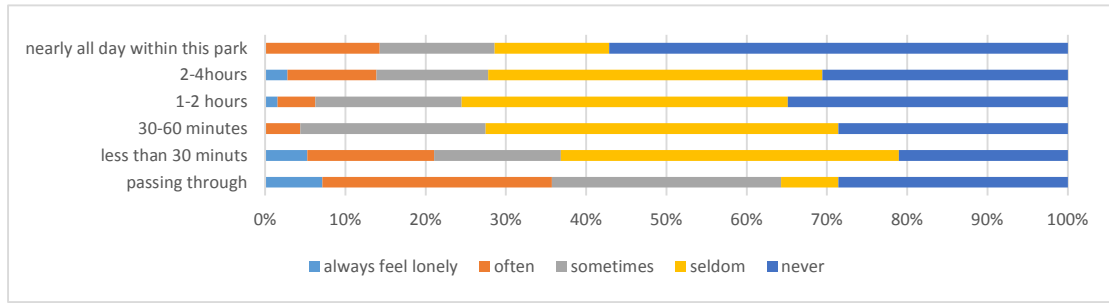


Figure 6-58 time of staying in neighbourhood park & the elderly park users' self-rated lonely

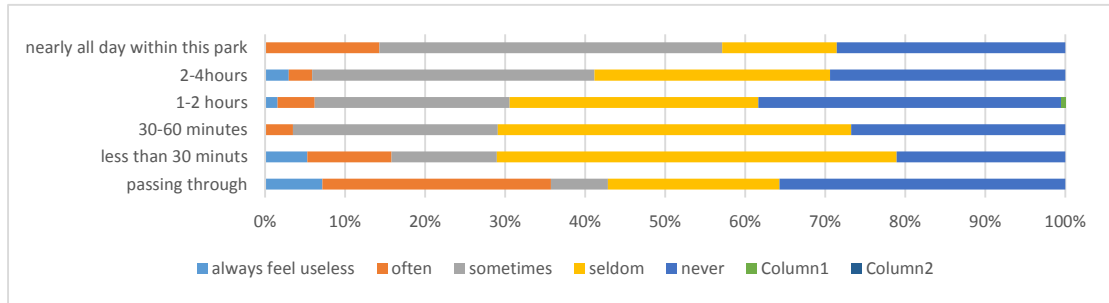


Figure 6-59 time of staying in neighbourhood park & the elderly park users' self-rated useless

Summary

This section of the study has investigated the effects of two aspects of usage behaviour (patterns of activities and frequency and duration of using the neighbourhood park) on the self-rated psychological state of the ageing people. The comparative weighted score analysis and cross-table figures were used to explore the relationship between the behaviours and psychological states of the ageing people. There are some main findings as follows:

Generally, people joining different activities has a different psychological statement.

- Some activities emerging in analysis shows a more positive impact than the others and closer linking with the psychological statement. They are:
 - Playing with children (6 times)
 - Walking (5 times)
 - Sitting in the sun (4 times)
 - Dancing (4 times)
 - Enjoy scenery (3 times)
 - Chatting (3 times)
 - Playing poker and chess (2 times)
 - Playing Tai Chi (2 times)
 - Playing softball or kicking (2 times)
- Using neighbourhood park over 30 minutes each time and using neighbourhood park

more than once every week have a considerable benefit on improving quality of life of ageing people and give essential support to maintain mental health and reducing loneliness and sense of useless.

- The current neighbourhood park is insufficient to meet the huge of the social psychological desire of the older people who come multi-times every to seek psychological satisfaction from the park.

The findings above contribute to making a deeper understanding of the relationship between activities and psychological benefit, which especially link behaviour-psychology and the elderly park users

6.3.7 Association 7 (emotional bonding – psychological states): The associations between different extent of emotional bonding of the ageing people in neighbourhood parks and their psychological statement.

This section of the study aimed to investigate the effects of emotional bonding, that the ageing people have with the neighbourhood park, on the psychological states of them. The data of emotional bonding (question C2.1 to C2.5.2) and self-rated psychological issues (C4.1 to C5.4) has been tested by Goodman and Kruskal's gamma analysis and checked by Spearman's rho correlation analysis in SPSS (Gamma test result see Table 6-12, Table 6-13, Table A. 5 he result of Self-evaluation positive mental health with emotional bonding in Gamma test

,Table A. 6 the result of self-evaluation fearful with emotional bonding in gamma test,

Table A. 7 the result of self-evaluation loneliness with emotional bonding in gamma test

,Table A. 8 the result of self-evaluation useless with emotional bonding in gamma test

). (question number and reference indicator of emotional bonding see Table 6-3, psychological indicator see Table 6-10)

Table 6-12 the result of self-evaluation quality of life with emotional bonding in gamma test

Symmetric Measures in SPSS			Value	Approximate Significance
EB personal dimension	Ordinal by Ordinal	Gamma	.639	.000
	N of Valid Cases		415	
EB place social level1	Ordinal by Ordinal	Gamma	.461	.000
	N of Valid Cases		413	
EB place social level2	Ordinal by Ordinal	Gamma	.280	.000
	N of Valid Cases		414	
EB psychological emotional level	Ordinal by Ordinal	Gamma	.407	.000

	N of Valid Cases		413	
EB psychological cognitive level	Ordinal by Ordinal	Gamma	-.143	.026
	N of Valid Cases		372	
EB psychological behavior 1	Ordinal by Ordinal	Gamma	.109	.134
	N of Valid Cases		416	
EB psychological behavior 2	Ordinal by Ordinal	Gamma	.255	.000
	N of Valid Cases		415	

Table 6-13 the result of Self-evaluation health with emotional bonding in Gamma test

Symmetric Measures in SPSS			Value	Approximate Significance
EB personal dimension	Ordinal by Ordinal	Gamma	.585	.000
	N of Valid Cases		417	
EB place social level1	Ordinal by Ordinal	Gamma	.350	.000
	N of Valid Cases		415	
EB place social level2	Ordinal by Ordinal	Gamma	.184	.006
	N of Valid Cases		416	
EB psychological emotional level	Ordinal by Ordinal	Gamma	.163	.011
	N of Valid Cases		415	
EB psychological cognitive level	Ordinal by Ordinal	Gamma	.074	.286
	N of Valid Cases		418	
EB psychological behavior 1	Ordinal by Ordinal	Gamma	.116	.078
	N of Valid Cases		418	
EB psychological behavior 2	Ordinal by Ordinal	Gamma	.191	.005
	N of Valid Cases		417	

The results of Gamma analysis shows some aspects of psychological issues of ageing people has a statistically significant correlation with some dimensions of their emotional bonding. The association between the psychological health of the elderly and their emotional bonding with the neighbourhood park is existing. The values as the coefficients of the associations illustrate that the influence of emotional bonding on the psychological is positive.

Especially, the self-evaluation quality of life and health has a considerable significant correlation with the personal dimension of group level of emotional bonding, and social level of place dimension of emotional bonding. Both dimensions of emotional bonding between people and place emphasize the social function and symbolic identification, through a process of self-categorization. It means the social ties and emotional bonding based on social activities and communication provided by neighbourhood plays an essential role in the achievement of psychological satisfaction.

Nevertheless, some indicators of psychological issues, as self-reported positive mental health, fearful, loneliness, useless, also has some correlation with some level of emotional bonding, but the relationship is weak caused by a value less than 0.3.

Moreover, the result of Spearman's correlation analysis (see **错误!未找到引用源。**) between data of emotional bonding and psychological issue shows the same trend of relationship and

similar coefficient compared with the result of the Gamma test. What needs to be highlighted in this analysis is the correlation between fearful, loneliness, and useless. They have a relatively high coefficient with each other. It means these three elements strongly affects each other. Because the positive impact of using a neighbourhood park on mental health mentioned above, in fact, it is still important to engage the ageing people to join the activities in the neighbourhood park to relief the loneliness, fearful and useless.

Summary

In this section, the aim was to investigate the effects of emotional bonding on the psychological states of the ageing park users. Gamma tests were used to achieve this aim.

Thus, some essential associations emerging as follows:

- Benefiting self-rated quality of life:
 - Emotional bonding – personal dimension – group level;
 - Emotional bonding – place dimension – social level;
 - Emotional bonding – psychological progressed dimension – emotional level ;
 - Emotional bonding – psychological progressed dimension – cognitive level;
 - Emotional bonding – psychological progressed dimension – behaviour level.
- Benefiting self-rated health:
 - Emotional bonding – personal dimension – group level;
 - Emotional bonding – place dimension – social level;
 - Emotional bonding – psychological progressed dimension – emotional level ;
 - Emotional bonding – psychological progressed dimension – behaviour level.
- Benefiting self-rated positive mental health:
 - Emotional bonding – personal dimension – group level;
 - Emotional bonding – place dimension – social level;
 - Emotional bonding – psychological progressed dimension – emotional level ;
- Benefiting self-rated fearful:
 - Emotional bonding – personal dimension – group level;
 - Emotional bonding – place dimension – social level;
- Benefiting self-rated loneliness:
 - Emotional bonding – place dimension – social level;

- Emotional bonding – psychological progressed dimension – emotional level ;
- Emotional bonding – psychological progressed dimension – cognitive level;
- Benefiting self-rated useless:
 - Emotional bonding – personal dimension – group level;
 - Emotional bonding – place dimension – social level;
 - Emotional bonding – psychological progressed dimension – emotional level ;
 - Emotional bonding – psychological progressed dimension – cognitive level;

In conclusion, there are two main points in this section:

- The most aspect of emotional bonding could contribute to help the ageing people to improve quality of life and give support for maintaining mental health, benefiting on relief loneliness.
- The section provides a new view for further understanding of the approaches of improving well-being and mental health. Improving emotional bonding is a breakthrough to achieve this aim.

The associations and points were integrated with finding from the other section into a comprehensive conceptual framework of the interactional relationship between ageing people and the neighbourhood park.

6.3.8 Summary

This study set out to explore the interactional relationship between ageing people and neighbourhood park and to test the effectivity of the conceptual framework of that and analysis how it works. Therefore, the three goals of the chapter are to discover the inner structure and key features of the dynamic system of interaction relationship; to uncover the most influential factors for the wellbeing and mental health of the ageing people; to produce a practical conceptual framework of interaction relationship between ageing people and the neighbourhood park. The comparative descriptive data analysis, Goodman and Kruskal's gamma, comparative weighted score analysis were used to achieve these research goals.

Overall, the findings obtained from seven pairs of association analysis were integrated into a few comprehensive conceptual frameworks; thus, the main significant outcomes of this section are:

- The integrated conceptual framework of **self-rated psychological statement benefited by emotional bonding and behaviours** (table 6.24)

- The integrated conceptual framework of **features of usage**, emotional bonding with park, self-rated psychological issues and characters of ageing people (table 6.21)
- The integrated conceptual framework of the **frequency** of usage, emotional bonding with park, self-rated psychological issues and characters of ageing people (table 6.22)
- The integrated conceptual framework of **the duration** of usage, emotional bonding with park, self-rated psychological issues and characters of ageing people. (table 6.23)
- The conceptual framework of **behaviour—emotional bonding—place** (figure 6.63)
- The conceptual framework of **behaviour—psychological issues—emotional bonding**. (figure 6.64)

Furthermore, there is some critical point emerging in each association in this study, as follows:

Association 1 people-behaviour

- The activities distribution shows a relatively similar trend in general view in different groups. Moreover, walking is the most popular activities of all ageing people.

Association 2 people-emotional bonding

- demographics (retirement or not, Native or not, educational level, living arrangement) of the ageing people shows a considerably significant influence on the social level, group level, cognitive level, behaviour level of the emotional bonding. These conditions, such as the retired statement, low education, living in their own home, have potential isolation around the older people who desire and seek the social psychological satisfaction from the neighbourhood park, and build deeper emotional bonding with the neighbourhood park than the older people still work and have much social communication in working or home life.
- This section provides a new approach in landscape and urban studies using the Goodman and Kruskal's gamma test which have a more effective and predictable performance compared with traditional correlation analysis as Spearman's rho in the relatively small sample size in social science.
- The older people who have high education have a high demand for environmental satisfaction. Especially with the development of society and globalization The conflict between the growing demand of higher quality park experience and the current statement of neighbourhood park will be more serious, which will reduce the satisfaction of the elderly from the environment, unable to meet the psychological

needs of them, especially for the retired people.

Association 3 place-behaviour

- The conditions of the neighbourhood park influenced the engagement of some usage behaviours such as, walking, playing poker or chess, enjoy the scenery, singing song, sitting in the sun, playing with children, reading a newspaper. A good special design of a neighbourhood park will engage more ageing people to join the activities in the park.

Association 4 place-emotional bonding

- The rank of parks in different dimensions of emotional bonding integrated with the outcomes of observation, semi-structured interview, and questionnaire to discuss the potential reasons of high performance in emotional bonding and to further understanding on the relationship between place and emotional bonding.

Association 5 behaviour – emotional bonding

- The extent of the emotional bonding of elderly park users has been impacted by the patterns, groupmate, duration, and frequency of activities they had. Using neighbourhood park over 30 minutes each time and more than once a week gives positive impacts on emotional bonding of the older people. The first five activities with high weighted scores in emotional bonding include: activity is playing with children; enjoy the scenery; dancing; sitting in the sun; playing chess or poker; walking.

Association 6 behaviour – psychological statement

- Using neighbourhood park over 30 minutes each time and using neighbourhood park more than once every week have a considerable benefit on improving quality of life of ageing people and give essential support to maintain mental health and reducing loneliness and sense of useless.
- Some activities emerging in analysis shows a more positive impact than the others and closer linking with the psychological statement. They are: Playing with children; Walking; Sitting in the sun; Dancing; Enjoy scenery; Chatting; Playing poker and chess; Playing Tai Chi; Playing softball or kicking

- The current neighbourhood park is insufficient to meet the huge of the social psychological desire of the older people who come multi-times every to seek psychological satisfaction from the park.

Association 7 emotional bonding – psychological statement

- The most aspect of emotional bonding could contribute to help the ageing people to improve quality of life and give support for maintaining mental health, benefiting on relief loneliness. The different dimension of emotional bonding contributes to different aspects of mental health.

6.4 Data comparison

This section is a supplement and continue of the previous section. The precious section discovered the inner structure and relationship of interaction between ageing people and the neighbourhood park. This section has two aims as follows:

- The first aim was to provide an overall view to assess the effects of using a neighbourhood park on the psychological statement of the ageing people by comparing the data from park survey in this study and the data from national survey.
- The second aim was to investigate the gender differences in the impact of behavioural activities on mental state and to investigate the differences of demographics on the self-rated psychological states of the ageing people.

The comparative cross-table figures, One-way ANOVA, Tukey HSD test, and Goodman and Kruskal's gamma test were used to achieve these aims based on the data from questionnaire. This findings of this section were contributing to uncover the most influential factors for the well-being and mental health of the ageing people.

6.4.1 Comparative analysis of neighbourhood park sample and national survey Psychological issues of the elderly

This research has surveyed at neighbourhood parks face to face. The participants are actually in or using parks. The questions of self-evaluation are cited from a national survey (the answers are from the dataset which is derived from the 6th wave of the Chinese Longitudinal Healthy Longevity Survey (CLHLS) in 2011 covering 23 or of 31 provinces in China.) in order to compare the level of the neighbourhood park survey and average level in national survey. Thus, the answers of self-evaluation (quality of life C4.1, health C4.2, mental health C5.1, fearful C5.2, loneliness C5.3, useless C5.4) has been analysed and shown in Figure 6.14., which is compared data of the national survey of the health of the elderly in China 2011.

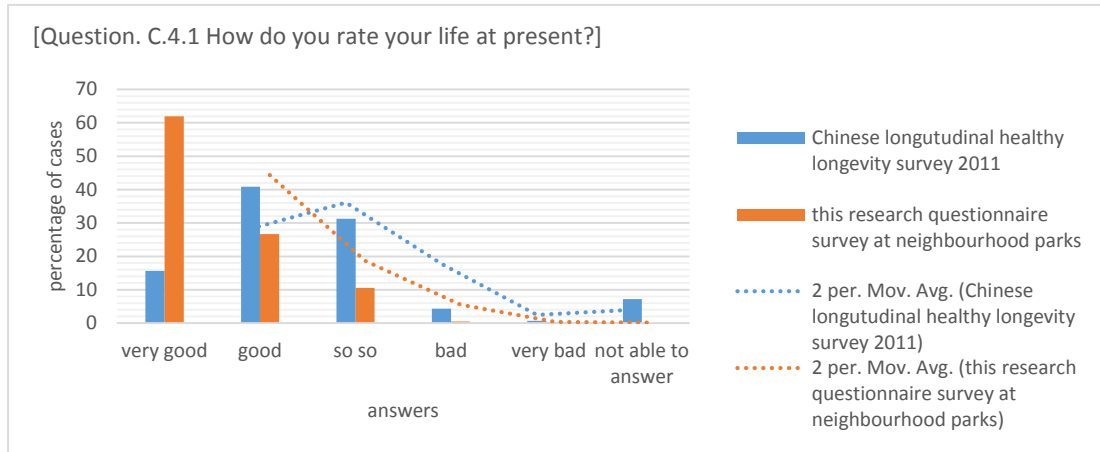


Figure 6-60 the comparison between national survey and the neighbourhood park survey in self-reported quality of life

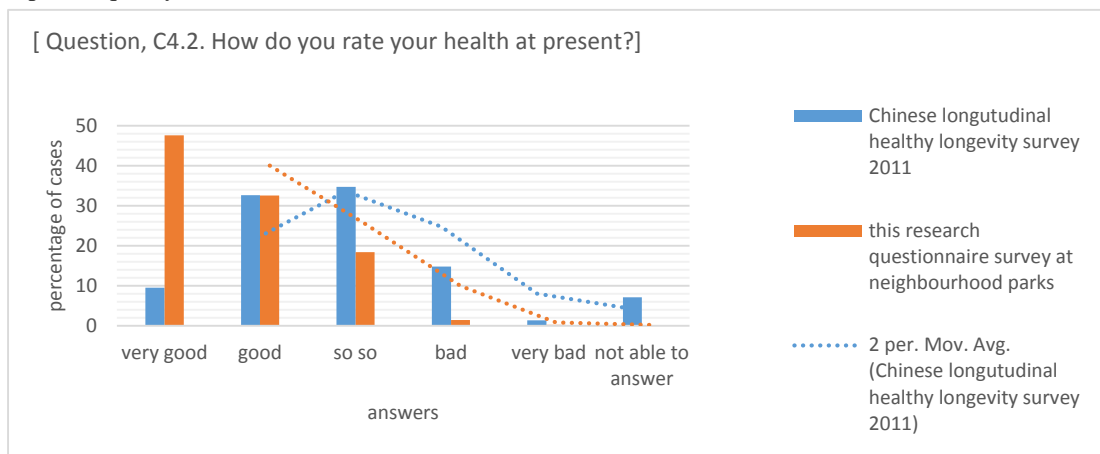


Figure 6-61 the comparison between national survey and the neighbourhood park survey in self-reported health

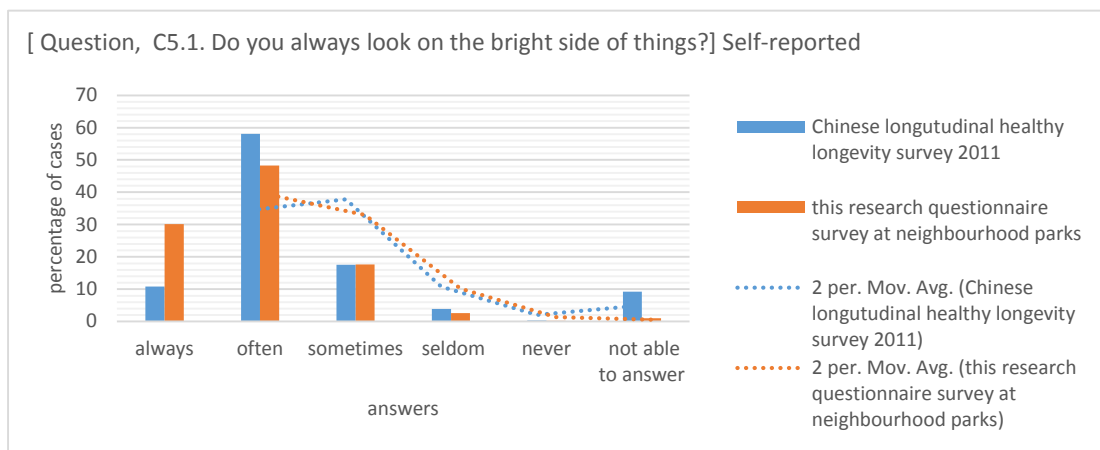


Figure 6-62 the comparison between national survey and the neighbourhood park survey in self-reported positive mental health

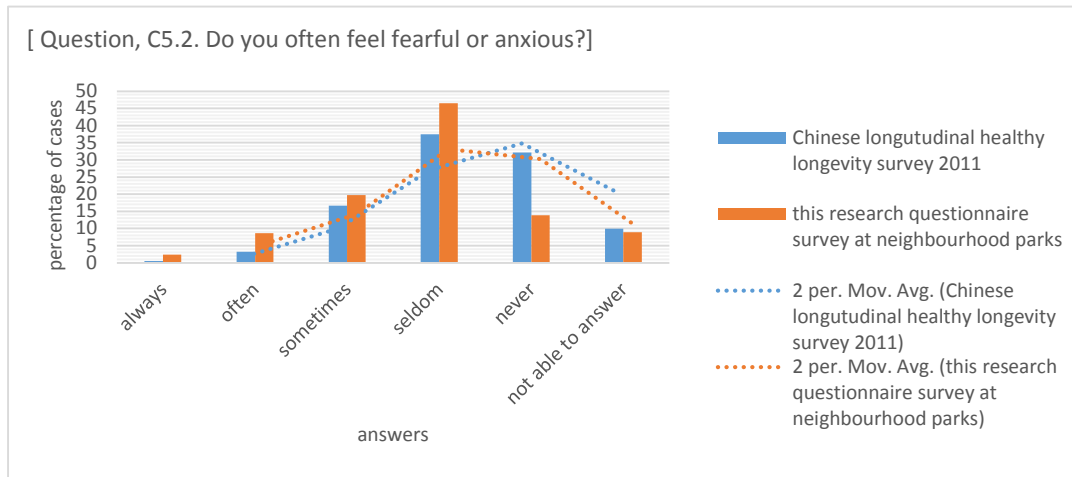


Figure 6-63 the comparison between national survey and the neighbourhood park survey in self-reported fearful

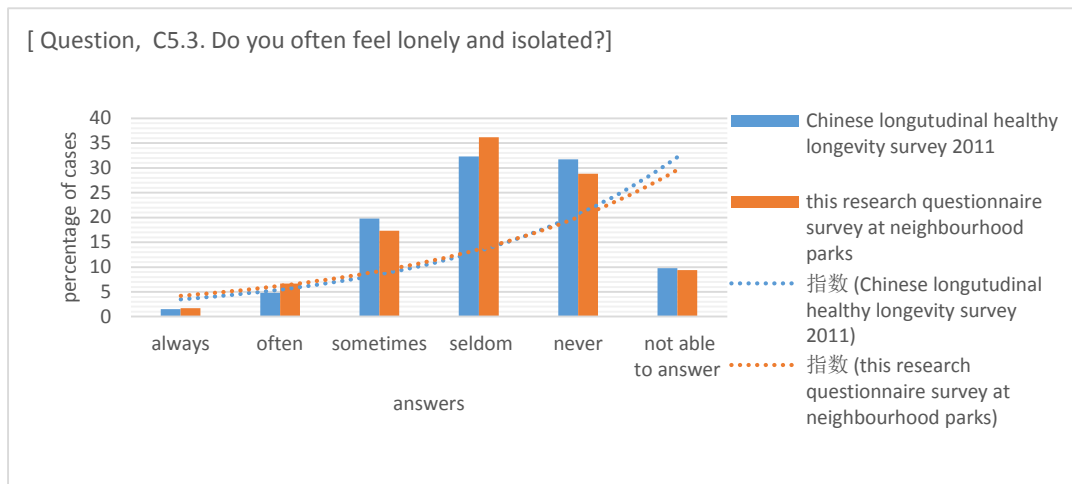


Figure 6-64 the comparison between national survey and the neighbourhood park survey in self-reported loneliness

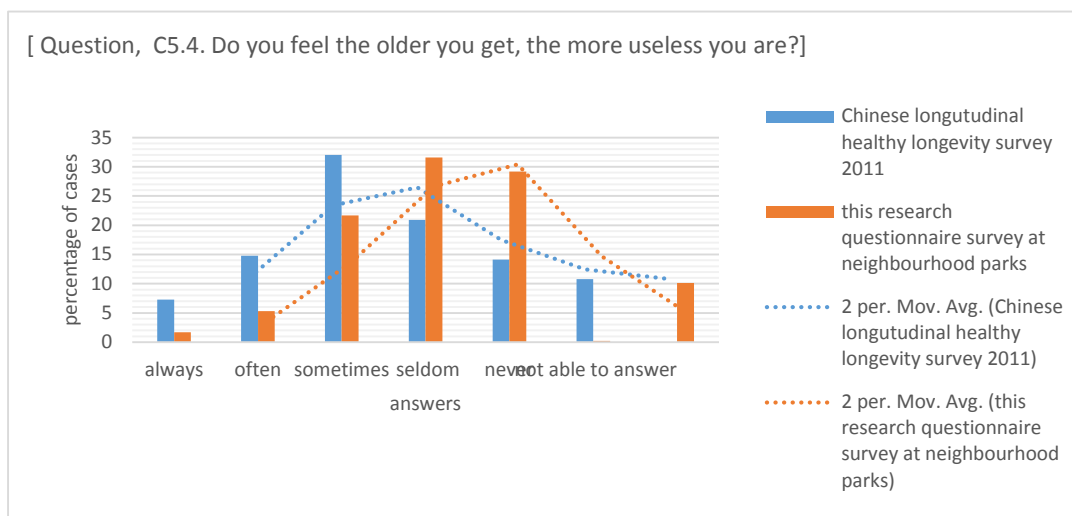


Figure 6-65 the comparison between national survey and the neighbourhood park survey in self-reported useless

Depending on the group of comparisons above (Figure 6-60, Figure 6-61, Figure 6-62, Figure 6-63, Figure 6-64 and Figure 6-65), some key points could be found as follows:

- The elderly people using neighbourhood park have considerable higher self-rated quality of life than the national average. It means using park has a positive impact on their quality of life.
- The elderly people using neighbourhood park have significantly higher self-rated health than the national average. It means using neighbourhood park plays an essential role in improving health and psychological satisfaction.
- Older people who use community parks show a better and more active in positive mental health than the averages in national surveys. In the park survey, the percentage of elderly people who always look on the bright side of things are higher nearly triple times the national average. It means using park could give strong support for the ageing people's positive mental health.
- The elderly people using neighbourhood park show a similar trend with the national average in self-rated fearful and anxious, and self-rated loneliness.
- The elderly people using neighbourhood park has significantly less feeling of useless than the national average. It means using park has a considerable impact on their psychological achievement and contribute to building their self-esteem.

Summary

This section of study set out to investigate the effects of using a neighbourhood park on the psychological states of the older people. A range of the data surveyed from the neighbourhood park and the national survey were comparatively analysed to achieve this aim.

The results of the comparative analysis show some important points as follows:

- Using the neighbourhood park gives a significantly positive impact on improving self-reported quality of life, health, bright mental health, and reducing the sense of useless;
- Currently, the impact on fearful and loneliness is not apparent.

In this section, using park identified as a comprehensive understanding in behavioural, social, emotional, perceptual interaction in neighbourhood park has been explored deeply through the semi-structured interview to uncover the desire and thought of the elderly when they are using parks.

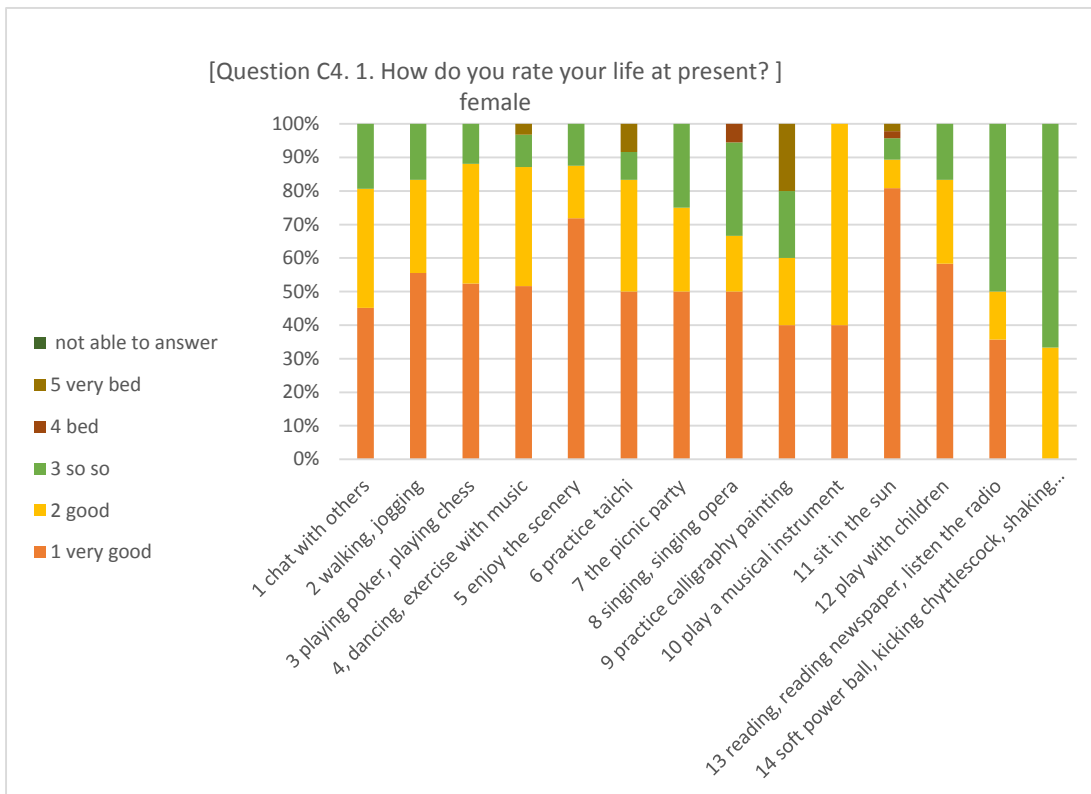
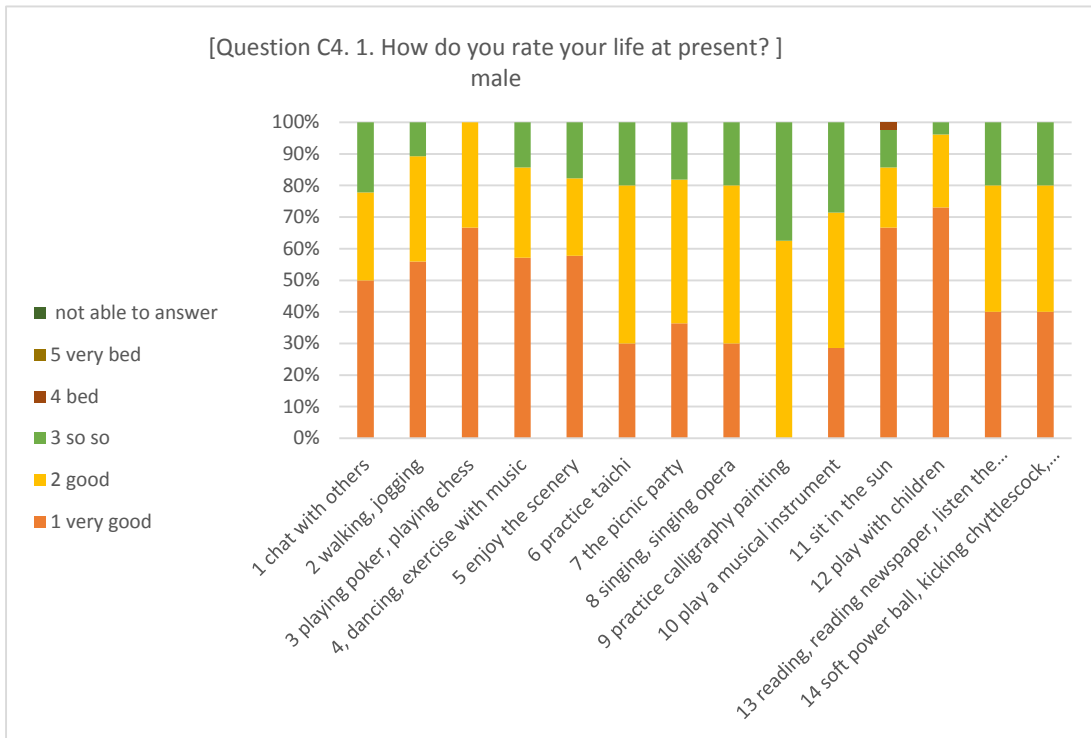


Figure 6-66 the comparison of self-rated quality of life of the elderly male and female chosen different activities

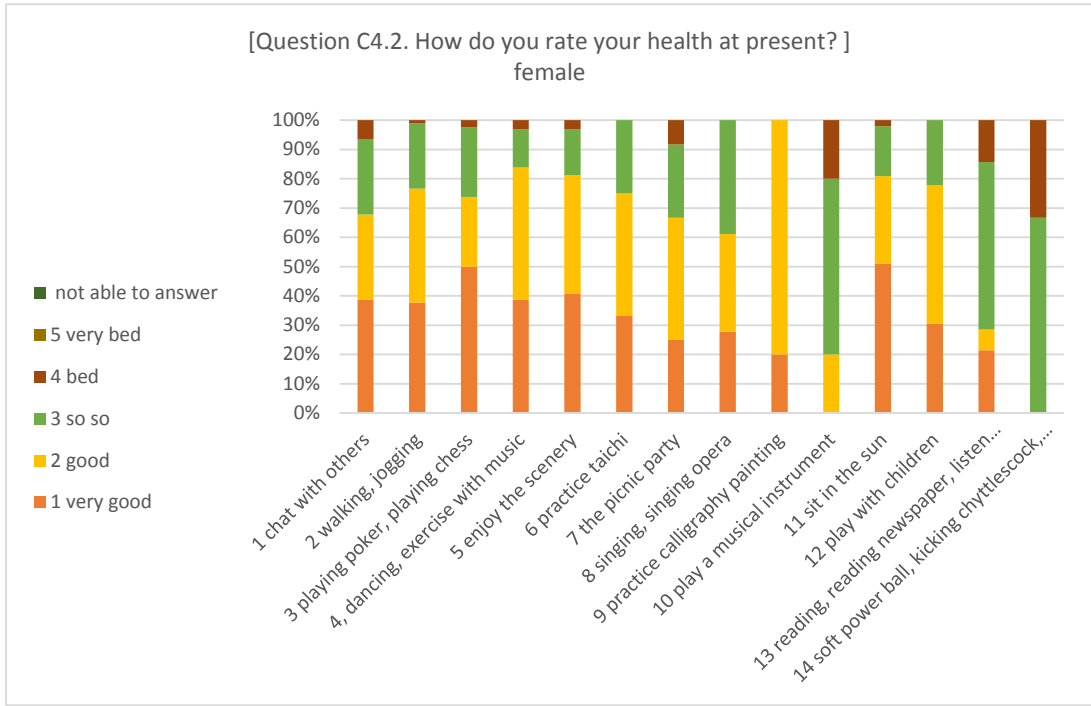
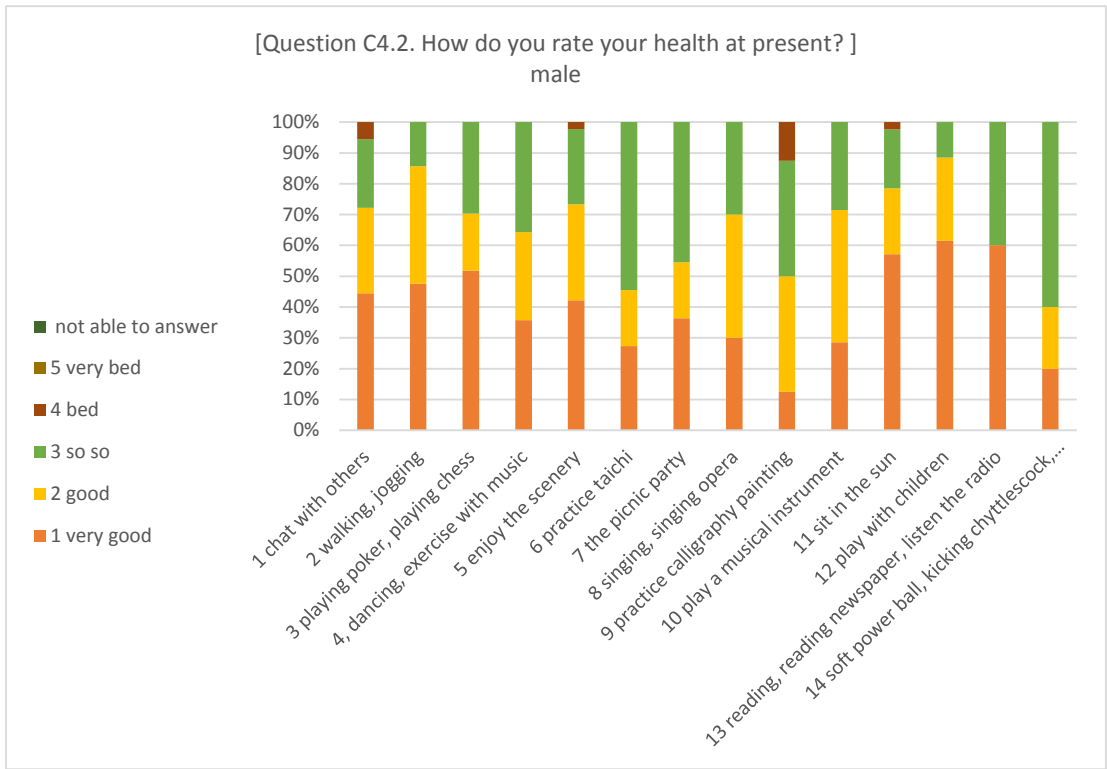


Figure 6-67 the comparison of self-rated health of the elderly male and female chosen different activities.

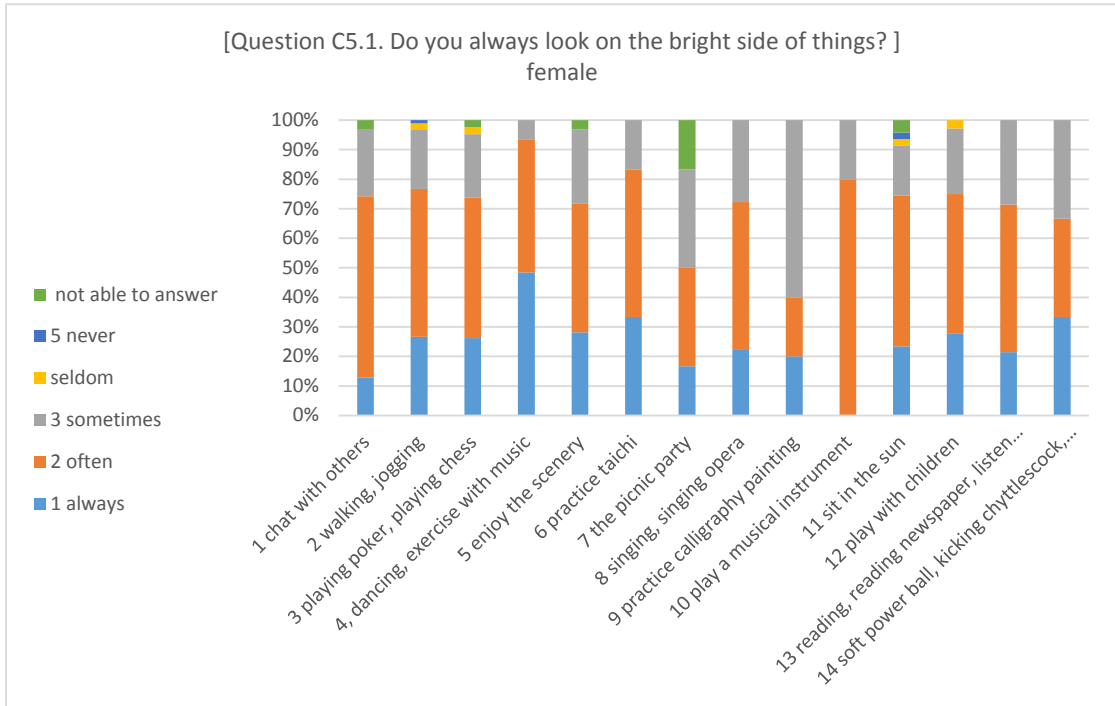
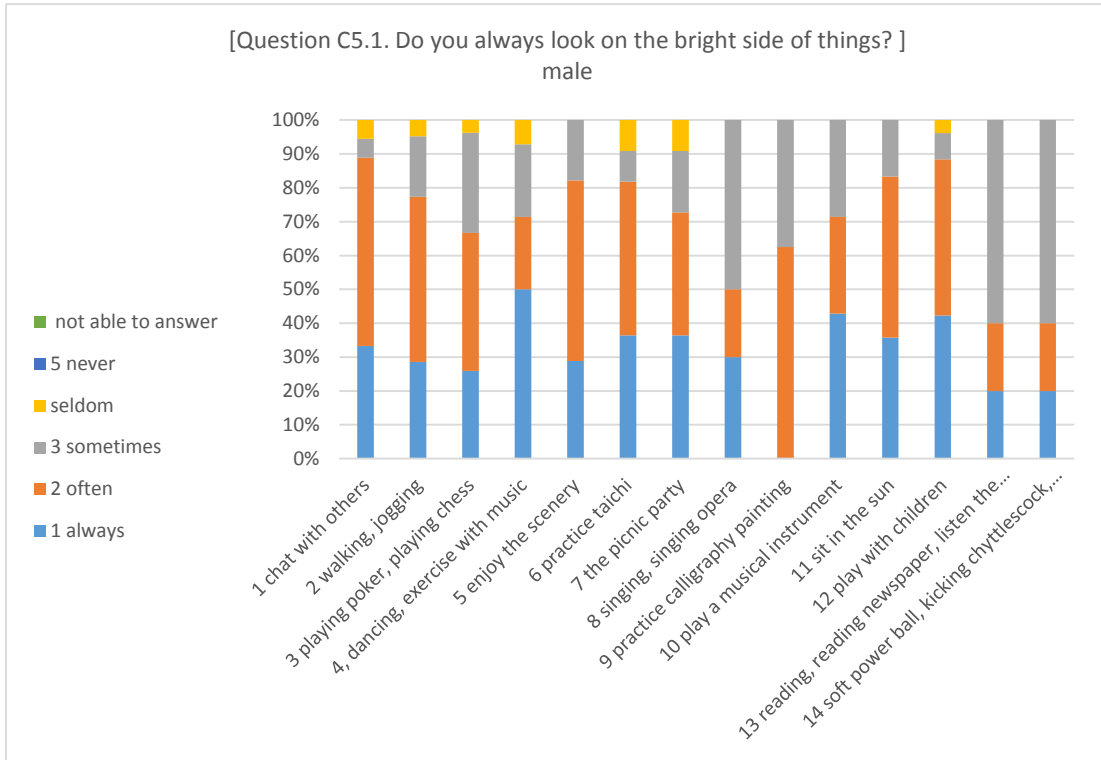


Figure 6-68 the comparison of self-rated positive mental health of the elderly male and female chosen different activities.

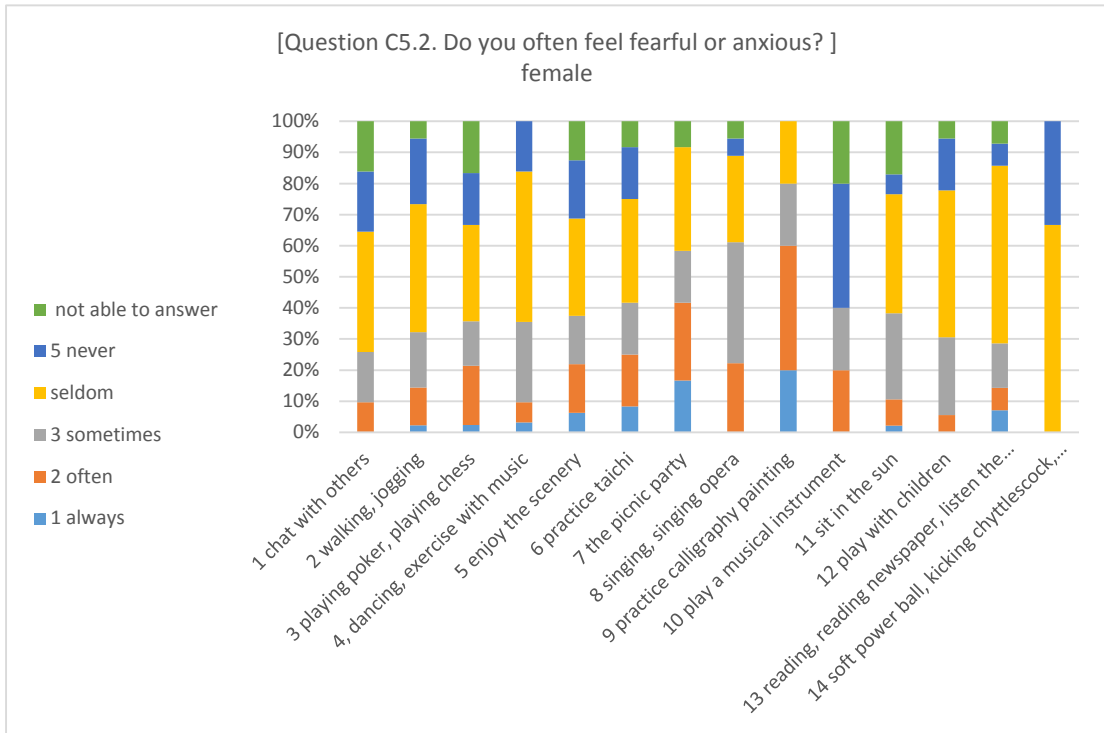
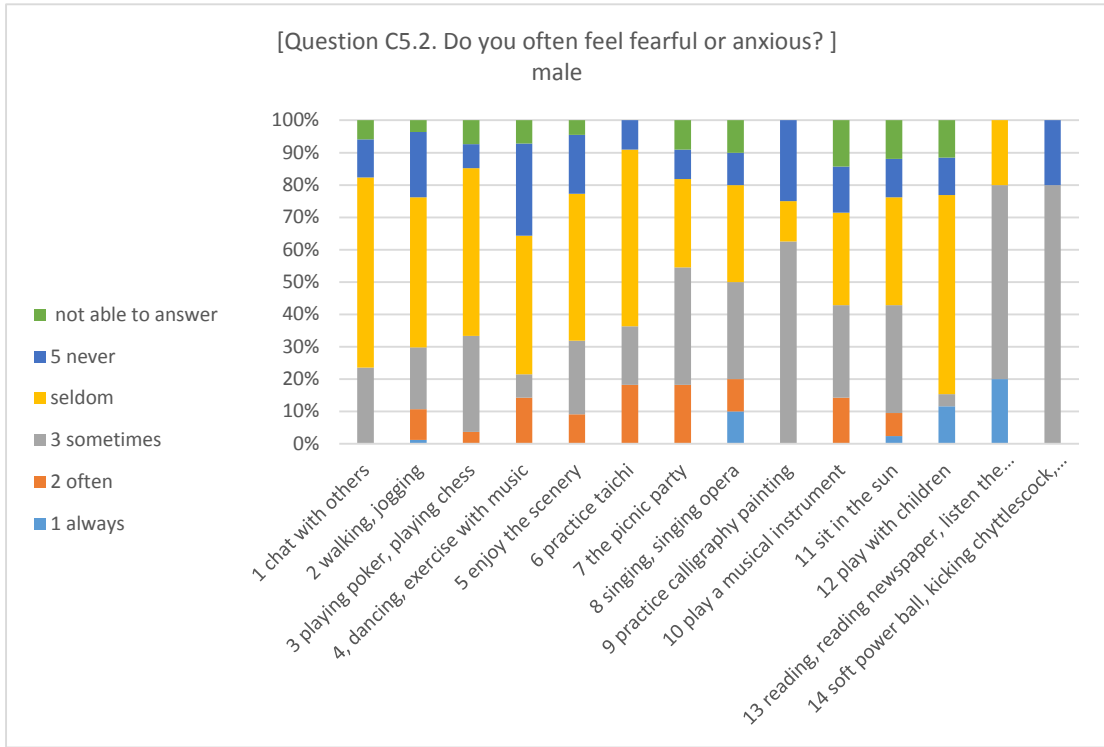


Figure 6-69 the comparison of self-rated fearful or anxious of the elderly male and female chosen different activities

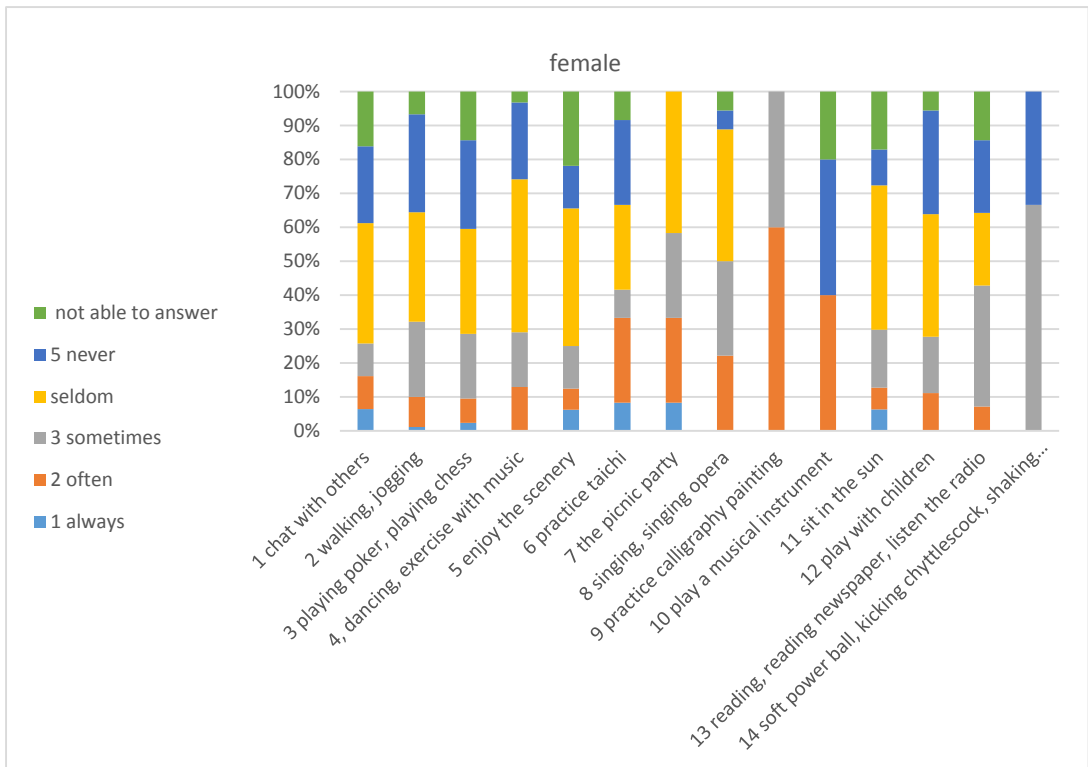
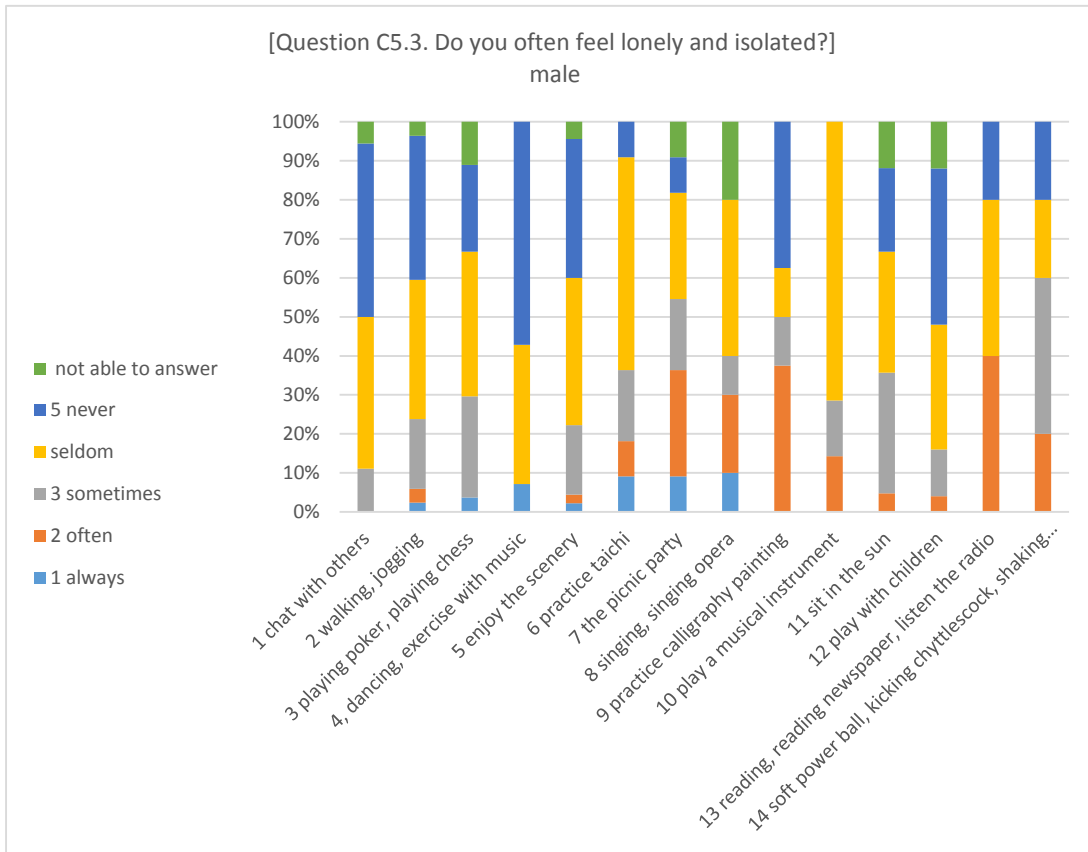


Figure 6-70 the comparison of self-rated loneliness of the elderly male and female chosen different activities

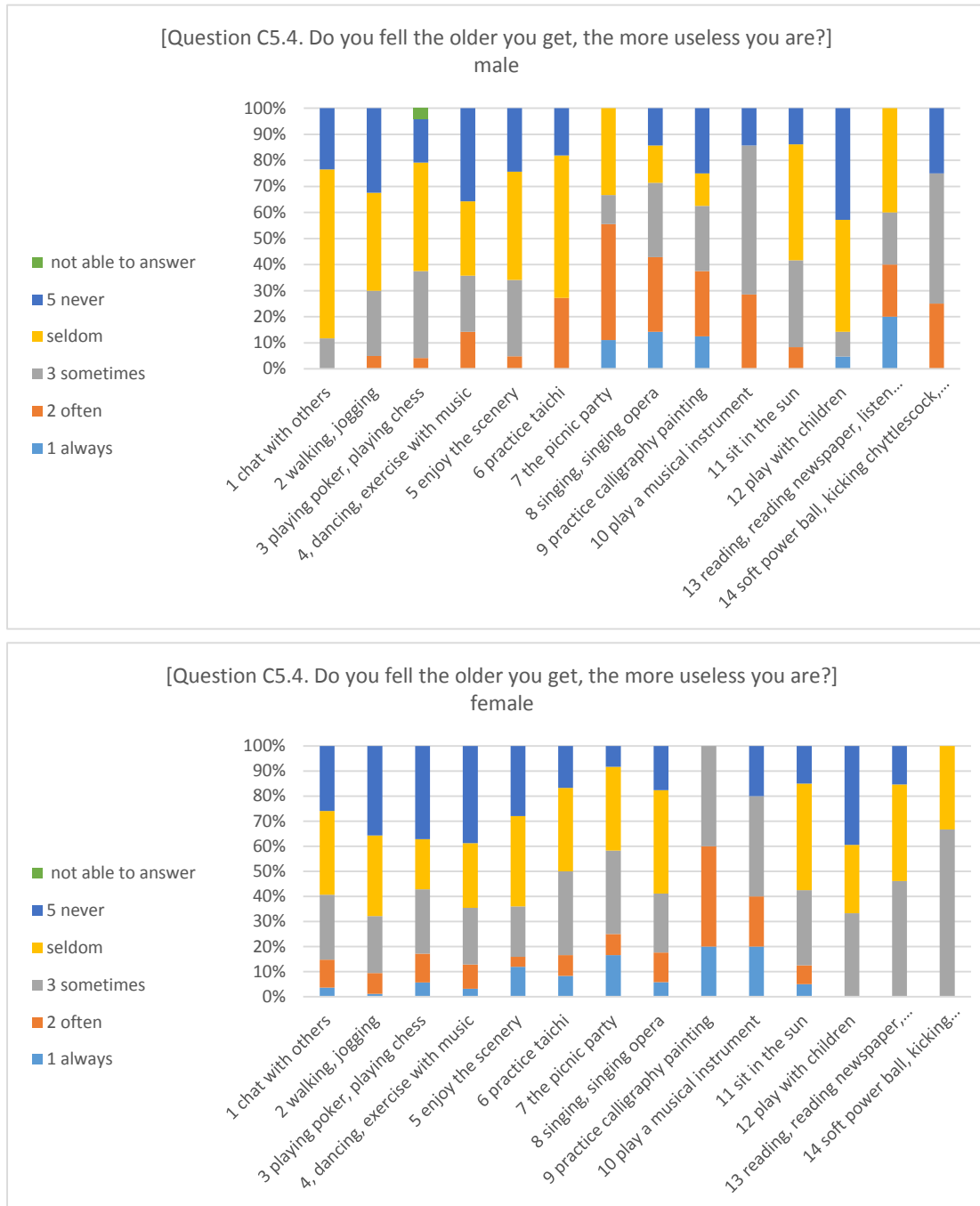


Figure 6-71 the comparison of self-rated useless of the elderly male and female chosen different activities.

6.4.2 The comparison of performance in the psychological status of the elderly male and female engaging in various activities in the neighbourhood park

According to the conclusions obtained in the previous section, older men and older women have different preferences in activity selection. The authors compare their psychological indicators to find characteristics and potential causes. Some key points emerging in comparisons (see from Figure 6-66 to Figure 6-71).

- Self-rated quality of life:

Figure 6-66 shows the general trends of elderly male and female are similar, but the psychological benefit from male and female in different activities are different. the first three activities with highest self-rated quality of life score are:

- Male: 12 playing with children; 3 playing poker or chess; 11 sittings in the sun.
 - Female: 11 sitting in the sun; 5 enjoy the scenery; 12 playing with children.
- Self-rated health:

Figure 6-67 shows the general trends of elderly male and female are similar (figure 6.72), but some differences are emerging in the best psychological benefit from different activities:

- Male: 12 playing with children, 2 walking and jogging, 11 sitting in the sun.
 - Female: 4 dancing, exercise with music: 3 playing poker or chess; 11 sittings in the sun.
- Self-rated positive mental health:

Figure 6-68 shows some key difference and findings in this comparison summarised as below:

- Dancing, exercises with music (4) chosen by the elderly female could give a significantly positive impact on their psychological states, which lead them thinking and look on the bright side of things on their daily life. It also has a significant positive impact on the elderly male, but the impact is less than the elderly female.
 - Chatting with others is a very significant activity for the elderly male to keep the bright and positive psychological statement in daily life. Its positive influence for the elderly male park user is stronger than the elderly female park users.
 - Playing with children play a key role in keeping the bright psychological statement of the elderly male park users. Compared with the elderly female, it has more significance for the elderly male in maintain bright and positive psychological health.
- Self-rated fearful or anxious:

Figure 6-69 show some key differences:

- To a certain extent, the fearful and anxiety of older female are higher than those older males in nearly all activities.
 - Dancing, exercise with music shows significant potential for the elderly male to anti-fearful or anti-anxious. It also plays an essential role for the elderly female, but the positive impact for the female is less than male.
 - Chatting with others is an essential activity to help them relief from fearful or anxious. Chatting with others as a higher level of social interaction has a considerably positive impact on anti-fearful or anti-anxious on both elderly male and female.
- Self-rated loneliness

Figure 6-70 shows two differences as below:

- To a certain extent, older women show more serious loneliness than men in most activities. In other words, older women are more psychologically plagued by loneliness or isolation. This echoes the conclusions from the comparison of activities between older men and women. Older women prefer to participate in activities that have more collective and social opportunities, consistent with their psychological loneliness and desire for social satisfaction.
 - Chatting with others, dancing and exercise with music, and playing with children, as the activities with social interactions are playing significantly in maintaining their psychological statement from loneliness. These interactions have a more significant effect on relief he psychological loneliness of older men than on older women.
- Self-rated useless

Figure 6-71 shows two key features as below:

- Older men and older women will have a certain percentage of their sense of uselessness. The overall proportion is similar, but the distribution trends in male and female activities are different.
- The activities with the least proportion of uselessness in elderly male and female are:
 Male: chatting with others; playing with children,
 Female: dancing and exercise with music, playing with children.

Summary

This section of study set out to assess the difference between the older male and older female in a psychological statement at different activities. The comparative cross-table figures were used to achieve this aim. There are some interesting points as emerging as follows:

- The different psychological indicators, the effects of different activities of older men and older women, are different. Most psychological indicators show similar trends in different genders.
- Women are more likely to be affected by loneliness. Older women prefer to participate in group activities or activities with social potential. That is, through activities to balance and satisfy the desire for social psychological satisfaction, to achieve psychological health and balance.

6.4.3 The comparison of psychological status between elderly male and female.

Table A. 10 the result of T-test for psychological indicator of gender

did not show statistical significance in the result of T-test of the psychological status in gender. By the comparison of the bar chart of psychological indicator (see Figure 6-72), some points could be found as follows:

- The elderly male and elderly female show a very similar distribution in self-rated quality of life and health.
- Older women are slightly more affected by fear and anxiety than older men.
- The proportion of older women affected by loneliness is considerably higher than that of older men.

In summary, gender is not a factor that affects the mental health status of the elderly. The distribution of mental states exhibited by older people of different genders is roughly the same, or mostly similar, and is not statistically different. Then, whether other factors are related to the mental state of the elderly will be analysed in the cut-off part.

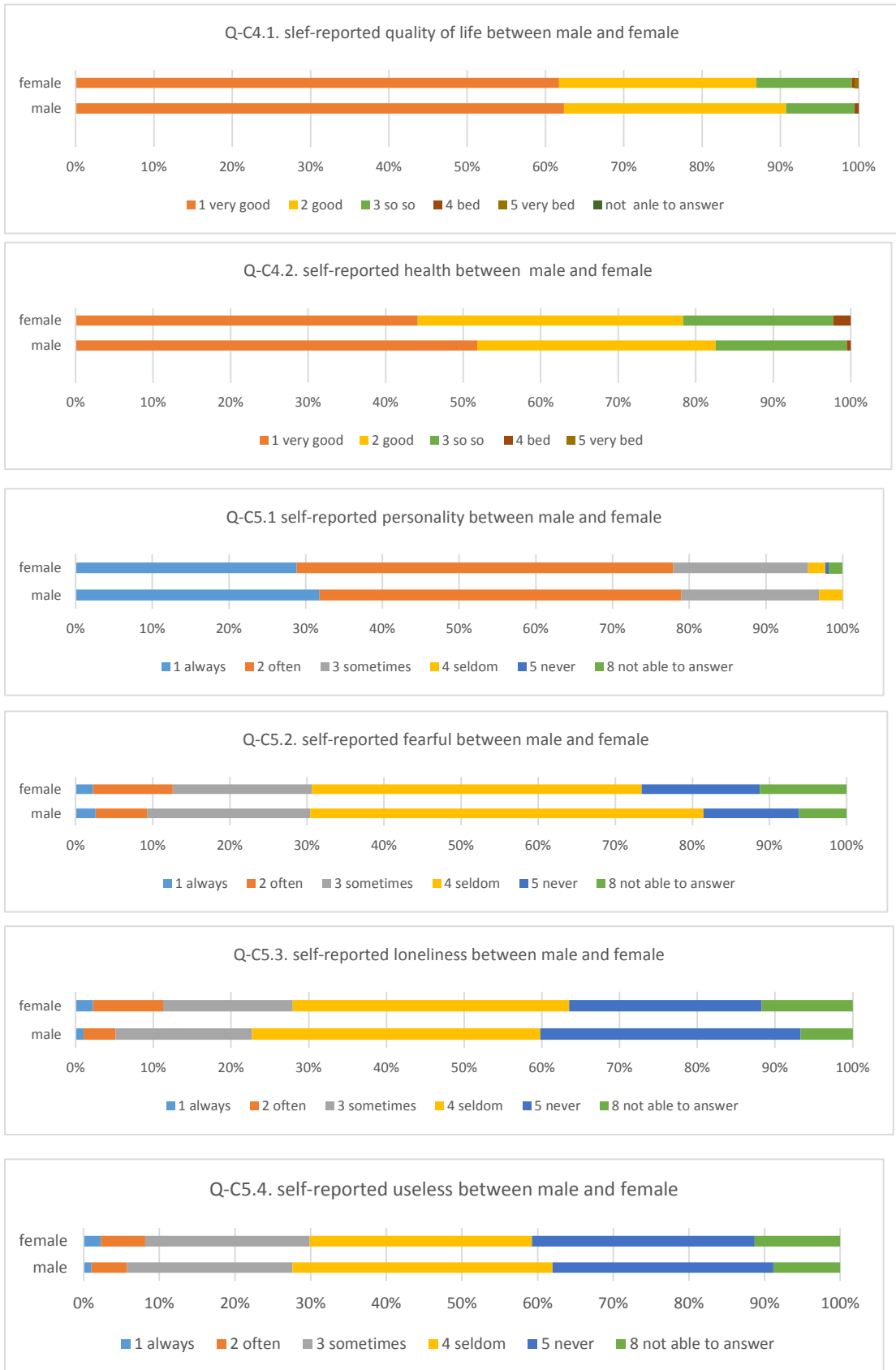


Figure 6-72 the comparative analysis of mental indicators between male and female (based on the answers of Question C4.1 to Question C5.4)

6.4.4 The comparison of psychological issues between elderly people in different age groups.

The one-way ANOVA is applied to determine whether there are any statistically significant differences between the means of psychological indicators of the elderly people in different age groups.

The results (see Table A. 11 the result of One-way ANOVA of age groups in psychological issues

) shows that there are two psychological indicators (quality of life, health) that have a statistically significant difference in different age groups. The specific findings from the Tukey HSD test following the one-way ANOVA could be described as below:

- The younger ageing people have a relatively low self-rated quality of life than older ageing people. It could be uncovered in two ways that the younger ageing people are facing more challenges in current society and facing the big changes in their life when they just retired. On the other hand, it means the new ageing people have a higher demand for their quality of life than the older ageing generation. In order to meet the increasing quality of life requirements of the new generation of elderly people, the design quality of the park and the social and sensory functions promoted through design are even more demanding.
- Depending on the Tukey HSD test following the one-way ANOVA, we could find the specific age groups that have statistical significance. The results are shown in table 6.26 (see appendix). The self-rated health of people aged in 45-55 is statistically significantly poorer than people aged in 56-65 and 66-75. It echoes with the retired regulation. Retired people aged 45-55 who have previously worked in toxic or excessive labour, so their retirement age will be relatively advanced, but their health may not be as good as the normal retirement. On the other hand, the people aged 55-65 show statistical healthiness compared to people aged 76-85.

Summary

The section of the study set out to assess the difference of different ageing older groups in a self-rated psychological statement. One-way ANOVA and the Tukey HSD test were used in this analysis to achieve this aim. Some crucial points emerging are as follows:

- Older people of different ages have different psychological states and requirements in terms of health and quality of life;
- The people aged 55-65 show statistical healthiness compared to people aged 76-85. However, the self-rated health of people aged in 45-55 in the neighbourhood park is statistically significantly poorer than people aged in 56-65 and 66-75. Thus, the needs of this age group should pay more concerns.

6.4.5 The comparison of association between characters of ageing people and psychological issues

Table 6-14 the indicators of characters of ageing people statistically significant relating with their psychological issues tested through Goodman and Kruskal's gamma test in SPSS. (fronts are bolded when the coefficient value is higher than 0.3)

Psychological indicators	*	Characters of ageing people	Value	Approximate Significance
Self-rated quality of life	*	Educational level	0.398	0.000
	*	Difficulty in seeing	0.567	0.000
Self-rated health	*	Educational level	0.335	0.000
	*	Difficulty in seeing	0.715	0.000
Self-rated positive psychological health	*	Living alone	-0.170	0.014
	*	Difficulty in seeing	0.290	0.002
	*	Difficulty in hearing	0.257	0.039
Self-rated fearful or anxious	*	Living arrangement	-0.355	0.005
Self-rated loneliness	*	Living arrangement	-0.583	0.000
	*	Living alone	0.177	0.020
	*	Difficulty in moving	-0.249	0.021
Self-rated useless	*	Difficulty in seeing	-0.450	0.001
	*	Difficulty in seeing	-0.277	0.002

Table 6-14 show that associations are existing between some characters of ageing people and their psychological statement. They could be described as:

- The lower educational level ageing people have a better self-rated quality of life than the ageing people with a higher educational level. It means the ageing people who have higher educational level have a higher demand for quality of life.
- The ageing people with difficulty in seeing have a considerably weaker quality of life than the ageing people who did not have difficulty in seeing. It means difficulty in seeing have a severe impact on the quality of life of ageing people.
- The lower educational level ageing people have better self-rated health than the ageing people with a higher educational level. It means e the ageing people who have higher educational level have a higher demand for health.
- The ageing people living alone have poorer self-rated positive mental health than the ageing people living with a spouse or with children. It means that living alone gives a negative impact on the psychological states of ageing people, which influenced and reduced their bright thinking of things.
- The ageing people with difficulty in seeing have considerable poorer self-rated positive mental health than the ageing people who did not have difficulty in seeing. It means difficulty in seeing have a severe negative impact on the self-rated mental health of

ageing people.

- The ageing people with difficulty in hearing have considerably poorer positive psychological health than the ageing people with no difficulty in hearing. The difficulty in hearing has seriously hindered their optimistic attitude in a psychological statement.
- The elderly people living in their own homes are more susceptible to be fearful and anxious than older people living with care services.
- The elderly people living in their own homes are more susceptible to be lonely than older people living with care services or care-home accommodation.
- The elderly people living alone are more susceptible to be lonely than older people living with spouse or children.
- The elderly people living in their own homes are more susceptible to feeling useless than older people living with care services or care-home accommodation.
- Older people with visual difficulties are more likely to be self-rated useless than older people without visual difficulties.

Summary

In summary, the elderly's factors have a certain degree of influence on their mentality. Among them, the difficulty of strength has the most significant impact on the mentality of the elderly. In today's community parks, there is a lack of design services for the elderly with poor eyesight. The incompatibility in use will aggravate this negative psychological impact. The key points emerged in this section are as follows:

- Educational level, difficulty in hearing and living arrangement were significantly impacting the self-rated quality of life, fearful, loneliness, and useless.

According to the analysis of the entire chapter above, many links have been explored in the analysis. These relationships and associations will be integrated and aggregated to produce several comprehensive and in-depth interactive conceptual frameworks as:

- The integrated conceptual framework of **features of usage**, emotional bonding with park, self-rated psychological issues and characters of ageing **people (Table 6.21)**

6.4.6 Summary

This section is a supplement and continues of the previous section. The previous section discovered the inner structure and relationship of interaction between ageing people and the neighbourhood park. This section has two aims. The first aim was to provide an overall view

to assess the effects of using a neighbourhood park on the psychological states of the ageing people by comparing the data from park survey in this study and the data from a national survey. The second aim was to investigate the gender differences in the impact of behavioural activities on mental state and to investigate the differences of demographics on the self-rated psychological states of the ageing people. The comparative cross-table figures, One-way ANOVA, Tukey HSD test, and Goodman and Kruskal's gamma test were used to achieve these aims based on the data from the questionnaire.

Thus, some critical points emerged in this section of the study; they are as follows:

- Overview, using the neighbourhood park gives a significantly positive impact on improving self-reported quality of life, health, bright mental health, and reducing the sense of useless;
- The different psychological indicators, the effects of different activities of older men and older women, are different. Most psychological indicators show similar trends in different genders;
- Women are more likely to be affected by psychological loneliness and fearful. Older women prefer to participate in group activities or activities with the social potential to seed social psychological satisfaction and to relieve the loneliness;
- The self-rated health of people aged in 45-55 in the neighbourhood park is statistically significant poorer than people aged in 56-65 and 66-75. Thus, the needs of this age group should pay more concerns;
- Educational level, difficulty in seeing and living arrangement were significantly impacting the self-rated quality of life, fearful, loneliness, and useless.

The primary outcome of this section:

- The comparison of the older male and older female of performance in the psychological status engaging in various activities in the neighbourhood park. (Table 6-15)
- The integrated conceptual framework of features of usage, emotional bonding with park, self-rated psychological issues and characters of ageing people (Table 6-16)

Table 6-15 The comparison of the older male and older female of performance in the psychological status engaging in various activities in the neighbourhood park

Table 6.27 The comparison of the older male and older female of performance in the psychological status engaging in various activities in the neighbourhood park		
	Male	Female
Self-rated quality of life	Playing with children; playing poker or chess; sitting in the sun	Sitting in the sun; enjoy the scenery; playing with children.
Self-rated health	Playing with children, walking and jogging, 11 sitting in the sun	Dancing, exercise with music; playing poker or chess; sitting in the sun.
Self-rated positive mental health	Chatting with others is a very significant activity for the elderly male. Its positive influence for the elderly male park user is stronger than the elderly female park users.	Dancing, exercises with music give a significantly positive impact on their psychological statement, which lead them thinking and look on the bright side of things on their daily life. It also has an important positive impact on the elderly male, but the impact is less than the elderly female.
	Playing with children play a key role in keeping the bright psychological statement of the elderly male park users. Compared with the elderly female, it has more significance for the elderly male in maintain bright and positive psychological health.	
Self-rated fearful	Dancing, exercise with music shows significant potential for the elderly male to anti-fearful or anti-anxious. It also plays an important role for the elderly female, but the positive impact for the female is less than male	To a certain extent, the fearful and anxiety of older female are higher than those older males in nearly all activities.
	Chatting with others is the most important activity to help them relief from fearful or anxious. Chatting with others as a higher level of social interaction has a considerably positive impact on anti-fearful or anti-anxious on both elderly male and female.	
Self-rated loneliness	Older man are more easy to obtain the social satisfaction from social interaction activities.	Older women show more serious loneliness than men in most activities. Older women prefer to participate in activities that have more collective and social opportunities, consistent with their psychological loneliness and desire for social satisfaction.
	Chatting with others, dancing and exercise with music, and playing with children, as the activities with social interactions are playing significantly in maintaining their psychological statement from loneliness.	
Self-rated useless	A certain percentage of their sense of uselessness.	
	Chatting with others; playing with children	Dancing and exercise with music, playing with children.
The comparison of older male and older female in self-rated psychological statement	Similar distribution in self-rated quality of life and health.	
		More affected by fear and anxiety Older women affected by loneliness is considerably higher than older men.

6.5 Summary

This section set out to investigate the interaction relationship between ageing people and the neighbourhood park through questionnaire data analysis. There are three aims of this chapter include:

- To discover the inner structure and key features of the dynamic system of the interaction relationship;
- To uncover the most influential factors for the well-being and mental health of the ageing people;
- To produce an effective conceptual framework of interaction relationship between ageing people and the neighbourhood park.

Thus, this chapter was divided into two sections:

The first section is the tests for the seven pairs of associations of the potential conceptual framework among ageing people, place, behaviours, emotional bonding, and self-rated psychological states. The purpose of this section is to test the effectivity of the conceptual framework and to further understanding how it works, in order to achieve the first and second aims. The comparative descriptive data analysis, Goodman and Kruskal's gamma, comparative weighted score analysis were used to achieve these research goals.

The second section is a supplement and continues of the previous section. The first section discovered the inner structure and relationship of interaction between ageing people and the neighbourhood park. This section gave an overview assessment of the effects of using a neighbourhood park on psychological states. Moreover, the second section is a continuation of association 1 and association 6 to investigate the gender differences in the impact of behavioural activities on mental state and to investigate the differences of demographics on the self-rated psychological states of the ageing people. A series of comparative analysis approaches, such as cross-table figures, One- way ANOVA, Tukey HSD test, and Goodman and Kruskal's gamma test were used to achieve these aims based on the data from the questionnaire.

However, the findings of this chapter have been integrated into a few conceptual frameworks as the primary outcomes as follows:

- The integrated conceptual framework of **self-rated psychological statement benefited by emotional bonding and behaviours** (Table 6-19)
- The integrated conceptual framework of **features of usage**, emotional bonding with park, self-rated psychological issues and characters of ageing people (Table 6-16)
- The integrated conceptual framework of the **frequency** of usage, emotional bonding with park, self-rated psychological issues and characters of ageing people (Table 6-17)
- The integrated conceptual framework of **the duration** of usage, emotional bonding with park, self-rated psychological issues and characters of ageing people. (Table 6-18)
- The conceptual framework of **behaviour—emotional bonding—place** (Figure 6-73)

- The conceptual framework of **behaviour—psychological issues—emotional bonding**. (Figure 6-74)
- The comparison of the **older male** and **older female** of performance in the psychological status engaging in various activities in the neighbourhood park. (Table 6-15)

Furthermore, some critical points emerged in this section of the study; they are as follows:

- This section provides a new approach in landscape and urban studies using the Goodman and Kruskal's gamma test which have a more effective and predictable performance compared with traditional correlation analysis as Spearman's rho for the ordinal data analysis in a relatively small sample size in social science.
- Overview, using the neighbourhood park gives a significantly positive impact on improving self-reported quality of life, health, bright mental health, and reducing the sense of useless;
- The conditions of the neighbourhood park influenced the engagement of some usage behaviours such as, walking, playing poker or chess, enjoy the scenery, singing song, sitting in the sun, playing with children, reading a newspaper. Moreover, walking is the most popular activities of all ageing people. Nevertheless, there are still some considerable differences emerged in the different demographic group in Table 6-16.
- Four demographics (retirement or not, Native or not, educational level, living arrangement) of the ageing people shows a considerably significant influence on the social level, group level, cognitive level, behaviour level of the emotional bonding.
- The patterns, groupmate, duration, and frequency of activities were affecting some dimensions of the emotional bonding and self-rated psychological states of the ageing park users. The different psychological indicators, the effects of different activities of older men and older women, are different.
- Women are more likely to be affected by psychological loneliness and fearful. Older women prefer to participate in group activities or activities with the social potential to seed social psychological satisfaction and to relieve the loneliness;
- The most aspect of emotional bonding could contribute to help the ageing people to improve quality of life and give support for maintaining mental health, benefiting on relief loneliness. The different dimension of emotional bonding contributes to different aspects of mental health.
- The current neighbourhood park is insufficient to meet the huge of the social psychological desire of the older people who come multi-times every to seek psychological satisfaction from the park.

Table 6-16 the integrated conceptual framework of features of usage, emotional bonding with park, self-rated psychological issues and characters of ageing people obtained from chapter 6.

Association 1: people-behaviour (comparative analysis) + Association 2: People-Emotional bonding (Gamma correlation test with statistical significant) + Comparative analysis 6.4.5 (One-way ANOVA Gamma test)	Demographic	Different features of usage	Associations with Emotional bonding		Self-rated psychological issues
		Gender →	Elderly female →social and group activates.		
	Age →	Younger ageing group → entertainment activities	→	older age →higher extent of environmental satisfaction	→ Self-rated quality of life: younger poorer than elder
		Older ageing group → walking & static activates & rest		Older age will have higher extent of emotional bonding person dimension – group level.	Self-rated health: 45-55 poorer than 56-65 and 66-75
	Retired or not →	Retired ageing people → social & group activities	→	The retired → higher extent of emotional bonding person dimension – group level. ***	
				The retired →higher extent of emotional level of psychological process of emotional bonding ***	
				retired→ higher extent of cognitive level of psychological process dimension of emotional bonding ***	
	Native or not →	Native ageing people → social & group activates	→	native Beijing → higher extent of group level of person dimension of emotional bonding	
		Not native ageing people → entertainment activities		native Beijing → lower extent of behaviour level of psychological processes dimension of emotional bonding***	
	Education level →	Low to high education level = entertainment high to low	→	higher educational level → lower environmental satisfaction***	→ higher educational level →poorer self-rated quality of life. ***
				Higher educational level → lower group level – personal level – emotional bonding ***	higher educational level → poorer self-rated health. ***
				higher educational level→ lower extent of social level of place dimension of emotional bonding	
				higher educational level → lower extent of emotional level in psychological processes dimension of emotional bonding	
				higher educational level → lower extent of behaviour level in psychological process dimension of emotional bonding	
	Living alone →	Living alone →walking, high heath protection awareness	→	living in alone → higher extent of social level and cognitive level of emotional bonding	→ living in alone → negative impact on positive mental health.
				living with children → higher extent of emotional bonding –person dimension – group level	living in alone → easier to feel lonely. ***
				living with children → higher extent of emotional bonding – place dimension – social level	
		Living with children → entertainment			
		Living with children or spouse →social activities			
	Living arrangement →	Living own home → social & group activities & walking exercise	→	Living alone → higher extent of social level – place dimension – emotional bonding ***	→ Living own home → more susceptible to be fearful and anxious. ***
		Living in care-accommodation →exercise, entertainment, group, sun, children			Living own home → more susceptible to feel loneliness and isolated.
					Living own home → more susceptible to feel useless.
	Difficulty in seeing, moving, and hearing →	More desire for communication and social interaction. Watching is their way to participate into social environment of neighbourhood park.			Difficulty in seeing → poorer self-rated quality of life; *** →poorer self-rated health; →negative impact on positive mental health; → more susceptible to feel useless. *** Difficulty in hearing → negative impact on positive mental health;

*** means value > 0.3 in statistical test.

Table 6-17 the integrated conceptual framework of frequency of usage, emotional bonding with park, self-rated psychological issues and characters of ageing people

Frequency of going park / Frequency of usage behaviours.	Demographic		Places	Associations with Emotional bonding	Self-rated psychological issues	
	Based on finding from: Association 1: people-behaviour + Association 3: place- Behaviour + Association 5: Behaviour-Emotional bonding + Association 6: Behaviour-psychological issues.	Gender	→	Similar, major→ once every day	→the frequency of the elderly to the park activities → once a day or several times a week, and the five performances are similar. Cuicheng park ↗ Tuanjiehu park ↗ Side park→ Beixiaohe park → Qingjing park ↘	The elderly people who was more frequently using neighbourhood park have a higher extent of emotional bonding in personal dimension – group level, place dimension – social level, psychological progresses dimension – cognitive level, and psychological dimension – behaviour level than the older people who infrequently coming to neighbourhood park; The older people, who shows the highest extent of emotional bonding in psychological progresses dimension -emotional level, are the people who came to neighbourhood park more than once a week and weekly. They are higher than the older people who came to park multi-times every day. The extent of emotional bonding in place dimension – social level, psychological progresses dimension – cognitive level, psychological progresses dimension – behaviour level is increasing with frequency raised.
Age		→	46-55, 66-75, and 76-85 → go to park once every day. 56-65 elderly people → go to park more than once every week.			
Married or not			Similar			
Retired or not		→	Retired → more frequency			
Native or not		→	Similar			
Education level		→	the level of education ↗→ the frequency of use of the park			
Living alone		→	Similar			
Living arrangement		→	The group living in their own home and the group living in the elderly apartment have a large number of parks per day, the elderly living in elderly apartments have a large proportion of low-frequency sub-uses. They come to the park once a week. This may be because some elderly apartments are far from the community park, which is not conducive to the elderly.			
Difficulty in seeing, moving, and hearing	→	elderly people with difficulties in vision have a higher frequency of coming to the park . reach 20%. The elderly who have difficulties in moving compare the elderly who have no difficulty → similar. The elderly who have difficulties in hearing compare the elderly who have no difficulty → similar.				

Table 6-18 The integrated conceptual framework of the duration of usage, emotional bonding with park, self-rated psychological issues and characters of ageing people

Duration of usage behaviours.	Demographic		Places	Associations with Emotional bonding	Self-rated psychological issues	
	Based on finding from: Association 1: people-behaviour + Association 3: place- Behaviour + Association 5: Behaviour-Emotional bonding + Association 6: Behaviour-psychological issues.	Gender	→	1-2 hours each time	Major: 1-2 hours Tuanjiehu park: 1-2 hours; Over 2 hours' place: Cuicheng park, Beixiaohe ; 30-60 minutes: Side park; Passing through: qingfeng park.	The data results shows that the most dimensions of emotional bonding were increasing with time of staying in the neighbourhood park being longer.
Age		→	46-55, 66-75, and 76-85 →1 to 2 hours and plus. 56-65, 30-60 mins, 1-2 hours.			
Married or not		→	Single aging people stay park longer than people married.			
Retired or not		→	People who still is not retired stay park longer each time, because the frequency is lower of them.			
Native or not		→	Not native → staying longer time in park.			
Education level		→	-			
Living alone		→	alone→ shorter time of activity each time.			
Living arrangement		→	Living in care-home → longer time Own home longer > own home with care support.			
Difficulty in seeing, moving, and hearing	→	Similar				

Table 6-19 the integrated conceptual framework of self-rated psychological statement benefited by emotional bonding and behaviours

Association 6: behaviour -psychological statement + Association 7: emotional bonding – psychological statement	Self-rated psychological statement		Associations with Emotional bonding	First five activities with high score in psychological issue.
		Self-rated quality of life	→	Emotional bonding – personal dimension – group level;
			Emotional bonding – place dimension – social level;	2. Playing Chess Or Poker
			Emotional bonding – psychological progressed dimension – emotional level	3. Enjoy Scenery
			Emotional bonding – psychological progressed dimension – cognitive level;	4. Playing With Children
			Emotional bonding – psychological progressed dimension – behaviour level.	5. Walking
Self-rated health			Emotional bonding – personal dimension – group level;	→ 1. Sitting In The Sun
			Emotional bonding – place dimension – social level;	2. Practice Tai Chi
			Emotional bonding – psychological progressed dimension – emotional level ;	3. Playing With Children
			Emotional bonding – psychological progressed dimension – behaviour level.	4. Sitting In The Sun
				5. Enjoy Scenery
Self-rated positive mental health		→	Emotional bonding – personal dimension – group level;	→ 1. Dancing in group
			Emotional bonding – place dimension – social level;	2. Practice Tai Chi
			Emotional bonding – psychological progressed dimension – emotional level ;	3. Playing With Children
				4. Sitting In The Sun
				5. Enjoy Scenery
Self-rated fearful		→	Emotional bonding – personal dimension – group level;	→ 1. Dancing in group
			Emotional bonding – place dimension – social level;	2. Walking
				3. Chatting
				4. Playing With Children
				5. Playing softball, kicking
Self-rated loneliness		Emotional bonding – place dimension – social level;	→ 1. Dancing in group	
		Emotional bonding – psychological progressed dimension – emotional level ;	2. Playing With Children	
		Emotional bonding – psychological progressed dimension – cognitive level;	3. walking	
			4. Chatting	
			5. Playing softball, kicking	
self-rated useless		Emotional bonding – personal dimension – group level;	→ 1. Dancing in group	
		Emotional bonding – place dimension – social level;	2. Walking	
		Emotional bonding – psychological progressed dimension – emotional level ;	3. Playing With Children	
		Emotional bonding – psychological progressed dimension – cognitive level;	4. Practice Tai Chi	
			5. Chatting	

Findings from association 5
Behaviour-emotional bonding

Findings from association 3
Behaviour-place

1
2
3
4
5

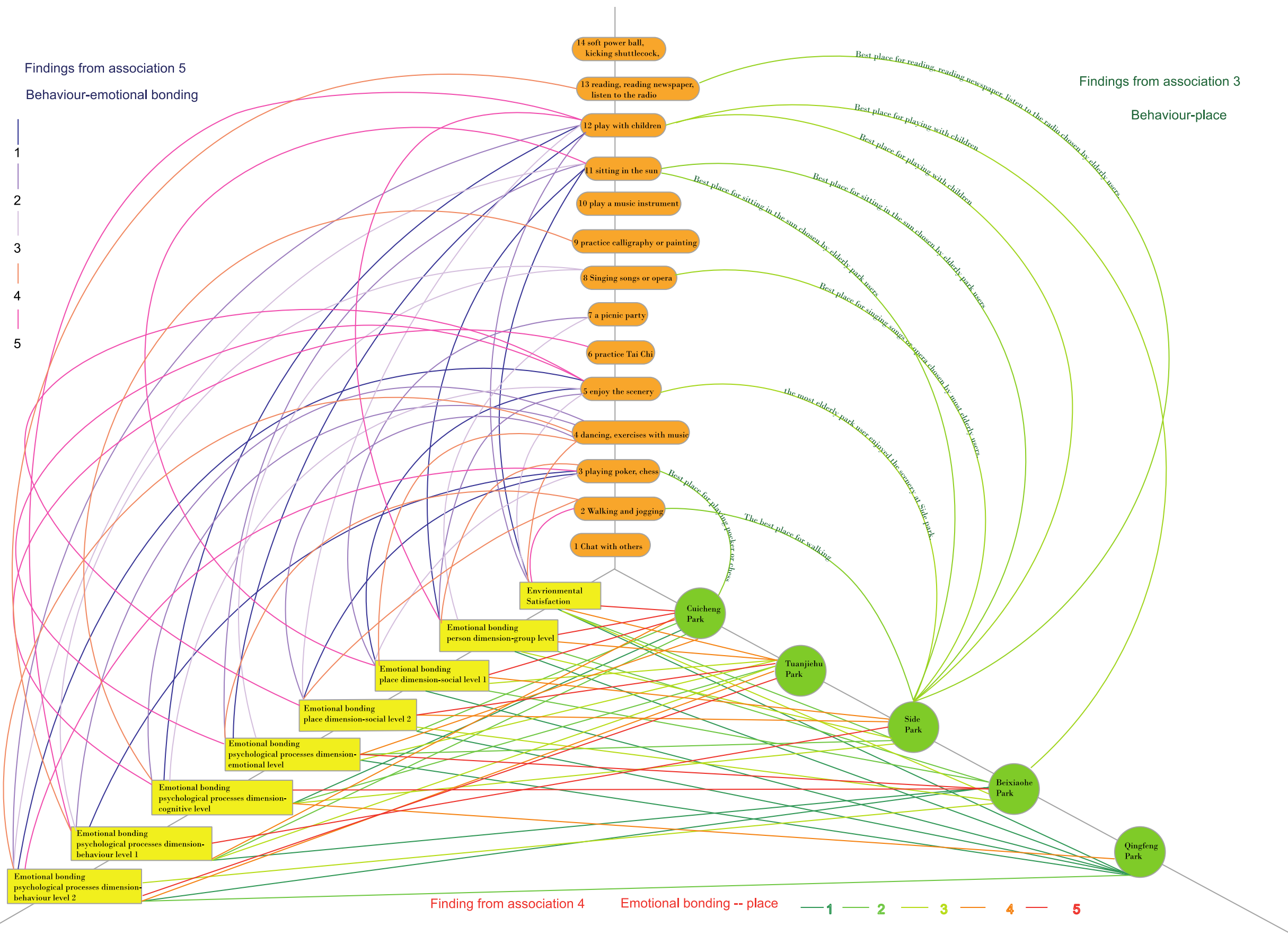
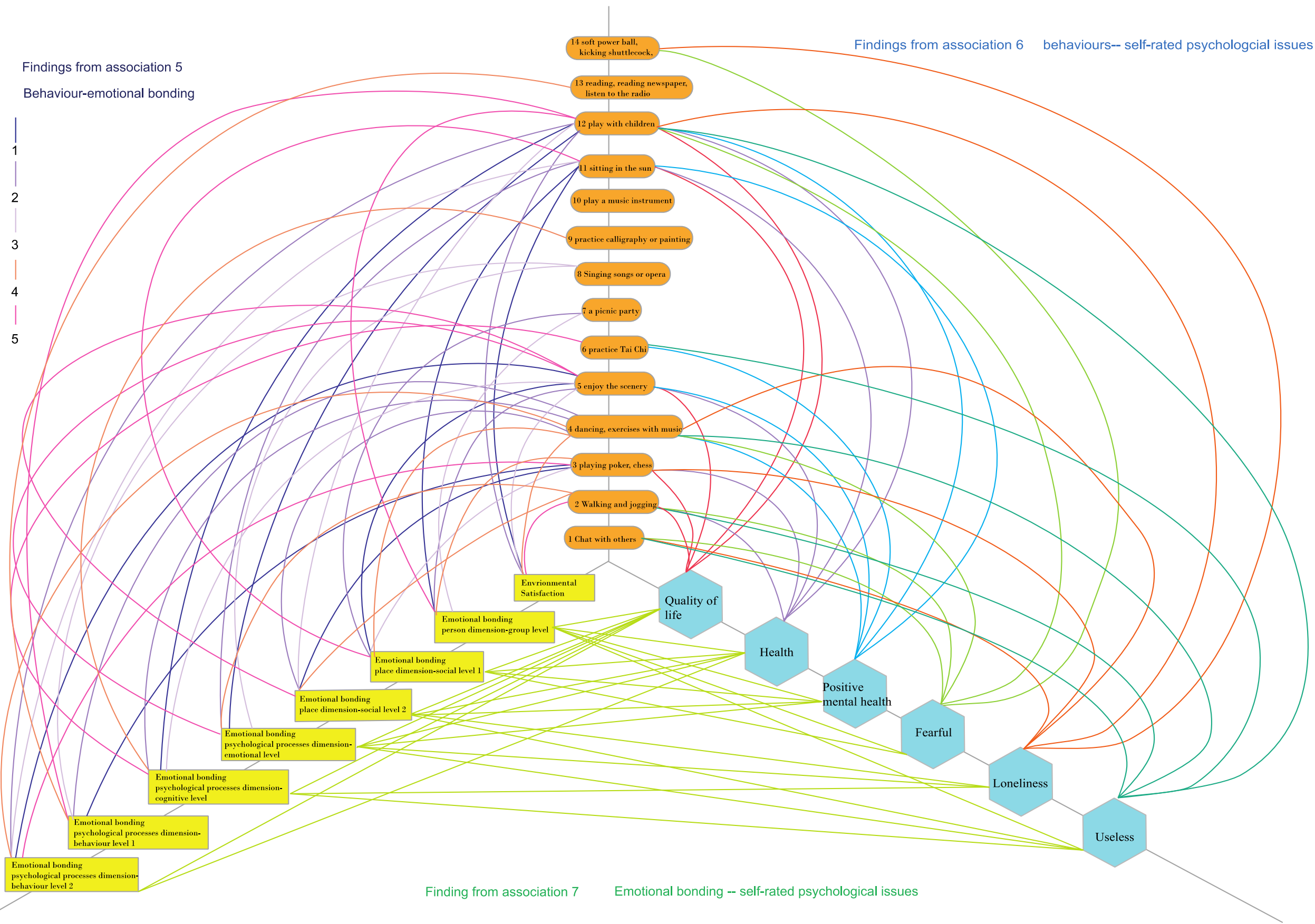


Figure 6-73 The conceptual framework of Behaviour—emotional bonding—place

Findings from association 5
Behaviour-emotional bonding

- 1
- 2
- 3
- 4
- 5

Findings from association 6 behaviours-- self-rated psychological issues



Finding from association 7 Emotional bonding -- self-rated psychological issues

Figure 6-74 the conceptual framework of Behaviour—Psychological issues—Emotional bonding.

Chapter 7 Thematic analysis and structural analysis

7.1 Introduction

Semi-structured interview designed to achieve two aims in this section:

- Firstly, to uncover the ageing people usage traits, desire and inside thought of neighbourhood park in social and perceptual dimension;
- Secondly, to supplement to questionnaire test result to discover the inner structure and key features of the interaction and to uncover the most influential factor for physical and mental health.

The methods applying in this section is thematic analysis and structural analysis by qualitative coding and quantitative coding. In the first part, the thematic analysis is contributed to explore the inside thought and attitude of them to a neighbourhood park in a narrative approach and then to identify the drives and limitation of them. In the second part, the structural analysis is contributed to identifying the different desire and thought of the ageing people in gender and age groups.

The demographic profile of participants shown in Table 6-1. For successfully achieving the research objective (see Figure 4-1), selection criteria are set as same with a questionnaire that the interviewees should be selected from amongst the on-site users across all the five neighbourhood parks, after they have completed the questionnaire and then start the semi-structured interview. Thus, the qualitative data could be cooperating analysis with the special characters of participants and indicators of emotional bonding and self-rated well-being and loneliness from the questionnaire.

7.2 Thematic analysis

The particular objectives of the section were to uncover the elder-park-users' inside thought, desires, and usage feature for the neighbourhood park, and to contribute to uncovering the most influential factors for the well-being and mental health based on the content analysis from the semi-structured interview. In this section, the thematic analysis used both quantitative coding and qualitative coding approaches by NVivo to achieve a more in-depth and reliable answer to these purposes. The data results show in figures, word clouds, and system diagrams.

The themes are mainly around the social and perceptual dimensions of neighbourhood park

7.2.2 The experienced attractive elements of joining the group activities

From the answers to Question E-2, the result of analysis by using NVivo (version.11) (Figure 7.3) shows that the drives of the elderly attending to group activities are diversities. The most frequent word is 'lively', which is a crucial element attracting elderly people. It could be found that some of the other vital elements, such as 'friends', 'people', and 'health'. However, the second round of coding key attractive elements had been applied, in order to detail more systematically and clearly understand the attractiveness of the group activities in the park to the elderly, and to further analyse the psychological and physical needs of the elderly meted in the activities.

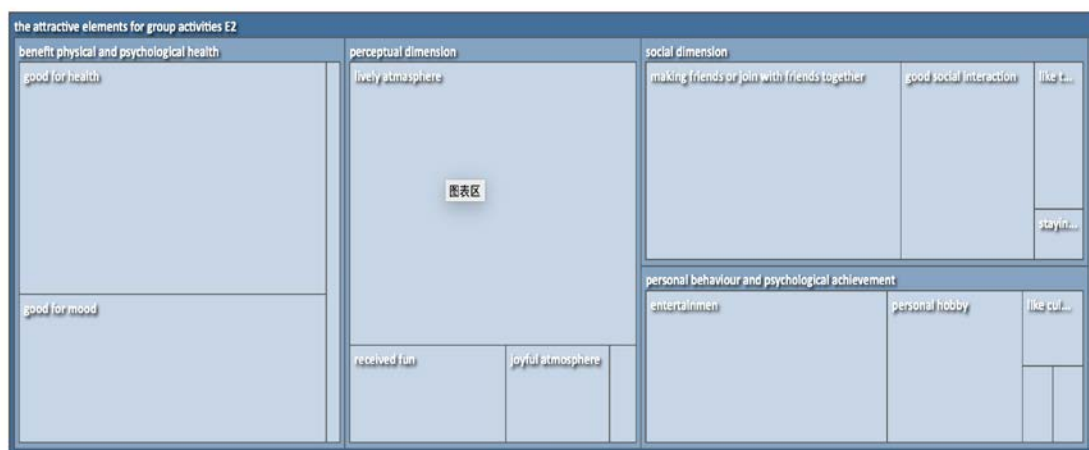


Figure 7-4 the hierarchy of the attractive elements of group activity in a neighbourhood park

The systematical analysis applying NVivo, the hierarchy of the attractive elements coded from the elderly interviewees' responses show in figure 7.4. The attractive elements divided into five dimensions including, 'benefit on physical and psychological health', 'perceptual dimension', 'social dimension', 'personal behaviour and psychological achievement', and 'physical dimension'. The elements of each dimension are summarised as follows:

- Attractiveness in benefiting physical and psychological health

'Group activities are very lively, and it is both able to dance together and exercise. Exercise is benefiting my health, especially is many similar age people work with you.' (BXH01, 54, female)

'Group exercise is good for mood and health. Dancing makes me happy. It works like good mood good health.' (TJH54, 75, female)

'Group exercise provides me with more opportunities to make friends broadly; it let me not feeling lonely.' (TJH53, 60, female)

There are 48 elderly interviewees expressed that they came to participate in group activities because these activities are good for their physical and mental health. This is the title extracted from their answers, which means that the elderly are very aware of their physical and mental health, and they are maintaining mental health by finding appropriate activities. The views of the elderly could be summarized and judged into three concepts as following and the examples of responses cited below:

- benefit for physical health (mentioned 28 times);
 - benefit for mental health (mentioned 18 times);
 - benefit for relief loneliness (mentioned 2 times)
- attractiveness in perceptual dimension

There are 43 elderly interviewees mentioned that they came to join group activities because they are attracted by the perceptual dimension of the activities, such as a lively atmosphere of dancing and singing. The attractive perceptual elements mentioned them could be summarized as:

- Lively atmosphere (mentioned 33 times)
- Received fun (mentioned 6 times)
- Joyful atmosphere (mentioned 4 times)
- Enthusiastic atmosphere (mentioned 1 time)

‘Group activities, such as singing group, dancing group, they are very fun and lively, I like the lively atmosphere, and I like to join them and joined into the lively atmosphere.’ (Side044, 65, female)

‘Singing together is very lively. I like this lively atmosphere. It makes me feel happy.’ (CC057, 62, female)

- Attractiveness in the social dimension

There are 36 interviewees expressed that social interaction in group activities are attracting them to engage in it. The context they mentioned about could be generally summarised as four groups including:

- Good for social interaction (general) (mentioned 11 times)
- Staying with a lot of older people (mentioned 1 time)
- Opportunities to chatting with others (mentioned 3 times)

- Making friends or join with friends together (mentioned 21 times)

'The attractiveness of group activities is social opportunities. I like to make some new friends, staying with friends let me not feeling lonely. The group activities let me make friends and benefit health.' (CC18, 55, female)

'I come to dance because people who know can chat together.' (QF16, 65, female)

'I helped my daughter to look after my grandson, sometimes I take him to join dancing together, sometimes I didn't join them, but stand around them to watch and chat with others.' (BXH05, 63, female)

- Attractiveness in personal achievement and behaviour

There are 29 elderly interviewees expressed that they join these activities is caused by their hobbies or their aims, which belonging to personal behaviour and psychological achievement. The specific context mentioned by the elderly park users includes:

- aim for entertainment (mentioned 16 times)
- personal hobby (mentioned 9 times)
- like culture and music (mentioned 2 times)
- aim for creative capture material from crowded people in activities (mentioned 1 time)
- like to watching (mentioned 1 time)

'I like to draw sketches in the neighbourhood park; I especially like to draw various expressions of various people, so I come to the park to participate in activities to collect materials. I have always liked to paint, but I was too busy. Now I am retired, and I can draw every day.' (CC35, 75, male)

'It is just a personal hobby; my hobby is dancing, so I join in the group dancing. You look, the dancers in our group are very professional, and we have the same dancing dress because now we are retired, we have plant time to develop our hobby.' (TJH64, 68, female)

'Singing group is a recreational activity for me. I join it is just for fun. Just play.' (TJH66, 74, female)

- Attractiveness in the physical dimension

One elderly interviewee, who expressed that a park is a suitable place for some group activities, which could reduce the negative impact on the others, has mentioned the physical dimension.

‘I am coming to the park to practice and play musical instruments with my friends. The park is a very suitable venue, and practising the instrument at home will affect others.’ (BXH22, 78, female)

Summary

In summary, the current part of the study aimed to determine the experienced attractiveness of group activity for the current ageing users in the neighbourhood park. The second aim of this study was to investigate the effects of engagement of group activity and thoughts of ageing people, to explore the more in-depth understanding among the motivations of their behaviours. Thus, the responses of Question E-2 was coded and analysed in NVivo. However, this study has discovered and identifies the experienced attractiveness expressed by ageing people are including 5 dimensions as ‘attractiveness in benefiting physical and psychological health’, ‘attractiveness in perceptual dimension’, ‘attractiveness in social dimension’, ‘attractiveness in physical dimension’, and ‘attractiveness in personal achievement’.

In details, three findings need to be highlighted as follow:

- Firstly, through this research, it has been found that the awareness of protecting health by participant in-group activities in neighbourhood park has emerged and covers physical and mental health. This awareness understanding among the elderly is a very positive sign for the future to increase the participation of the elderly and improve the healthy level of the overall ageing people. This study has identified the significant effect of perceptual dimension and social dimension in engaging the older people into group activities.
- Secondly, among all the attractive factors, the lively atmosphere is mentioned by most of the elderly as one of the sensing elements, which is categorised into a perceptual dimension.
- Finally, this study found that to meet the social psychological needs is one of the main

aims to join the group activity of the ageing people. The description of the satisfaction of social needs can be summarised into four types, including 'good for social interaction', 'staying with a lot of elderly people', 'opportunities to chatting with others', and 'opportunities of making friends or joining with friends'.

These empirical findings in this section provide a new understanding of the attractive of group activities and the motivations of the ageing people and discover the practical possible approach to engage the ageing park user to improve the physical and mental health of the ageing population in the future. The conceptual framework of the experienced attractiveness in joining group activities has been shown in **Figure 7.5**.

7.2.3 The friendliness of the social atmosphere in neighbourhood parks

The specific objective of this section is to discover the inner thought and experience of ageing people regarding the friendliness of social atmosphere in a neighbourhood park, which including the social atmosphere of groups in park and local resident around the park. Thus, through the analysis of the responses to Question E-3 and Question E-4, this section has the social accessibility of groups in the neighbourhood park and local residents' attribute towards park activities.

- **The friendliness of the social atmosphere of group activities in the neighbourhood park**

The answers to Question E-3 in Figure 7-5 indicate that there are 318 elderly participants (79%) feeling the other people are friendly when they join in the group activities in the park, and there are 87 participants (21%) not feeling that. The result shows the most ageing park users experienced a friendly social atmosphere in the local neighbourhood park. The crossable of the participants' attitude and their perceived friendliness in Figure 7-6 indicates a fact that a part of people did not choose local group activities is impacted by that they did not receive the friendliness or accessibility of the local group activities or the local social atmosphere.

Figure 7-5 Answers to Question E-3

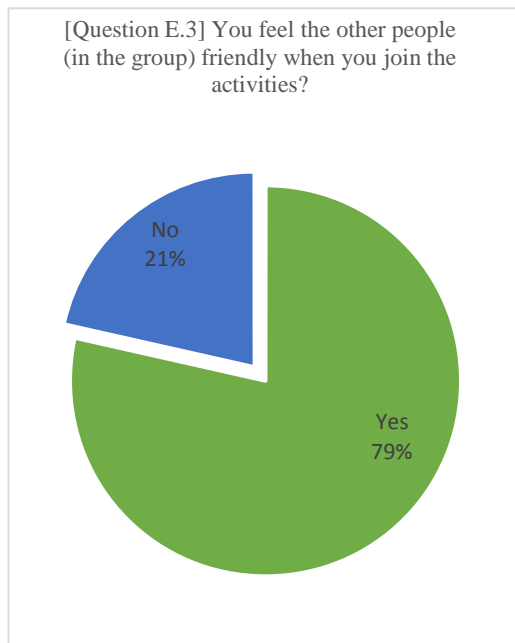


Figure 7-6 Cross distribution between the attitude of joining and perceived friendliness of local group activities.

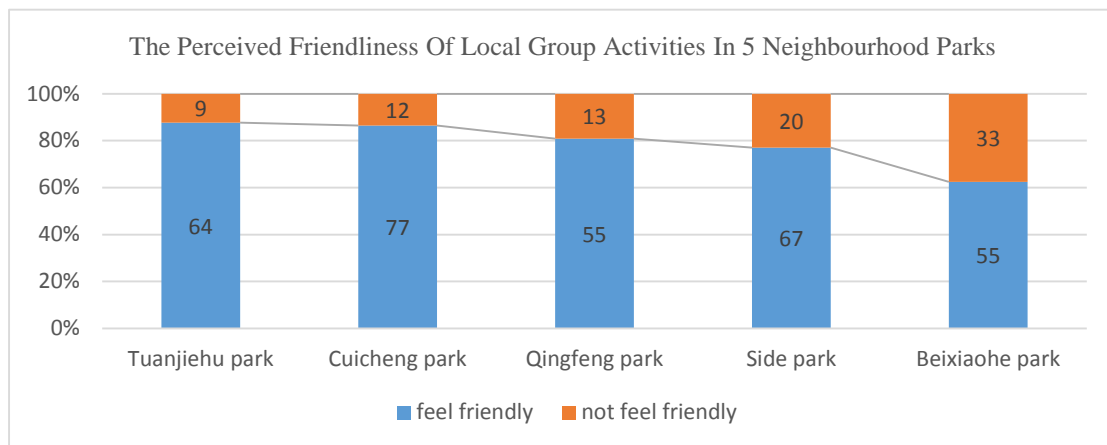
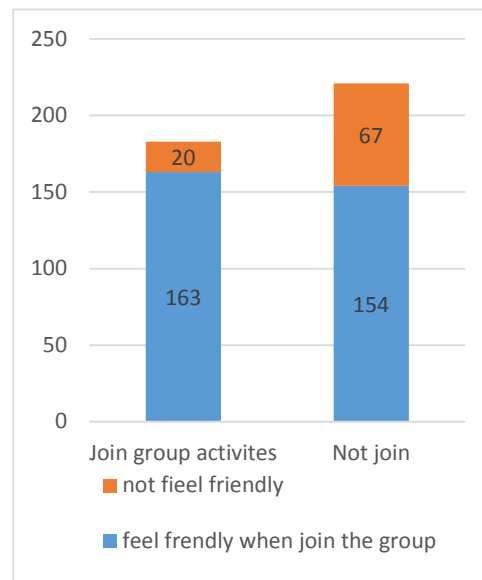


Figure 7-7 the perceived friendliness of local group activities of 5 neighbourhood parks

Figure 7-7 shows that in a different neighbourhood park, the perceived friendliness of the social environment is different. Tuanjiehu park and Cuicheng park show a higher percentage of elderly participants feeling friendly group activities. The perceived friendliness of local group activities is the critical element to restore a healthy and ageing friendly social environment in the neighbourhood park. It implies the accessibility of the local social environment is different. Some of them, such as Tuanjiehu park and Cuichen park, shows the higher performance in a friendly and accessible social environment which would tie the ageing users in the group and

engage the new ageing people joining park groups.

- **The friendliness of the social atmosphere of local resident around the neighbourhood park.**

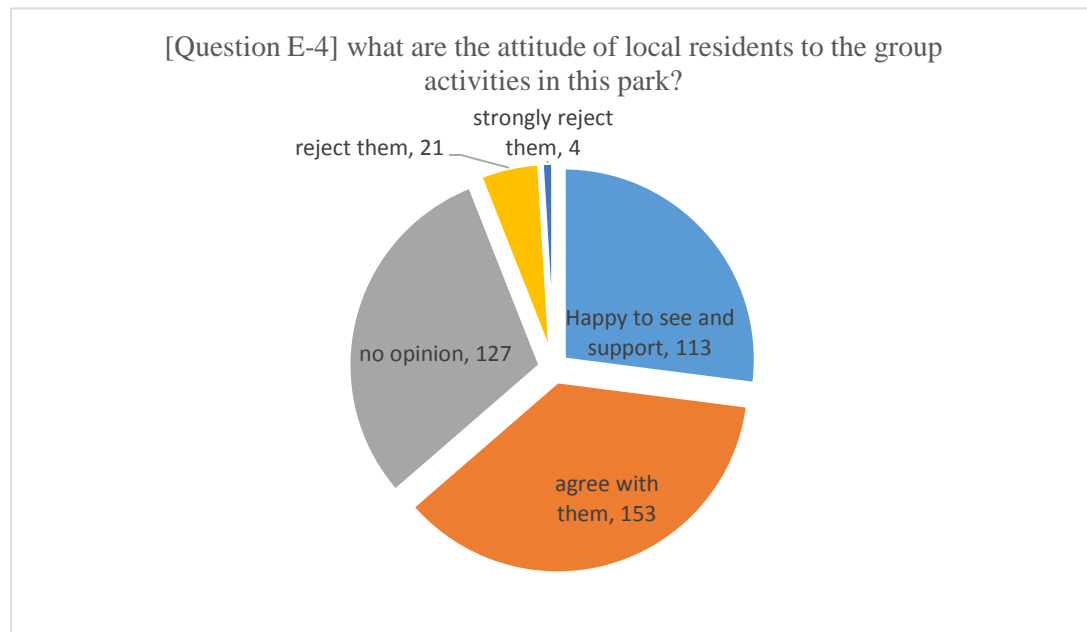


Figure 7-8 the attitude of residents for the group activities in the neighbourhood parks

Figure 7-8 shows the answers to Question E-4 indicate that only 6% participant is feeling the residents show a negative attitude for the group activities, most of them received positive attitude of residents. This implies a general containment of the current social environment for the elderly group activities is relatively friendly, and the local residents give understanding, tolerance and support to the activities of the older people.

Meanwhile, the residential attitude is also express a part of the friendliness of the social environment of the neighbourhood parks. It is crucial to restore the harmonise atmosphere for the elderly users to achieve self-esteem and psychologically social satisfaction and avoid the misunderstanding between the other users, especially some residents around the parks.

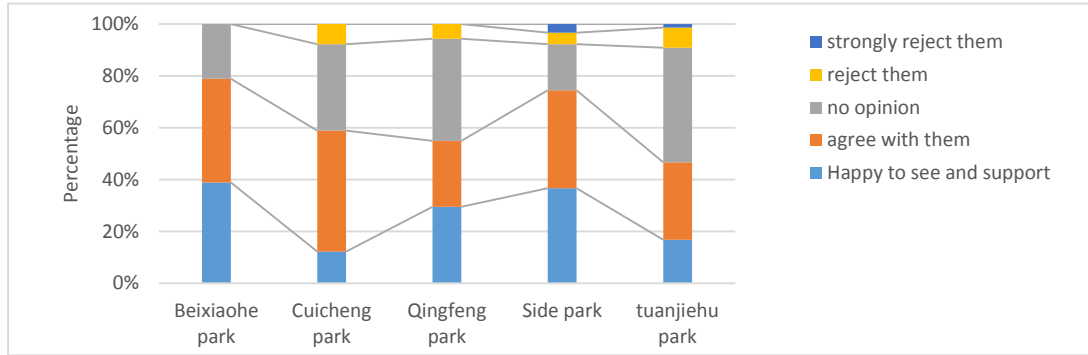


Figure 7-9 the attitude of local residents to group activities in 5 neighbourhood

Figure 7-9 shows that the social atmosphere of local residents in different neighbourhood park express different attitudes. Side park and Beixiaohe shows the greater extent of positive friendliness of the local residents for the elderly's group activities, which maintain an ageing friendly and containment of the local social environment. Cuicheng park and Tuanjiehu park shows the lowest extent of the tolerant attitude of a local resident.

In summary, the attitudes of the responses to these two questions about the social environment show they are not coincident and relatively independent. However, the social environment of the park perceived by the park users is a two in one atmosphere, which combines the accessible and inclusive of local group and residents. The current study shows the friendliness of the social atmosphere is different in a different site, while the overview of it is relatively satisfied. Nevertheless, there is still much room for improvement in social friendliness and inclusive of the social environment in a neighbourhood park. On the other hands, a good healthy, friendly social environment will be more conducive to enhancing the psychological experience and psychological benefits of elderly users.

7.2.4 The social life in neighbourhood parks

This section set out to investigate the social life of the ageing people in neighbourhood park composed three issues including the current situation of social interaction in-group activities, the attitude of ageing people toward the social interaction in the neighbourhood park, and the sociability of activities by ageing park users. This section has discovered that the majority elderly park users desire communication and positive social relationship with others in the neighbourhood park, and most of them had built deeper social interaction relationship as making friends through participating group activities. In addition, the third part of this section has identified the characters of activities with experienced sociability of ageing park users.

- **The social interaction in group activities**

The overall response to this question was very positive. **错误!未找到引用源。** shows that 70% of participants who have made some friends in the activities in neighbourhood parks. It reveals that most neighbourhood-park users had deeper social interaction relationship. Turning now to the experimental evidence on five sites comparison, Figure 7-11 shows a relatively similar trend of making friends among the 5 neighbourhood parks. This implies the real social opportunities for elderly users is significant and maintained similar extent in different sites.

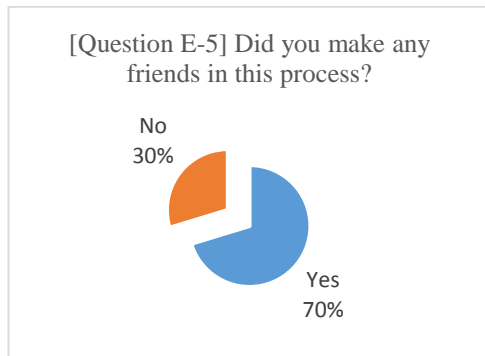


Figure 7-10 Answers to Q.E-5

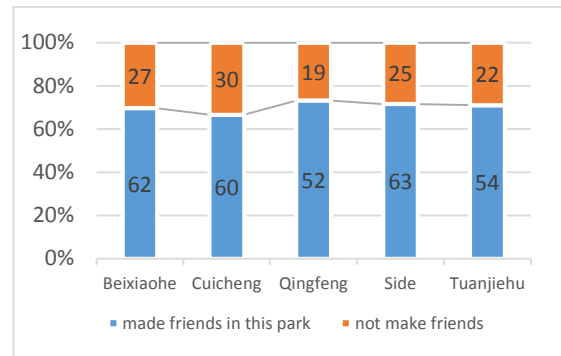


Figure 7-11 Answers to Q.E-5 in 5 sites

- **The attitude of social interaction of the ageing people toward neighbourhood parks**

Figure 7-12 shows that 72% of participants surveyed (318 participants) thought the neighbourhood park is a good place to make friends. This also implies the majority of elderly users who desire to communicate and to build positive social relationships with others in daily life. The neighbourhood park as the elderly most frequently using a place where shows the affordance of social communication and social satisfaction.

Figure 7-13 implies that the perception of the elderly users in the achievement of the social needs at neighbourhood parks has a slightly impact by different conditions of the parks. the attitude of social interaction in neighbourhood park of older people are very active and positive.

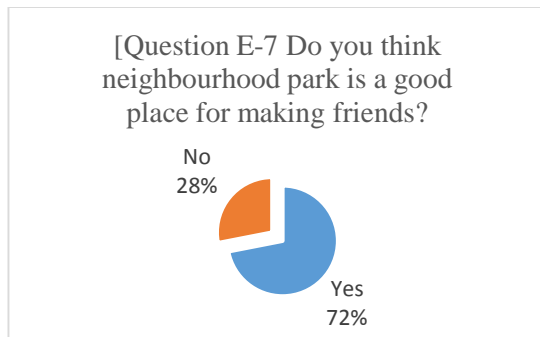


Figure 7-12 Answers to Question E-5

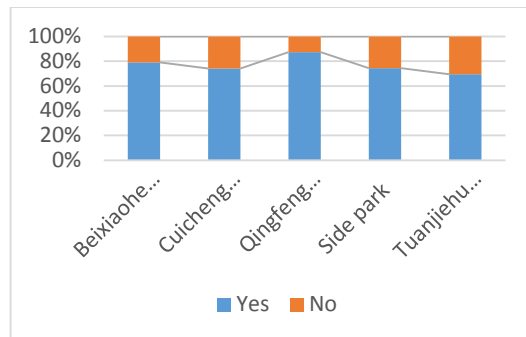


Figure 7-13 Answers to Q.E-5 in 5 sites

- **The sociability of activities in the neighbourhood park for elderly users**



Figure 7-14 the words cloud analysis result of E7 the activities let the elderly user making friends analysed through NVivo.

Figure 7-14 conveys everyday activities in making friends, from entertainment activities, such as dancing, playing cards, to social behaviours as chatting, which is the foundation to build a deeper level of social interaction for the ageing park users. Depending on the analysis of the response of question E7, some key points could be discovered that:

- Big group activities such as dancing and singing are popular with high sociability for elderly park users.
- Entertainment activity is one of the most popular activity with high sociability for elderly park users, who are playing in a relatively small group, such as cards and chess.
- The sociability of the exercise process, such as walking, is high, which is always happened

with chatting.

- In the event, the older people are familiar with each other and reach the satisfaction of social psychology through chatting. Chat is a critical step in building deeper social interaction and emotional bonding. Providing a suitable venue for those processes advance becomes the key to promoting the social psychological satisfaction of the elderly through using a neighbourhood park.
- The diversity of social activities mentioned is echoed to the diversity of hobbies and interests of ageing people. Older users with the same hobbies and joining the same activity, which allows them familiar with each other and building deeper social interaction as making friends, thus they could strength the emotional bond, engaging them to use the park more frequent and achieve the aim of maintaining both physical and mental health.

The diverse activities in a neighbourhood park provide substantial potential opportunities for elderly users to achieve their social-psychological needs and relief loneliness through a different kind of social interaction occurring in activities. These findings discovered to give us a deeper understanding of the social interaction occurring in activities of the older people in a neighbourhood park, give us a direction of attracting and engaging the ageing people using parks, and give us a more effective breakthrough to improve the quality of life and happiness of the elderly.

Summary

This section set out to discover the behaviour, thought and experience of ageing people towards social life in neighbourhood park composed with three aspects including how possible of building deeper social interaction in group activities, what attitude of ageing park uses towards social interaction, and experienced sociability of activities. Several findings are emerging in this section:

- The most neighbourhood-park users had deeper social interaction relationship, and the existing social opportunities for the elderly users is significant and maintained similar extent in different sites
- The majority of elderly users who desire to communicate and to build positive social relationships with others in daily life. The neighbourhood park as the elderly most frequently using a place where shows the affordance of social communication and social satisfaction

- Big group activities such as dancing and singing are popular with high sociability for elderly park users.
- Entertainment activity is one of the most popular activity with high sociability for elderly park users,
- The sociability of the exercise process, such as walking, is high, which is always happened with chatting. Thus, chatting expressed by participants has been identified as a critical step in building deeper social interaction and emotional bonding.
- The diverse activities in neighbourhood park provide substantial potential opportunities for the elderly users to achieve their social-psychological needs and relief loneliness through a different kind of social interaction occurring in activities.

7.2.5 The attractive elements for the elderly users in neighbourhood parks



Figure 7-15 the hierarchy of attractive elements of neighbourhood parks for elderly users through NVivo.

Figure 7-15 shows the attractive element mentioned by the elderly users in neighbourhood parks. Depending on the analysis through Nvivo, the categories organized including physical dimension, social dimension, perceptual dimension, and the other influential and attractive elements as close distance, fresh air, suitability for children.

Physical dimension

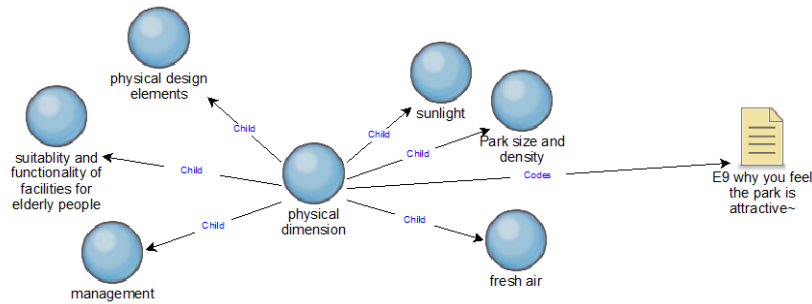


Figure 7-16 the attractive aspects of the physical environment.

The physical environmental elements (see Figure 7-16) mentioned by the elderly in this question is 226 times occupied half of the total participant. This implies the extension of physical satisfaction is still a key feature engaging the older people coming to a neighbourhood park and using it. In the physical environmental category, some key points could be found in 7 aspects as following:

- the first most mentioned by the elderly users is ‘the physical design condition’ including:
 - general visual satisfaction (mentioned 87 times),
 - green planting (mentioned 23 times),
 - walking road (mentioned 7 times),
 - waterfront landscape (7 times),
 - hills (3 times).
- The secondly important physical element is the ‘suitability and functionality of the facilities and space’ (mentioned 45 times) provided by the neighbourhood park. In this aspect, there are three concepts mentioned by elderly users, including:
 - Suitable places for activities (mentioned 24 times);
 - General functional facilities for exercise (mentioned 9 times);
 - Special facilities for the elderly user to relax, exercise, and rest. (mentioned 5 times)
 - Facilities for children playing and easy for elderly people companies. (mentioned 11 times).
- Fresh air is the third attractive elements for older people using neighbourhood parks, has been mentioned 31 times.

- Fourthly, the park size is also considered by older people when they choose which neighbourhood park they would like to use, which has been mentioned by 11 participants. In general, the elderly users would like to choose a relatively bigger neighbourhood park for activities. But, some of them shows that why they choose this park is because this is the only park in this residential area.
- Fifthly, good management of the neighbourhood park is one influential element mentioned by 7 elderly users. The elderly users expect that the neighbourhood park is neat, clean, safety with security.
- Sixthly, the sunlight is also a considerable element which attracts older people using a neighbourhood park. There are 3 elderly participants shows the aim of them coming to the neighbourhood park is enjoy the sunshine.

Social dimension

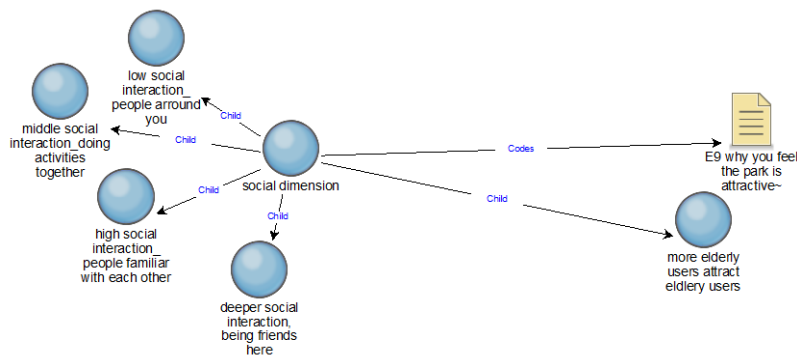


Figure 7-17 the attractive relationships of social environment mentioned in answers to E-11

Depending on the answers to why you feel the park is attractive, the social environment has been mentioned by 77 elderly participants as the second main parts. The social environment plays a significant role in engaging the ageing people in using the neighbourhood park. Figure 7-17 shows that the reasons mentioned relate to social interaction could be categorized into four extents as following:

- Low-level social interaction – people around you; (27 times)
- Middle-level social interaction – people doing activities together; (13 times)
- High-level social interaction – people chat with each other and familiar with each other; (4 times)
- Deeper level social interaction – people being friends at the neighbourhood park (7 times)

These four levels are identified from the interview context of the elderly users to some extent; the level of social interaction shows how to tie the elderly users linking with the neighbourhood park. The deeper level of social interaction would be stronger relationship engaging the older people using parks more frequently and receive more social psychological satisfaction than the older people have lower interaction.

Meanwhile, there are 5 elderly users express the reason they like to come to their neighbourhood park is there are more older people using this neighbourhood park. They come to play with their similar generation people. This finding is consisted with the theory of 'people attract people' Gehl (1987) and Whyte (1980). But, it implies a deeper understanding that people attract similar age people, which means the older people attract older people. In the psychological dimension, People of similar age who have similar experiences have more empathy, and it is more likely to produce empathy in communication, resulting in psychological satisfaction.

Perceptual dimension

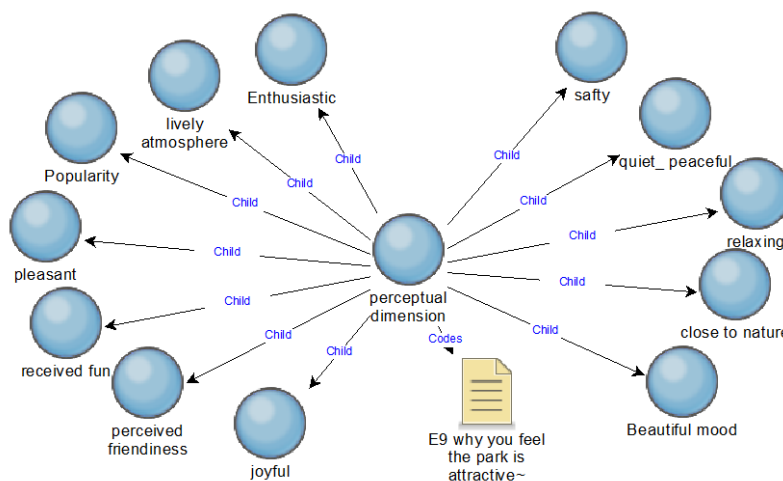


Figure 7-18 the attractive elements in the perceptual dimension of a neighbourhood park for elderly people

Figure 7-18 shows some older people express that what attract they coming to use the neighbourhood park is a feeling, which is identified as a perceptual recognition and achievement. This process of identification is an exploring way to identify what the elderly users received in perceptual dimension, which engaging them to come.

The perceptual dimension as the thirdly main part has been mentioned by 53 elderly participants. The perceptual elements they have talked are what they seek and desire in neighbourhood parks.

Based on the analysis, these relevant responses can be summarised into two aspects, including interactional aspects and individual aspects.

- Interactional aspect has been mentioned by 18 elderly participants, elements including:
 - Received friendliness
 - Lively atmosphere
 - Pleasant
 - Popularity
 - Joyful
 - Enthusiastic
 - Received fun

- Individual aspect, has been mentioned 21 times, elements include:
 - Sense of safety
 - Sense of quiet and peaceful
 - Sense of relaxing
 - Sense of closing to nature
 - Sense of beautiful mood

The perceptions in interactional aspects are produced in the interaction between the people between social environment, also named as the other people or groups in the neighbourhood park. It is a sense based on the feedback from other people. It could produce from low-level social interaction to deeper level social interaction, which gives the older people different perception in the neighbourhood park. Meanwhile, the perception in individual aspect is focused on the interaction between the people and the physical environment. These perceptual elements mentioned by the elderly users are what they seek in the park.

The other impact factors

Thus, the three attractive dimensions of the neighbourhood park have been analysed as above; there are still some the other features of neighbourhood park attracting the older people coming to use it, such as:

- Close distance

The distance is an essential condition what the older people consider. There are 37 elderly participants express that why they come to this park in daily life is the position nearby home. Some elderly parks users (eg. cc04, cc33, cc61, cc62, cc68) show that they come to park to exercise and then go back home for lunch and a little sleep, after that, they come

to park doing something, such as chatting, walking, playing chess or poker, and then go shopping and eat dinner, after that, they come to park again to join square dancing. The key factor influencing the elderly user's daily route is the distance between homes to the neighbourhood park.

- Suitability for children

There are 9 elderly people shows that why this park attracts them is where to have 'perfect place and facilities for children to play'. The aim of them coming to the park is accompanying their grandchildren and help to bear the busy duty of their children. This implies the suitability of children is also an important factor in engaging older people using it.

This factor is discovered another series problem occurred in ageing people and influenced their well-being and loneliness. As one participant said 'I come to neighbourhood park is to company my grandchild, I pick him from nursery and play here from 3 pm to 5.30pm when his parents came back, we go home for dinner. I came to Beijing is because my daughter is too busy to look after her child when she is working.'

This phenomenon is widespread in China currently, especially in a metropolis such as Beijing, Shanghai. The ageing people retired are leaving their hometown or familiar place and coming to help their child. The change of their living environment and social environment, which lead them isolated from old social relations, thus the consequence is that the possibility of depression or loneliness is increasing.

However, based on observation in the neighbourhood parks, it could be found that some elderly grandparents are sitting under the trees or stand nearby the Children playing ground when they are looking or waiting for their grandchildren. It implies that the potential social opportunities are around them, and the waiting area should be designed for older people to have a comfortable place to rest. It, more importantly, could be considered as a place providing social interactions for the elderly users in their daily life.

Summary

In this section, the aim was to discover the experienced attractiveness of the neighbourhood park for the ageing people through responses of Question E-9. In the rich and intricate qualitative data, through repeated analysis and refinement, induction and aggregation, the main finding of the section was a logically comprehensive conceptual framework (see figure 7.36, at the summary section of thematic analysis) for the factors that attract the ageing people engaging to the park. It composed of three dimensions among physical dimension, perceptual dimension,

mentioned 53 times and the second one is waterfront area mentioned by 35 interviewees. Furthermore, the answers of often using place indicate the diversity of the elderly users' needs of the place.

In fact, as a mixed functional venue, the square can meet the needs of most older people, such as group activities, group entertainment, social and communication, and perceived needs. The functionality of the square coincides with the majority of the attractive elements mentioned by the elderly. Thus, the square became the most frequently used venue for the elderly in community parks.

Meanwhile, the waterfront area is the second most common area for the elderly, and its attractiveness and functionality echo with the findings of Q-E-9 and Q-E-14. Both the waterfront and the lakeside are attractive elements of design conditions mentioned by the elderly in Q-E-9, where could provide a rest function, and a certain degree of sociality. They are important places for the elderly to find personally needs of perceptual dimensions, such as a sense of relaxing, calm. Peaceful and close to nature. At the same time, the waterfront landscape is also one of the two most important places in the response of Q-E-14, that the area benefits the elderly users to relieve loneliness.

In conclusion, this section has identified the main using areas of neighbourhood park by ageing uses are square and waterfront (including waterside, lakeside) areas. This finding echoes with the conclusion from the attractiveness of neighbourhood park regarding the desire of multi-functional places with social interaction and the perceptions among sense of relaxing, peaceful and close to nature. This view provides the key places to improve ageing friendly serves and restore the positive perceptual dimension of the neighbourhood park and contribute to an overview of spaces using by ageing people in neighbourhood parks.

7.2.7 Relief loneliness effect in the neighbourhood park

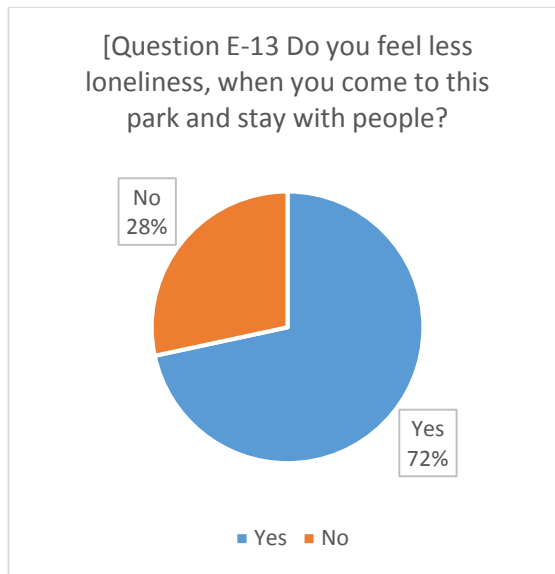


Figure 7-20 the answers to Question E-13

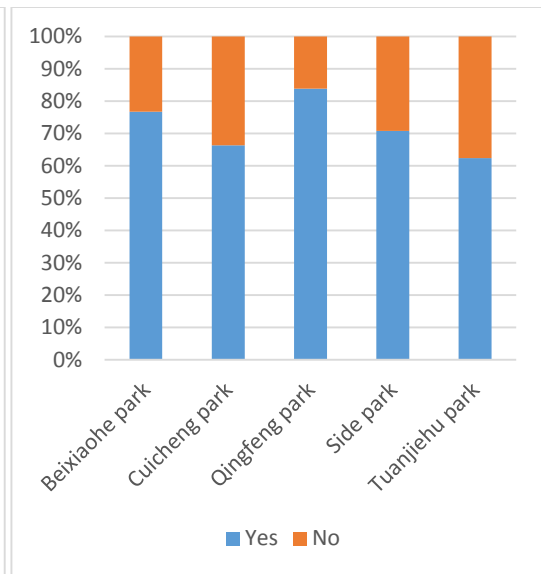


Figure 7-21 the answers to Q-E-13 in 5 sites

Figure 7-20 indicate that there are 72% elderly participants expressing that they feel less lonely when they come to this park and stay with people. It implies that ‘come to the park and stay with people’ shows a positive impact on the psychological health of the elderly.

Figure 7-21 compares the number of older people could relief loneliness in five neighbourhood parks. The obviously, difference implies that the conditions of the neighbourhood parks and interaction influence the psychological states of the elderly users through the interaction between them and the park.

Overall, these results indicate that using a neighbourhood park has a positive impact on the ageing, psychological states of the ageing people and helps the majority of them relief loneliness. Furthermore, this also implies the lower level of social interaction as staying with people in the park play an essential role in this process. Moreover, the extent of this positive impact shows the differences between the different condition of the neighbourhood parks.

7.2.8 A place where the elderly feel relief loneliness



Figure 7-22 the keywords cloud of answers to Question E-14

The answers to Question E-14 (see Figure 7-22) indicate that the first three most frequently word emerging is 'square', 'children', and 'people', where let the elderly people feel less lonely. The context of the response is involved, the diversity of the place mentioned by the older people, although the most elderly expressed square could help them control their psychological statement. Nevertheless, the deeply comprehensive understanding of the active elements benefiting on relief loneliness of the elderly is necessary to meet all ageing people's psychological desire and to improve their psychological health. Thus, the answers have been analysed depending on the findings above and divided into four dimensions including the social, physical and perceptual dimensions of a neighbourhood park and the elderly themselves' personal psychological control, shown as below. (Figure 7-23)

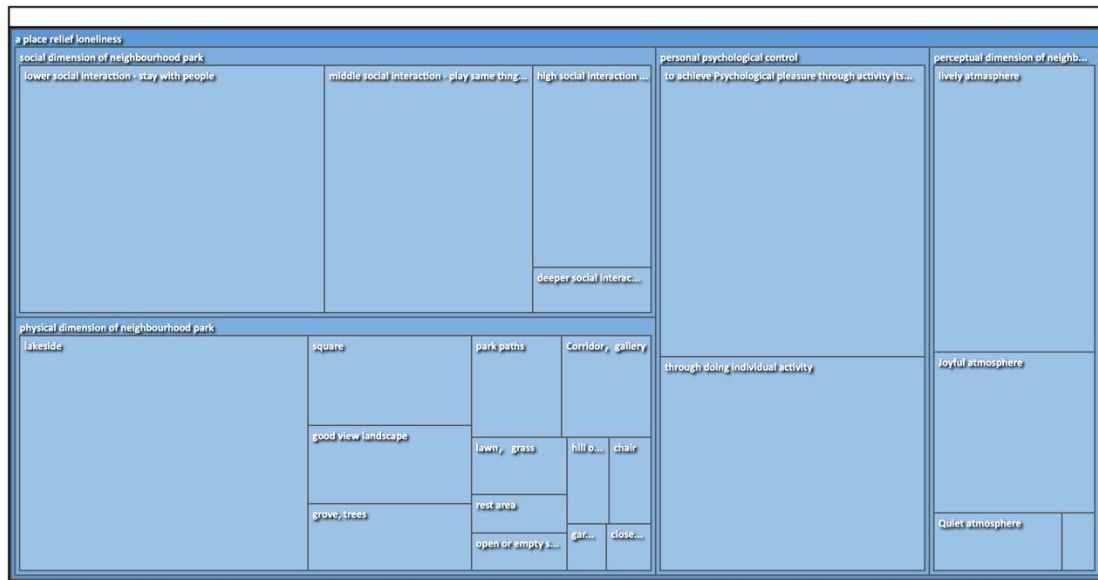


Figure 7-23 the hierarchy of the dimension of a place relief loneliness.

The social dimension of a place relieving loneliness

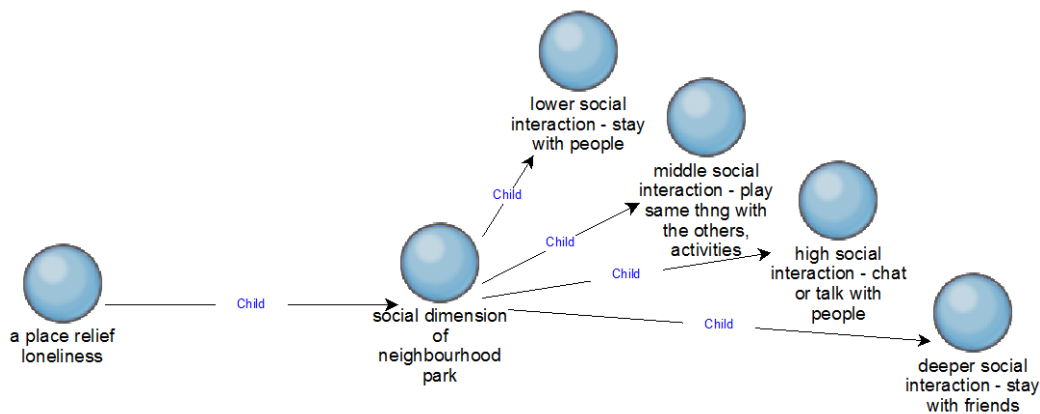


Figure 7-24 the elements of the social dimension

There are 85 elderly interviewees expressed that they feel a place help them feel less lonely is because they could stay with the others, including just people around them, people playing together, people who could talk with them, and friends. The social dimension of a place is the dimension that most older people mention, and it is also the aspect that most older people are more concerns.

However, the results indicate that psychological comfort comes from the social dimension of the place, not just the physical design itself. What the elderly are looking for in this space is a social connection that exists in the neighbourhood park space. The square is the vehicle to provide this kind of social connection.

According to the analysis of the answers to the elderly, the social connections they seek in the park are consistent with the analysis in the previous article, which is divided into four kinds of social psychological interactions (categories see Figure 7-24). The detail analyzed below:

- Low-level social interaction – stay with people;

There are 41 interviewees expressed that staying on square or the other place with many people let them feel relief loneliness, which means the low-level social interaction impact on them and benefit on the psychological statement. There are some phrases, such as:

I am not always lonely, but sometimes, I did. When I feel lonely, I like to come to some place where many people are. Sometimes I come to the square where the others are dancing, and I will sit around the square and watch them, there are also some other people watch them.’ (TJH220, 75, female)

‘I like to go to places where people are crowded. I don’t feel lonely when someone plays.’ (BXH01, 49, female)

‘I will go to the square because there are always some people in the square.’ (CC42, 72, male)

Thus, for these ageing people, low-level social interaction, as staying with people, could meet their social psychological desire to achieve the effect of relief loneliness. Square is an important place to provide the low-level social interaction for the older people. Another things interviewee mentioned is ‘ring seat’, which also play a considerable role for the elderly users to achieve low-level social interaction.

- Middle-level social interaction – people doing activities together;

There are 28 interviewees expressed that they like to go some places do some activities

‘I like to go to the area of chess, playing chess with other elderly people let me feel good and not lonely.’ (BXH32, 60, female)

‘When I feel lonely, I could go to the area of the table to watch the others playing poker and join them to play. Playing poker let me feel not lonely again.’ (CC62, 84, female)

‘I will go to the fitness area there are some Ping-Pang tables, there is always someone playing. When I feel lonely, I will join them to play.’ (Side58, 73, male)

‘Dancing in a group makes me never feel lonely in the park and I feel I belong to

which are working in group or in pair, such as playing Ping-Pang, poker, chess, square dancing, and singing, which could be identified as middle-level social interaction

benefiting the ageing people reducing their loneliness through meet their social psychological desire. There are some phrases, such as:

The suitable area is not only providing fitness and entertainment, but also provide the social connections for the older people. Based on the analysis, these older people to achieve psychologically

- High-level social interaction – people chat with each other and familiar with each other;

There are 13 elderly interviewees expressed that they need to go somewhere they could chat with someone, which help them to reduce the feeling of lonely. There are some phrases, such as:

‘If I feel lonely, I need to chat with someone. Chatting, let me feel better. Sometimes, I will chat with the people sitting near me.’ (QF44, 53, male)

‘When I feel lonely and boring, I will go to chat with others, probably standing around the square to chat with others, or sitting close to the idle old man chatting. Just talking about recent news or heathy issues’ (CC26, 65, male)

‘I like to talk, and I always chat with the other people who are dancing in the same group. After finish square dancing, we always rest on the chairs and chat, talk about familv. health. children. So. I’m not alone.’ (Side35. 60. female)

These older people who need deep level social interaction are the people who have a higher psychological social desire. The impact of this interaction is often two-way. Both sides of the interaction received the satisfaction of social needs at the same time. However, the types of venues or places that provide deep social interaction for the elderly are relatively diverse and relatively free. These venues often relate to or overlap with other venue functions, such as squares, seats, or a socially suitable standing space.

- Deeper level social interaction – people being friends at the neighbourhood park

There are 6 interviewees expressed that they need to be with friends or partner together in the park, where let them feel relief loneliness. There are some phrases, such as:

‘I just have to be with my friends and my companions. With them, I am not alone. These few friends around me met when I danced in the square dance. I was very happy to dance and chat with them. Wherever they went, I went there, and they all agreed to come together every day.’ (BXH23, 69, female)

‘Singing let me make a lot of friends here. I like to sing with them and talk to them. Staying with these friends let me feel not lonely.’ (BXH64, 63, female)

Neighbourhood Park for the elderly established deep level social interaction provides a

very good platform for the elderly. The ageing friendly site and venue offer great possibilities for the establishment of a deep level of social interaction to meet the social needs of older persons in psychological and emotional aspects.

In summary, the social dimension of neighbourhood parks plays a significant role in relieving loneliness in the elderly, and social interaction is the psychological need of most older people. According to the above analysis, achieving this psychological and emotional social interaction needs can help them reduce loneliness.

The social psychological needs show that different older people need to meet different, so their behaviour and approach are different. The social dimension of the park to satisfy and help the elderly reach their social psychological desire should cover all level of the social needs with changing and different approach with changing of the habits of the ageing society with development, which is the most beneficial means to help them reduce loneliness and enhance happiness.

The physical dimension of a place relieving loneliness

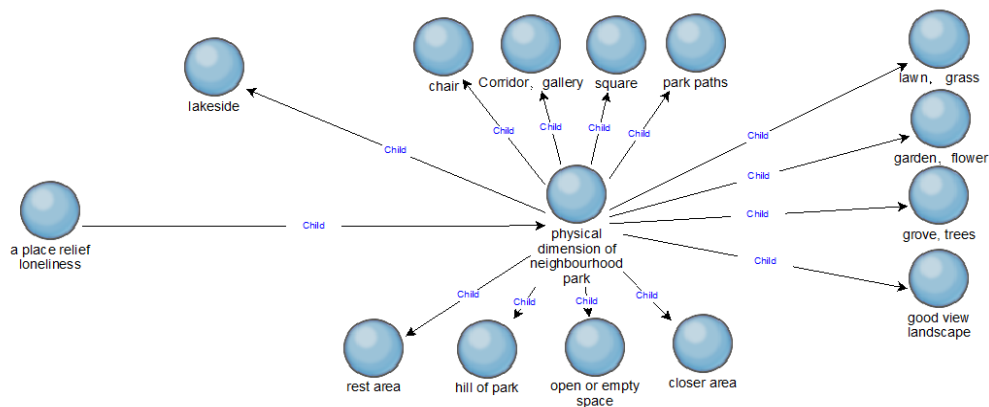


Figure 7-25 the physical environmental elements mentioned by elderly interviewees

There are 81 interviewees expressed that some physical environment could help them to relieve the loneliness, especially the lakeside and waterfront area. This is the second most mentioned dimension. (see Figure 7-25)

First of all, the lakeside and waterfront area are the most mentioned physical environment is the physical dimension. There are 38 elderly interviewees show they could feel less lonely when they see water, stay nearby lake or waterfront, or walking around the lake. This means that the waterscape has a primarily psychological healing effect on the elderly, and the relief effect on loneliness is noticeable.

- Lakeside and waterfront area (38 times)

The other physical environmental elements are mentioned by 43 interviewees, which are summarized from the response of the older people. They are mostly a description of the place. Depending on the context, the influencing elements could be divided into three aspects, including space form, the design element of parks, greening aspects, shown as below:

- Space form:
 - Hill head of park;(2 times)
 - Open or empty place;(2 times)
 - Relative enclosed place;(1 time)
 - Rest area;(2 times)
- Design elements of the park:
 - Parks paths;(5 times)
 - Square; (8 times)
 - Corridor or gallery;(5 times)
 - Comfortable chair or bench;(2 times)
- Greening aspects:
 - Lawn or grass;(3 times)
 - Flower garden;(1 time)
 - Grave and trees;(6 times)
 - ‘good view’ landscape;(7 times)

In summary, the physical elements of the park landscape have a positive effect on the relief of loneliness in the elderly, and different factors have different effects on different older people. The above are the environmental elements extracted from the feelings and answers of the elderly. These can more intuitively deeper expand our understanding of the landscape psychology of the elderly. In general, lakes and waterscapes have a role in relieving loneliness and adjusting mentality for most older people. Other factors also affect different elderly users. This study has comprehensively refined the factors related to the loneliness of the elderly, but the degree of influence of these factors needs to be answered in future research.

The perceptual dimension of a place relieving loneliness

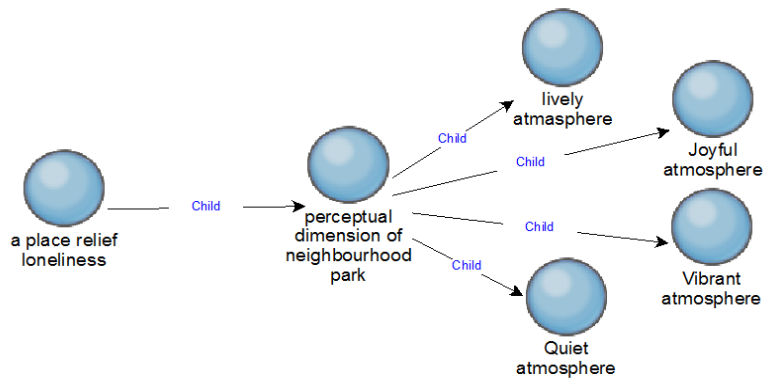


Figure 7-26 the perceptual elements of neighbourhood park relieving loneliness

There are 44 elderly interviewee shows their benefit from the perception of the place. The refinement of this perceived dimension is based on the description of the environment in their answers. This perceived atmosphere drives the elderly, which relieves their inner loneliness. The perception atmosphere existing in a neighbourhood park that affects loneliness is mainly mentioned by the elderly in the following four categories (see Figure 7-26), including :

- Lively atmosphere (25 times)
 - Place: square;

‘When I feel lonely, I usually go to the square. The square is very lively, singing, or dancing. I will go and see it. There is no sense of loneliness when it is lively.’
(TJH214, 75, female)

‘I would like to go to a place where singing or dancing. Watching them sing, it’s so

- Joyful atmosphere (14 times)

- Place: children playing area;

‘Seeing children, watching children play is very happy, they don't feel lonely.’ (BXH50, 61, male)

‘If I am lonely and upset, I would like to come over and see where the children are playing and see how happy the children are. I feel happy too.’ (BXH63, 65, male)

‘I am not alone, but when I am in a bad mood, I will go to the children's area of the park to sit and watch the children play. The child is so cute and happy, and I really like this feeling and atmosphere. Look at the child's mood just fine.’ (TJH72, 60, female)

- Vibrant atmosphere (1 time)

- Place: sports area;

‘I can't talk about loneliness, but when I'm in a bad mood, I like to go to the football field and see if they play, especially energetic, vibrant.’ (Side70, male, 80)

- Quiet atmosphere (4 times)

- Place: forest, grove, lakeside.

‘When I am alone or in a bad mood, I like to find a quiet place in the park for a while.’ (QF14, 78, male)

‘I might go to the grove, quiet place, sit for a while.’ (QF28, 81, male)

‘When I feel lonely, I go back to the park and stay quiet for a while, look at the water, sit for a while, let myself calm down.’ (TJH74, 83, male)

In conclusion, based on the above analysis, we found the four key park elements in the perceptual dimension on relieving the loneliness of the elderly, and the relationship between this perception and the performance of the place and the crowd. This kind of relationship and interaction discovered has a critical role in helping us get a clearer understanding of the environmental perception and psychological impact of the elderly and has become a capable breakthrough for us to adjust the mental health of the elderly through the design of neighbourhood parks.

Personal psychosocial control

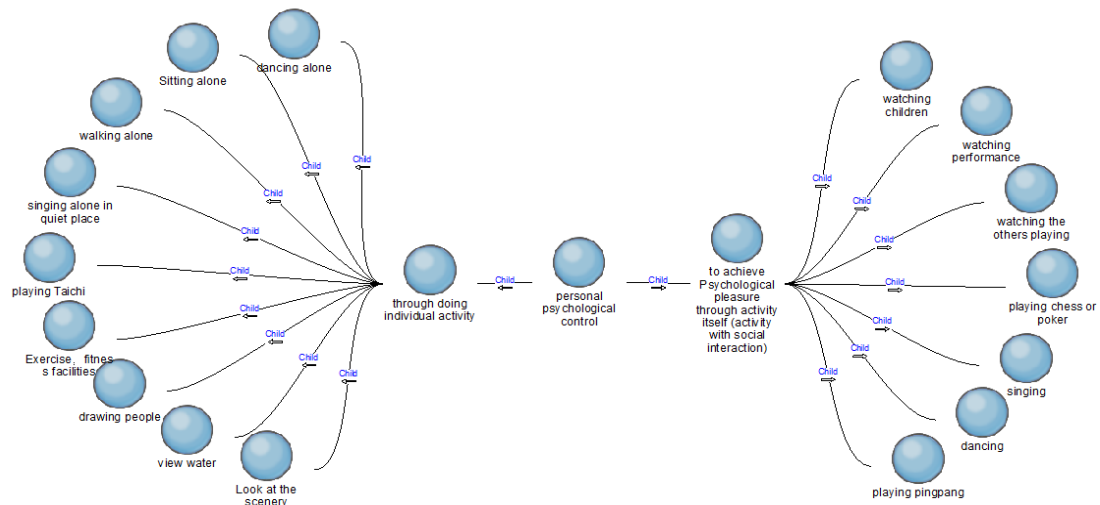


Figure 7-27 the structural elements were emerging in personal psychological control for relieving loneliness.

The answers to question E-14 indicate that personal psychological adjustment plays an essential role in some ageing people to maintain their mental health. There are 71 elderly interviewees they want to control their psychological statement by doing some activities, which means they want to get relief from these activities itself. These activities mentioned by them could be divided into two groups depending on whether they have possibly social interaction in this process. Thus, the elements (Figure 7-27) are shown as:

- To achieve psychosocial pleasure through doing an activity with social interaction (41times):
 - Playing chess or poker; (15 times)
 - Square dancing; (5 times)
 - Singing; (4 times)
 - Playing Ping-Pang; (3 times)
 - Watching a performance (the others dancing, singing); (10 times)
 - Watching children (these interviewees exclude the interviewee mentioned atmosphere); (3 times)
 - Watching the others playing poker or chess; (1 time)
- To achieve psychosocial pleasure through doing activity individually (30 times):
 - Walking alone; (16 times)
 - Dancing alone; (1 time)
 - Singing alone in a quiet place; (1 time)
 - Playing Tai Chi alone; (1 time)
 - Exercise alone in fitness facility area; (2 times)

- Drawing people; (1 time)
- View water; (3 times)
- View scenery; (3 times)

In summary, according to the analysis, many older people have a self-adjustment of their mood and loneliness through some activities. This part of the adjustment stems from the fun or psychological satisfaction of the activity itself. In fact, some older people choose socially interactive activities, while others choose to be independent. However, this section of the study reveals that these activities have a psychological adjustment effect on the elderly themselves. This discovery is conducive to providing venues and opportunities to promote self-adjustment of the elderly through design neighbourhood park means to improve the quality of life, reduce loneliness and improve happiness. Moreover, in the analysis, it is found that the pleasure of "watching" as an activity mentioned by the elderly can also drive them to participate in the social dimension of the park in the role of watching, thereby improving the satisfaction of social psychology. "Viewing" can be defined as a form of participation.

Summary

Overall, this section has identified comprehensive categories of active elements of neighbourhood park regarding positive impact on relief loneliness of the ageing park users, depending on the analysis of responses to question E-14 in the semi-structured interview. This study has shown that the definition of 'a place relief loneliness' given by the ageing users is mostly relating to the social and perceptual dimension instead of a range of certain places.

The significant finding is that the social dimension of the neighbourhood park plays the relatively same or even more significant role in relieving loneliness in the elderly, compared with a physical dimension, which has an essential impact on loneliness relief. The second significant finding is that the experienced perceptual dimension of neighbourhood park is also an crucial active part in maintaining mental health. On the other hand, one of the more significant findings is the self-psychological adjustment of the elderly also play a significant role in maintaining mental health, and the neighbourhood park plays a significant role in providing suitable places. The elderly consciously carry out psychological adjustment through activities in the neighbourhood park, including some interactive activates and some solitude activities. The system judged among the active elements has been summarized as Figure 7.37 (attached at the summary section of thematical analysis).

7.2.9 The limitation of current neighbourhood parks and desires of ageing users

In the final step of the interview, an open question, Question E-15, has been designed for

exploring an in-depth rooted and human-oriented answer of the elderly users thought and what they concerned in a current neighbourhood park. The diversity of issues mentioned by interviewees are emerging in Figure 7-28 based on the analysis through NVivo, but the more productive way is to divide into the relevant group and then to explore what are the elements in each aspect they minded and desired in the neighbourhood park.



Figure 7-28 the keywords cloud of answers to Question E-15

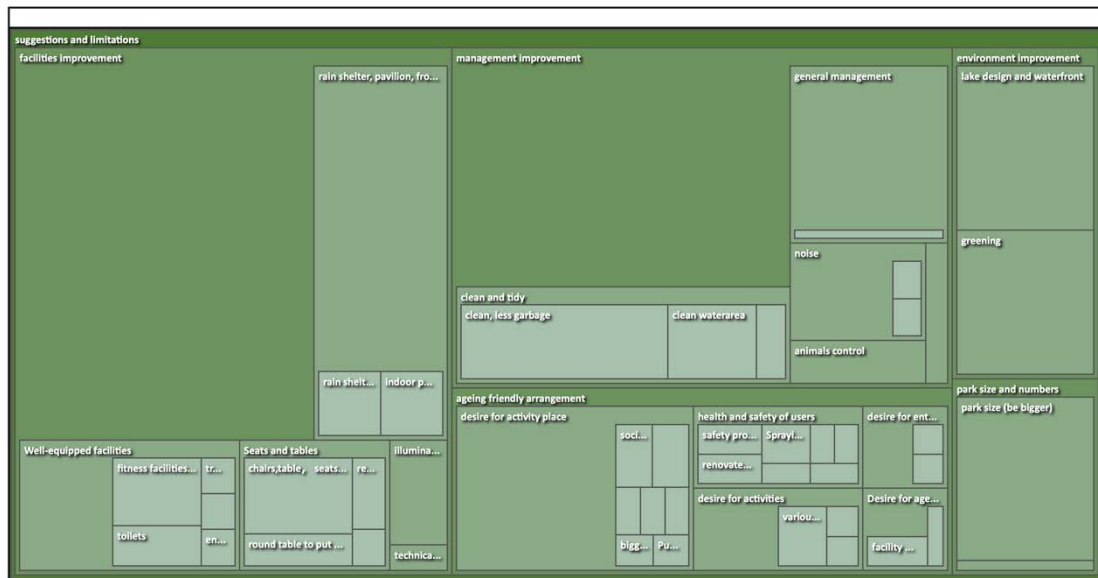


Figure 7-29 the hierarchy of answers coded to Question E-15 in NVivo.

Depend on the context of response, the answers have been coded into 5 aspects shown in Figure 7-29 including facilities improvement (73 times), management improvement (50 times), desire

for ageing friendly arrangement (47 times), environment improvement (30 times), and park size and number (18 times). The key element emerging in the response of the elderly users has been categorized into these aspects as follows.

Facilities improvement

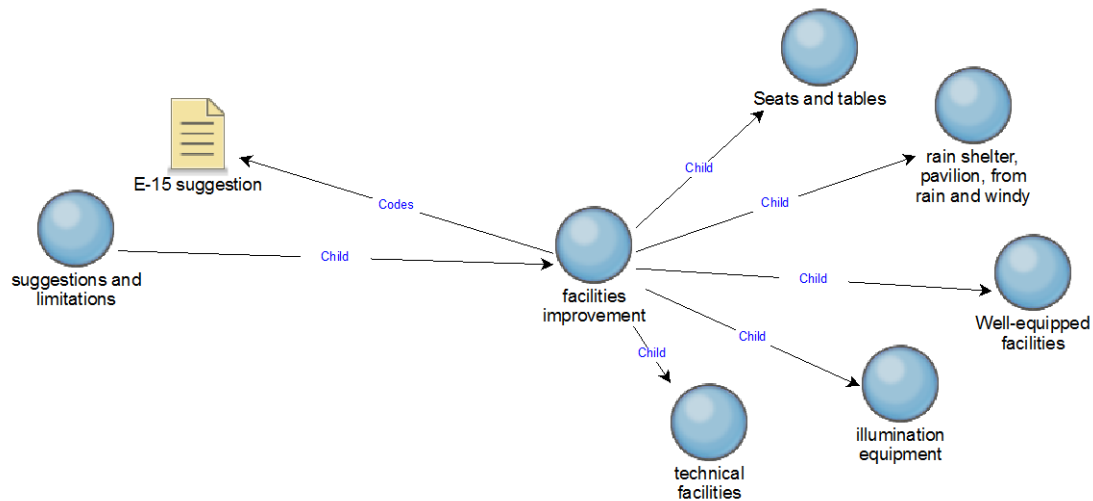


Figure 7-30 the sub-issues of facilities improvement in the answers of Q-E-5

The issues relevant to facilities improvement could be divided into 5 topics shown as Diagram 7.11s including ‘seat and table’ (mentioned 13 times), ‘rain shelter and pavilion’ (mentioned 33 times), ‘well-equipped facilities’ (mentioned 8 times), ‘illumination equipment’ (mentioned 4 times), and ‘safety issues’ (mentioned 4times). (Figure 7-30) There are some different desires and thoughts in these topics analysed as follows:

- **Seats and tables**

Some elderly users are talking about more seats and tables with different desires, which are for not only rest but also related with their daily life, the degradation of body function, and social and psychological needs. The functions they needed for seat and table could be summarised as:

- **More seats and tables for rest and beneficial social functions;**

The interviewees’ answers express that the seats are important for them because they are easy to feel tired when activities in the parks do. On the other hand, some interviewees said that they came to park with friends, neighbours, and some people known in group activities in the park, when they need rest, they wish to seat together,

which is easy for them talking with each other. This implies seats and table is an important social place for the older people to achieve social psychological satisfaction, and a place closing the distance of each other to enhance the sense of belonging.

- **More seats nearby children's entertainment area;**

Some interviewees expressed the aim of their coming to the neighbourhood park is accompanying and looking after their grandchildren. The lack of seat around the children's entertainment area makes the elderly grandparents easy to feel tired. Depending on the observation in sites, many older people are standing or squatting around playing area, when their grandchildren are playing slide or some other entertainment facilities. Some grandparents are standing together and talking. Thus, the seats nearby children's entertainment area are not only important for the older people to rest but also providing a potential social benefit for the older people with socially isolated consequence by the situation that they left their hometown and came to help their children.

- **More seats with shaded by tree or shelter, avoid the sun in the summer;**

The older people are sensitive to temperature because of the degradation of physical function. Beijing has 5 months when the maximum temperature is over 26 degree Celsius, and sometimes the temperature could reach 42 degree Celsius in the summer. High temperatures and prolonged direct sunlight will make the elderly feel dizziness and dehydration. Some interviewees express that the shade of trees or shelters nearby the seats are essential for them when the sunlight is heavy in the summer.

- **More tables for conveniences;**

Some interviewees show that the tables are not enough, sometimes they want to drink some water and eat some snacks, there is no place for the things. Because of the decline in physical function and lifestyle habits of the elderly, they do not like to bend over or stand up for drinking. Older people prefer to sit in a chair and put the cup on the table to drink and rest. This will make them feel more comfortable. Currently, the neighbourhood park needs to improve ageing friendly facilities and design.

- **Rain shelter and pavilion**

'Rain shelter and pavilion' are the most mentioned issue in facilities improvement. There are a few main points include:

- **Accessibility of the rain shelter**

There are 33 participants express that the lack of rain shelter affects their activities in raining, windy and some bad weather. Sometimes it suddenly rains, the elderly is slower, and there is no nearby shelter or rain cover, which makes them unable to hide from the rain. It is easy to get wet and affect health. Thus, the number and accessibility of rain shelter are significant for elderly users.

- **Rain shelter for activities**

There are 3 interviewees shows the need for rain shelter for small group activities, such as chess and poker. They said sometimes it is raining, there is no place to hide from the rain, and no the other place to play. Playing chess with friends in the neighbourhood park is their daily life.

- **Semi-indoor public space for the elderly**

The neighbourhood park is playing an essential role in older people's daily life. Three participant express that they came to neighbourhood park every day, if the weather is terrible, nowhere to go, so they wish the neighbourhood park could build some semi-indoor public space for the elderly to stay. In other words, the role of the neighbourhood park is providing a social association among older people to keep in touch with others.

- **Well-equipped facilities**

The answers relevant to well-equipped facilities include 5 kinds of facilities as:

- Toilet
- Fitness and sport facilities
- Entertainment facilities
- Music sound
- Trash cans

Some interviewees show that the accessibility of the toilet is relatively low for elderly users, and accessibility for disabled users need to be considered in the

neighbourhood park, because the degradation of a body function of the elderly, who's slow body feeling and slowness of movement lead them cannot complete the process as healthy adults. Thus, the distance of the toilet is impacting the accessibility.

The square-dancing elderly participants have recommended the music sound. They said that currently, they bring the music sound by pushing trolley or bicycle, which is hard work for ageing people. On the other hand, the personal high-power electronic devices have security risks, which is influent, the safety of park users. The square dancing is a popular activity for ageing people in China. If the neighbourhood park could provide high-quality public facilities like well-built music sound supporting them, these two problems could be solved.

- **Illumination equipment**

Some interviewees expressed the insufficient illumination equipment in neighbourhood parks. There are mainly two situations:

- Activity site illumination equipment
- Park road illumination equipment

The most square-dancing group are popular in the evening when the elderly participants finished their dinner and then come to Neighborhood Park for activities. Depending on the observation, in general, there are almost four groups of dancing in each neighbourhood park. The lack of illumination equipment leads that they have to bring their own facilities for enough illuminate, which has potential risk on safety, such as an electric fire. It is not easy for older people to bring the big facility every day. On the other hand, the elderly have reduced vision and are active in places with insufficient light, which can easily fall and cause serious consequences. Thus, the park road illuminating equipment is also significant for elderly users.

- **Technical facilities**

Some elderly park users have suggested technical facilities. One elderly user said that if there were a large screen for people, it would be more enjoyable. Depending on the observation, many older people are holding a radio while walking in the park and sitting and resting. To some extent, it is the habit of the elderly, and it means that the elderly are afraid of being alone.

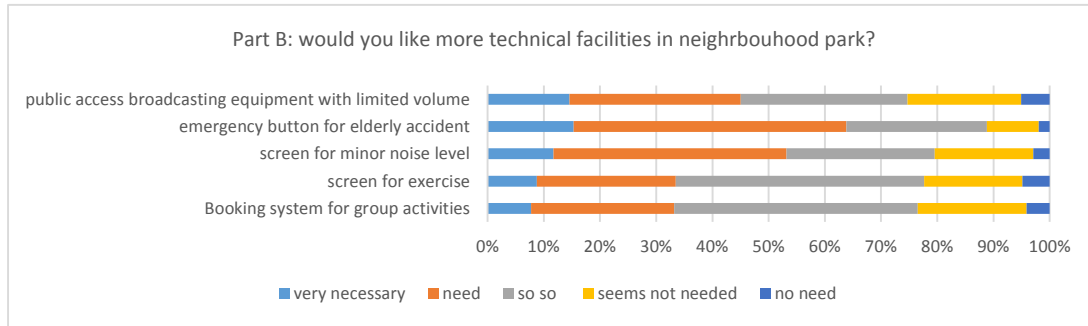


Figure 7-31 the responses for Part B: would you like more technical facilities in a neighbourhood park?

Turning now to the experimental evidence on the issue of technical facilities in part B of the questionnaire, Figure 7-31 illustrate the extent with older users has different needs for the technological facilities listed by the author. The most demanding is the emergency button, which is an idea about the facility in the future. When the elderly are in an emergency in the park, they ask for help and accurate positioning. When the old park user faints or falls, himself or the people around him could contact the staff of the park and report it to the local hospital by pressing the surrounding prefabricated buttons.

The other two technical facilities with relatively high demand level are volume-limited audio or music playback broadcasting devices and noise monitors. Their essence is the same, that is, to meet the needs of different park users to the greatest extent. According to the situation observed in fieldwork, in some cases, some older people who joined dancing or singing in the park carried high-powered power and old sound to play background music for groups. The facilities prepared by these ageing users are not only cumbersome but may make themselves injury at the time of handling, more dangerous, these facilities have not been pretested, there is a severe risk of electric shock or fire, which is a great threat to the safety of the elderly and other users of the park. Moreover, these sounding facilities are controlled by the users themselves, which may cause conflicts about loud volume disturbances or interference with other park users. If the park provides sounding equipment with volume-limited, the above problems will be avoided to some extent.

Management improvement

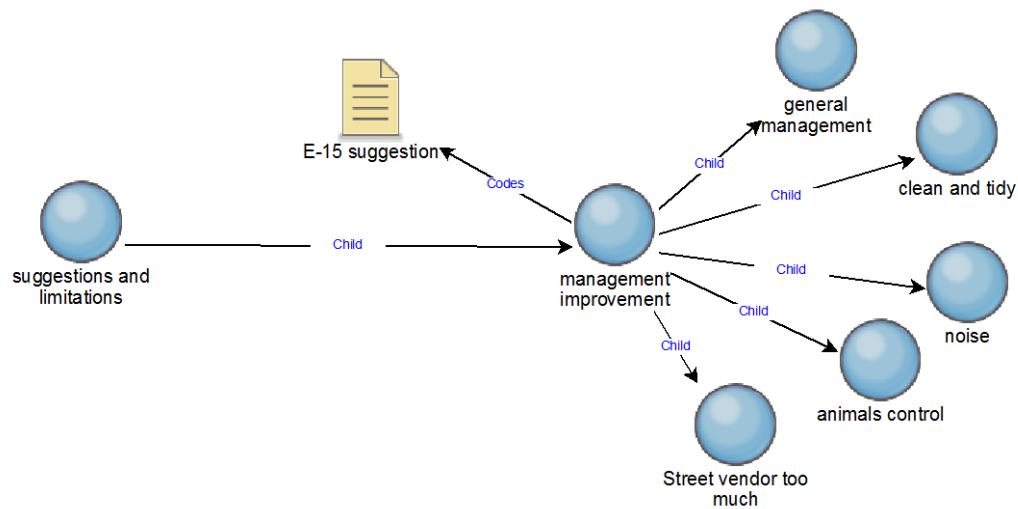


Figure 7-32 the sub-issues of management improvement in Q-E-15

Meanwhile, Figure 7-32 shows that elderly users' answers mentioned about management improvement, the context of answers could be separated to 5 groups, there are specific 4 problems with different elements emerging in the analysis as following, which the elderly users thought significantly affects their usage.

- **Clean and tidy**

There are 22 elderly users emphasized the desire of 'clean environment', which is an important indicator that affects their perception of the park; there are a few aspects mentioned by them, including

- A neat environment with no garbage;
- Clean water quality and lakeside area;
- Clean facilities;

- **Noise**

There are 7 elderly users talked about the noise, which should be controlled and reduced by management. The two specific kinds of noise they mentioned are:

- The noise of multiple lawn mowers;
- Too loud music of square dancing.

- **To control animals**

There are 4 elderly users recommended that the neighbourhood park need to enhance the management of animals, which include domestic pets and stray animals, which are dangerous for the park users, especially for the children and older people with a weak body.

Meanwhile, the awareness of clean and safety of the pet’s owners need to be improved. The dog owner should deal with the dog's excrement in time, hold the dog while walking the dog, instead of letting him run around in the park, it is easy to scare the older man and the child. If the dog will bite, give the dog a protective cover. Then go out.

- **To control the sales behaviour in the parks**

There are 2 elderly interviewees talked about the problem of sales behaviour in parks. One participant (TJH80, female, 75) said that ‘the salesmen are too much in the park, which need to be controlled; the management of sales behaviours need to be enhanced. Because the salesmen mostly focus on an elderly person, it impacts our using of the park and leads potential risk on my safety.’ Depending on her description, the controlling of sales behaviour in the neighbourhood park is an essential issue for older people's usage and safety.

Ageing friendly arrangement

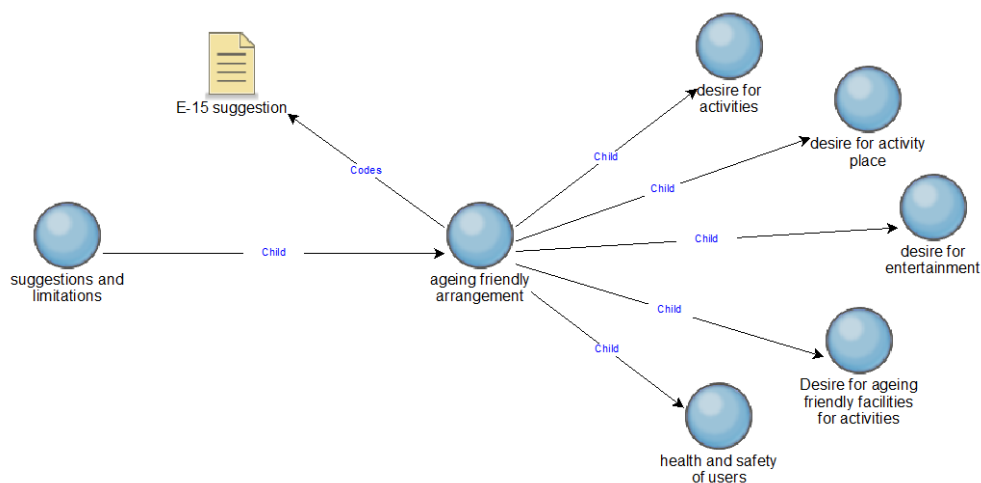


Figure 7-33 the sub-categories of ageing friendly arrangement in Q-E-15

- **Desire for activities**
 - More diversity of old-age activities be held;
 - Regularly organize the elderly matchmaking event;
 - Public performance open theatre;

- **A desire for places of activities**
 - More dance square;
 - Public performance stage;
 - Place for watching dancing;
 - A social place for chatting with friends
 - Bigger site for elderly's activities;
 - Sports court for older people;
 - Place to eat snacks;

- **A desire for ageing friendly facilities to exercise**
 - Wooden table and seats for around 6 people designed for elderly users;
 - Some food provided for elderly park users;

- **Desire for entertainment**
 - Park entertainment for the elderly is too monotonous;
 - Nothing to do after retirement;

- **Health and safety of the elderly user**
 - Road conditions (the elderly easy to fall): rocks on the road, potholes on the walking roads;
 - Lack of guardrails by the lake;
 - Spraying insecticides on trees during the day, the elderly is slower moving and have a greater impact on health;
 - Strengthen patrols to ensure the safety of older people in the evening;
 - To establish emergency responding system;

Due to the degradation of body conditions of the older people, who are easier to face potential dangers and difficulties, the conditions of the neighbourhood park are

significantly impacting their usage and personal health and safety.

Some elderly participants express that the safety protection awareness of current designing of the neighbourhood park is weak. For example 'the lack of guardrails around lake', 'The road became particularly slippery for the elderly when the staff watering the plants', 'The trash cans were removed, but the base of the trash cans remained on the ground, prone to accidents.', and 'The old facilities will be rectified, and the broken ones will affect everyone's use and affect safety.'

These suggestions are focused on the details of the park they used, but it implies the awareness of safety is weak and less consideration on the special conditions of the elderly users. In fact, the physical function of the elderly is degraded. Many people have difficulty in moving, and they are more likely to fall on slippery roads, posing a threat to their safety. On the other hand, many older people said that they like to rest around the lake or by the waterfront, but the lake without fences is dangerous for older people with weak physical stability. There is no support or protection, and there may be slippery roads along the lake, which makes it more dangerous to use the elderly.

Environment improvement

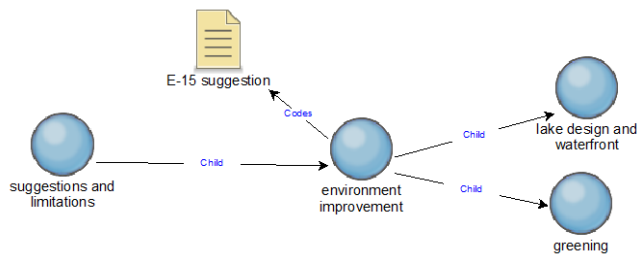


Figure 7-34 the sub-categories of environment improvement in Q-E-15

There are 30 elderly interviewees suggested that the environment of the neighbourhood park need to be improved in the future, half of them implies the quality of the water in the parks need to be clear, and the road along the lake should also be cleaned up so that the road is not slippery. (see Figure 7-34) The other elderly users suggested that the greening of the park need to be enhanced, which is important for health that is the main aim, the older people want to keep healthy.

Limitation of size and serving area of the neighbourhood park

There are 18 respondents expressed that the current park is too small, there are too many people

moving around every day, and if the park can expand a little more! It has also been said that if there is not only one park nearby that can be active, there will not be so many people.

Therefore, many older people hope to increase the number of parks, increase the serving area, and increase the per capita activity area.

Conclusion

This section has identified the limitation existing in the current neighbourhood park and the desires of ageing users based on the responses of question E-15 in the semi-structured interview. The results confirmed that there are some gaps between the quality of current neighbourhood park and the needs of the ageing users. The gaps emerging has been categorized into five main aspects, including facilities improvement, management improvement, ageing friendly arrangement, environment improvement and limitation of size and serving area of the neighbourhood park. (The details of suggestions have been summarized into Figure 7.38) The most concerned aspect is facilities improvement regarding the degraded body function of the ageing park users and desire of suitable space for social interaction and diversity of activity. One of the more significant finding to emerge from this analysis is that the current ageing park users have realized the importance of ageing friendly environment serving. While the needs of arrangement are rising with the increasing desire of diversity of entertainment activities and functional spaces, diversity of socially interracial ageing activities and events, and designed ageing friendly facilities with health and safety concern. Another issue is the limitation of size and serving area of the neighbourhood park, which means the current number of neighbourhood parks is insufficient to meet the increasingly ageing population.

7.2.10 Summary

The section of thematic analysis was designed to uncover the elder-park-users' inside thought, desires, and usage feature for the neighbourhood park, and to contribute to uncovering the most influential factors for the well-being and mental health based on the content analysis from the semi-structured interview. In this section, the thematic analysis used both quantitative coding and qualitative coding approaches by NVivo to achieve a deeper and solid answer to these purposes.

Overall, the key outcomes in this section mainly include:

- The frameworks for the attractiveness of joining the group activities for the elderly;

(Figure 7-37)

- The frameworks for the attractiveness of neighbourhood parks for the elderly; (Figure 7-36)
- The frameworks for a place where the elderly feel relief loneliness; (Figure 7-35)
- The frameworks for the limitations of current neighbourhood parks and desires of ageing users; (Figure 7-38)

In addition, some important points are emerging in this section include:

- The elderly female shows a stronger interest in social and self-expression activities than the elderly male.
- The different neighbourhood park, the perceived friendliness of the social environment, is different.
- The higher performance in a friendly and accessible social environment which would tie the ageing users in a group and engage the new ageing people joining park groups.
- A current social environment for the elderly group activities is relatively friendly, and the local residents give understanding, tolerance and support to the activities of the older people, but not enough.
- A good healthy, friendly social environment will be more conducive to enhancing the psychological experience and psychological benefits of elderly users.
- The most neighbourhood-park users had deeper social interaction relationship.
- The majority of elderly users desire to communicate and to build positive social relationships with others in daily life.
- The high sociability is hiding in big group activities (such as dancing and singing), entertainment activities (such as poker and chess), and exercise process (such as walking in route).
- The majority of elderly users desire to communicate and to build positive social relationships with others in daily life.
- Social interaction in a neighbourhood park contributed to relieve loneliness for the ageing people, even the lower level social interaction as staying with people in the park play an important role in this process.

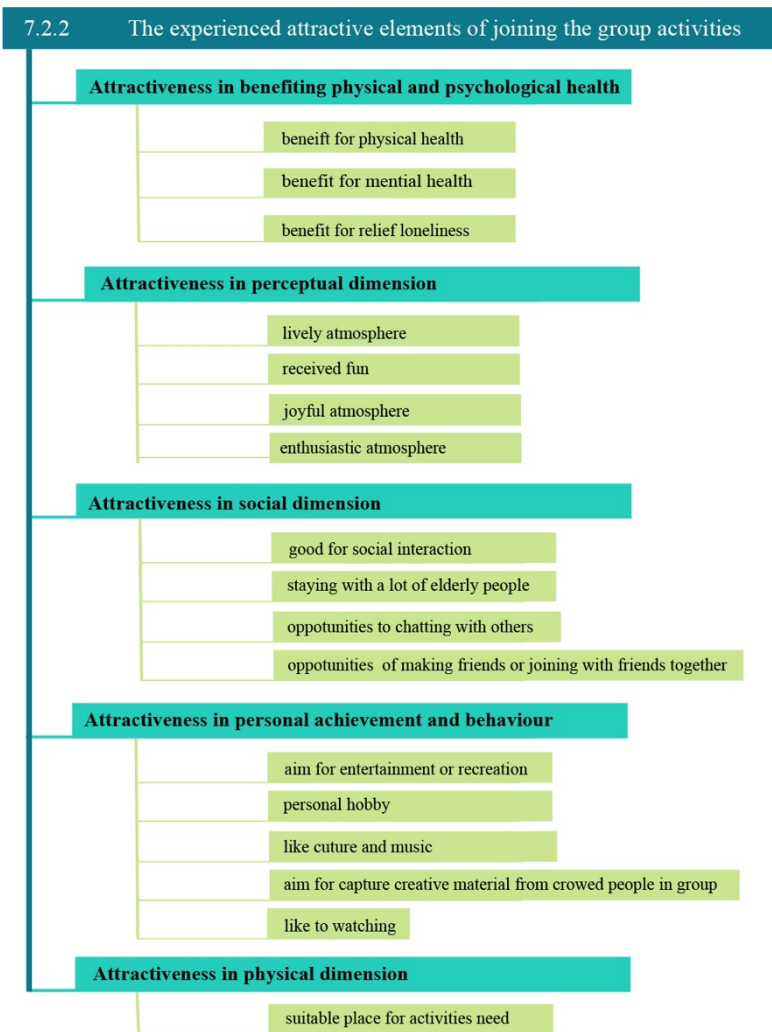


Figure 7-37 the conceptual framework of the experienced attractive elements of joining the group activities in neighbourhood park

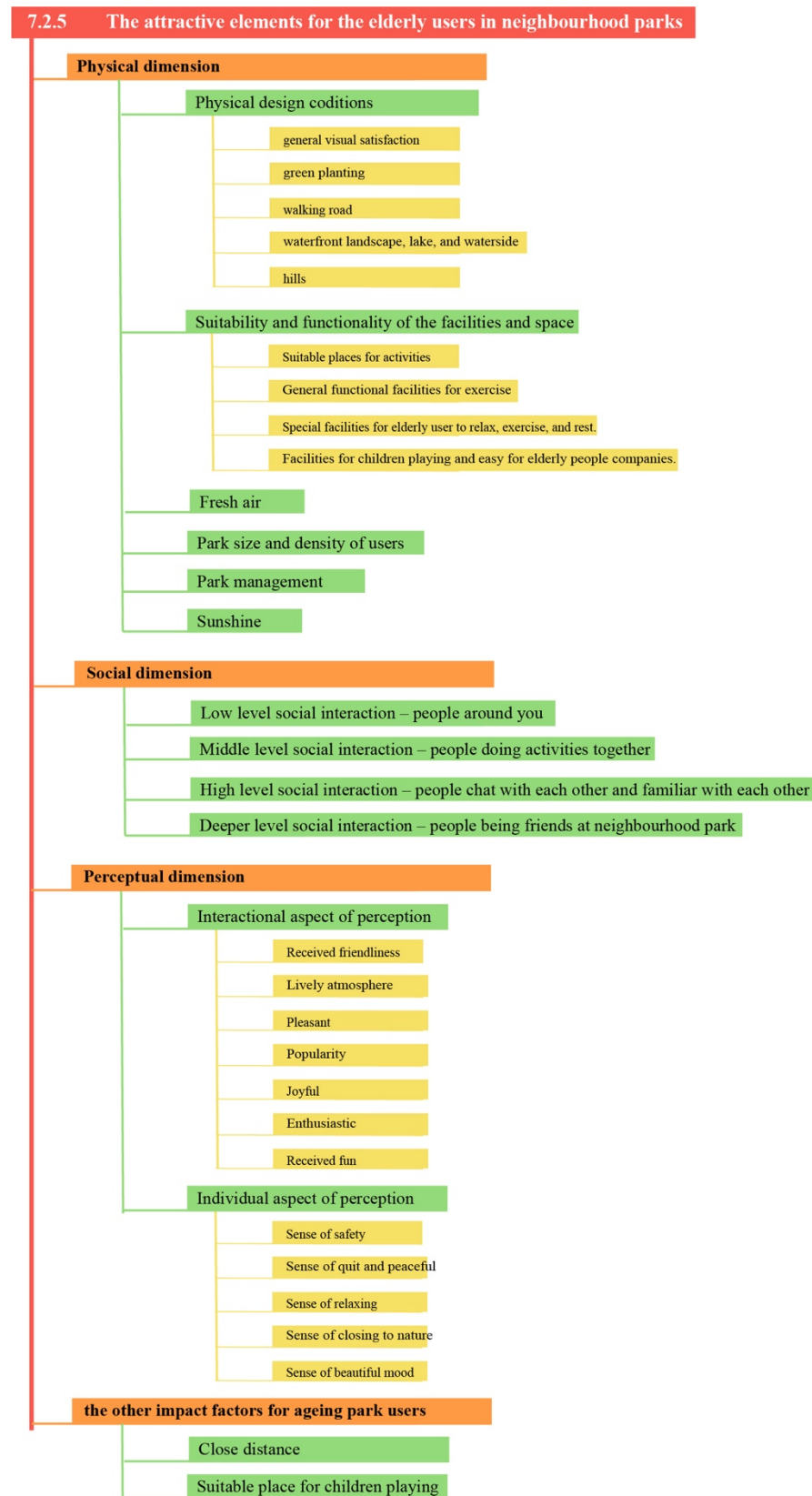


Figure 7-36 the conceptual framework of the experienced attractiveness of neighbourhood park for the ageing people

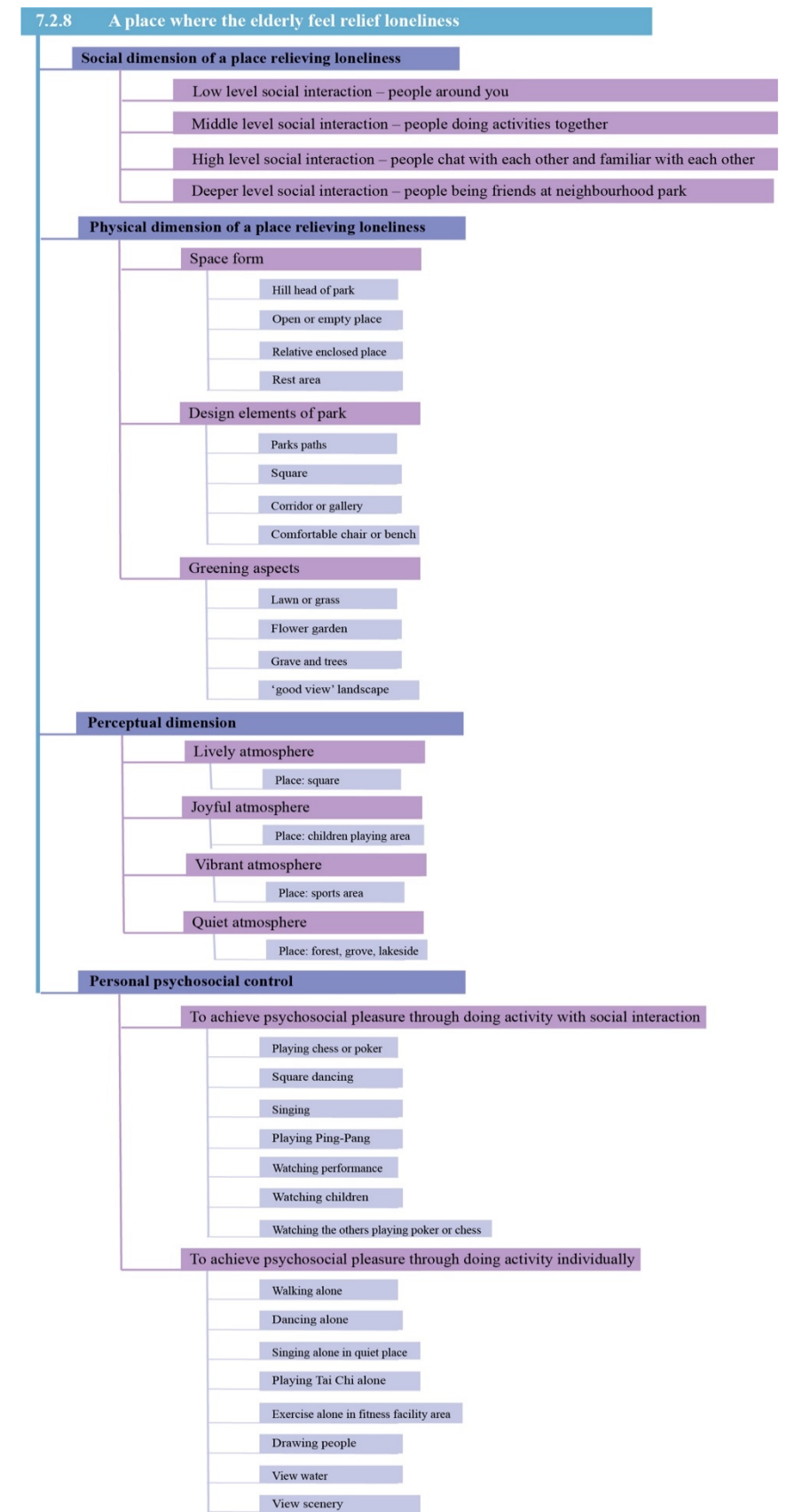


Figure 7-35 the conceptual framework of a place relieve loneliness for ageing people

7.2.9 The limitation of current neighbourhood parks and ageing users' desire

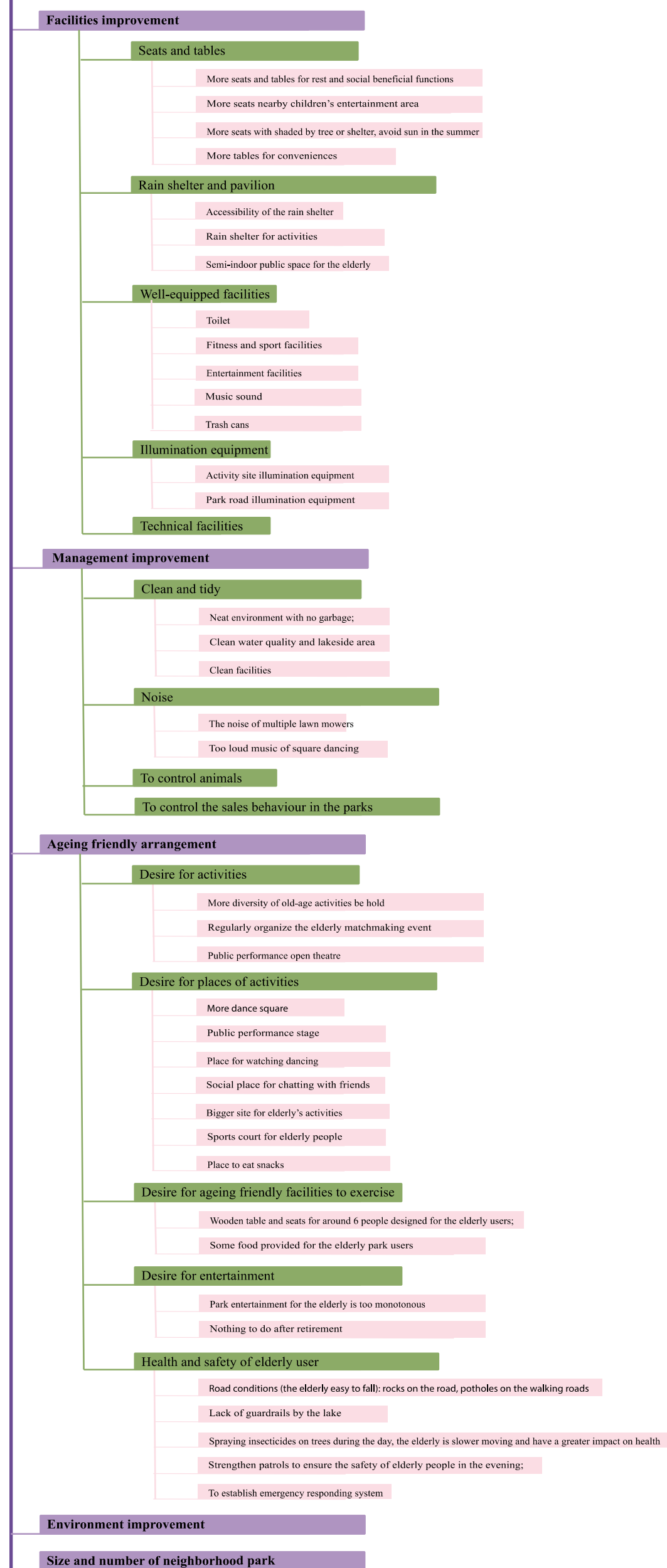


Figure 7-38 the conceptual framework of limitation of current neighbourhood park for ageing people and their desire

7.3 Structural analysis

The most effective way to improve the quality of life of the older people by using park is to clarify their desires and specific needs, and then applying into the design. The elderly people is a general definition; there are few pieces of research on what characteristics of the different older people.

In this section, the context of the interview will be analysed in a range of structural comparison to explore the different desire and thought of a different group of older people. The structure analysis has two sections:

- gender comparison,
- age group comparison,

Thus, the deeper relationship of desire and thought in park and well-being and loneliness in the psychological dimension could be explored. Furthermore, the deeper understanding of the differences of each group is contributing to give specific design to meet their needs, to generalize the changing trend of ageing generations in the future, and to give social support to the 'moving elderly people' through improving the design of neighbourhood park.

7.3.1 Gender comparison

The most effective way to improve the quality of life of the older people using park is to clarify their desire and specific needs, and then applying into the design. The deferent gender leads to different psychological needs and features of using parks. Through the comparison of the elderly male and female, the different usage, drives and relationship have been clarified.

7.3.1.1 The attitude of joining group activities

In general, the elderly female shows more interest in joining group activities in the neighbourhood park, compared with the elderly male. (see Figure 7-2)

7.3.1.2 The attractive elements of joining group activities of different age group

The attractive elements for joining group activities (see Figure 7-39), the elderly male and female shows the similar performance, the key elements for them are 'lively', 'people', 'friends', and 'health'. The specific difference is that the elderly female shows more 'happy' as enjoy group activities such as square dancing and singing.

[Q-E-2] why you enjoy the group activities?



Figure 7-39 The comparison between drives of male and female.

[Q-E-3] You feel the other people (in group) friendly when you join the activities?

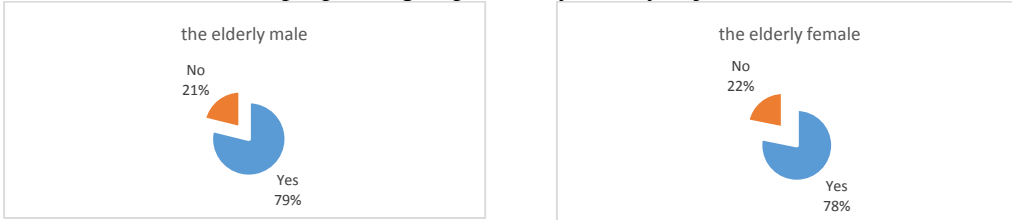


Figure 7-40 The comparison between perceptual friendliness of male and female

[Q-E-5] Did you make some friend in this process?

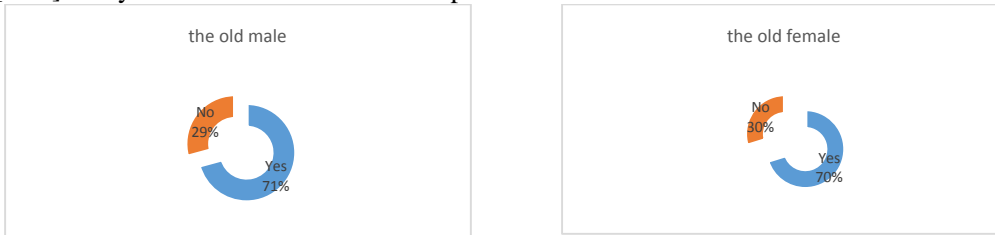


Figure 7-41 The comparison between social life in-group of male and female.

[Q-E-6] Do you think neighbourhood park is a good place for making friends?

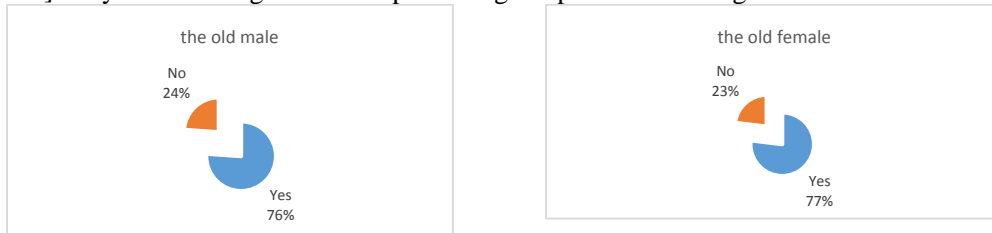


Figure 7-42 The comparison between attitude of social life in neighborhood park of male and female

[Q-E-12] Do you feel less loneliness, when you come to this park and stay with people?

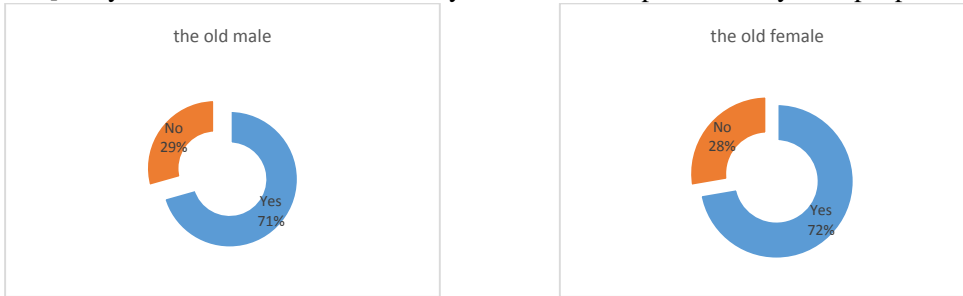


Figure 7-46 The comparison between relief loneliness of male and female

[Q-E-14] when you feel loneliness, which area of this park help you feel less lonely?

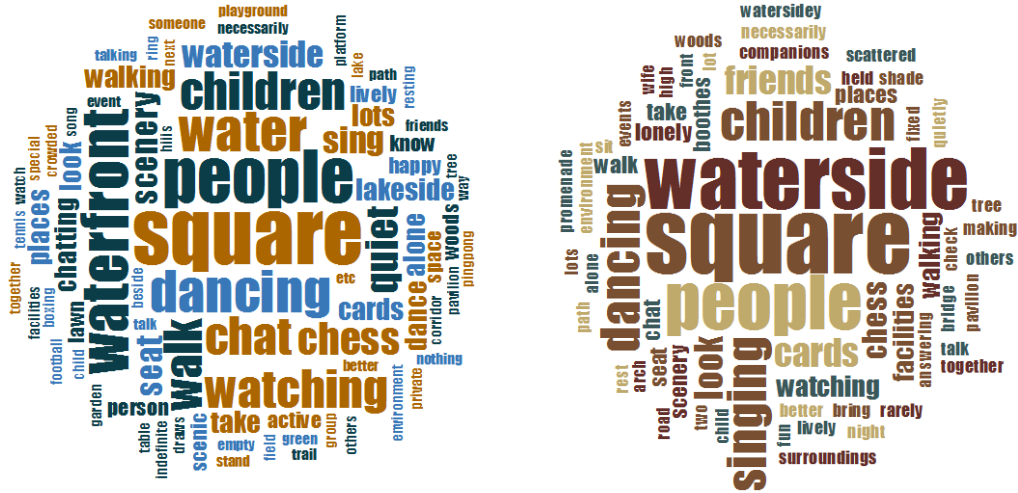


Figure 7-47 The comparison between relief loneliness of male and female

[Q-E-15] could you give some suggestions on the parks and active field in the future?



Figure 7-48 The comparison between suggestions of male and female.

7.3.1.3 Perceptual friendliness from group activities

The perceptual friendliness in group activities (see Figure 7-40), there is no distinct difference in gender. It means the accessibility of group activities is the same for the elderly male and

female.

7.3.1.4 A deeper level of social interaction in group activities

The elderly male and female shows a similar trend in social life in group activities (see Figure 7-41) and in the attitude of the social function of a neighbourhood park (see Figure 7-42). Most older people have made a deeper social relationship in the process of the group activities, and confirm the social function of the neighbourhood parks.

7.3.1.5 The sociability of activities in the neighbourhood park for the elderly participants

The social ability of activities (see Figure 7-43) is different for the elderly male and female.

- The elderly male achieved deeper social relationship through ‘chat’, ‘playing cards’ and ‘playing chess’;
- The elderly female is most through ‘dancing’, ‘cards’ and ‘walking’. The social benefit for male and female is different in different activities in the neighbourhood park.

The habits of the male and female lead them to enjoy different activities, in the same time , this behaviour as a middle social interaction provides a significant opportunity for the high level and more in-depth level social interaction, such as chat and make friends.

7.3.1.6 The attractive elements of a neighbourhood park for the elderly people

The environment of the park is a crucial element (see Figure 7-44) attracted the elderly male and female. The elderly female shows more attractiveness in ‘people’ in the park compared with the elderly male. It means the social dimension of the neighbourhood park shows the same significance to attract the elderly female to using parks, compared with physical ‘environment’.

7.3.1.7 The frequently used area in the neighbourhood park

The square is the most often use the area for both the elderly male and female (see Figure 7-45), playing a key role in their daily life in the neighbourhood park. The difference is that the elderly male’s second often using place is waterfront, which implies the elderly male is more concerned and enjoying the relatively individual time and space, compared with the elderly female. This finding is echoed with finding in questionnaire analysis.

7.3.1.8 For the relief of loneliness

Most older people feel less lonely when they came to the park and stay with people compared with staying at home or the other places. The elderly male and elderly female show the same trend. (see Figure 7-46)

7.3.1.9 A place where the elderly relief loneliness

The key elements of park impacting on relief loneliness for the elderly users, the elderly male and female show similar elements relating to social dimension and physical dimensions of the neighbourhood park. (see Figure 7-47)

The same social dimension elements for elderly male and female:

- 'square' (functional social site),
- 'people' (low-level social interaction),
- 'children' (family support or low-level social interaction)
- 'dancing' (middle-level social interaction)

Specific elements for elderly female:

- 'singing' (middle-level social interaction),
- 'friends' (deeper level social interaction)

Special elements for elderly male:

- 'watching' (low-level social interaction to middle-level social interaction)
- 'chess' ((middle-level social interaction)
- 'chat' (high-level social interaction)

'waterfront', as a key physical element for the elderly people to relieve loneliness, works well in both male and female. It implies that the waterfront, lake, and water area, which have a significantly positive impact on individual psychological health.

7.3.1.10 Limitations found by the elderly users of the current neighbourhood park

Depending on the suggestion, the result in Figure 7-48 shows that the elderly male is more focus on the improvement of facilities, than the elderly female who more focuses on the improvement of facilities.

7.3.1.11 Summary

This section set out to clarify the difference between the ageing male and ageing female on their desire, usage features, and needs. The deferent gender leads to different psychological needs and features of using parks. Through the comparison of the elderly male and female, the different usage, drives and relationship have been identified in table 7.1 as below.

	male	female
The attitude of joining group activities		more interest in joining group activities
The attractive elements of joining group activities of different age group	'lively', 'people', 'friends', and 'health'.	
		more 'happy' as enjoy group activities such as square dancing and singing.
Perceptual friendliness from group activities	The accessibility of group activities is the same for the elderly male and female.	
A deeper level of social interaction in group activities	Most older people have made a deeper social relationship in the process of group activities and confirmed the social function of the neighbourhood parks.	
The sociability of activities in the neighbourhood park for the elderly participant.	The elderly male achieved deeper social relationship through 'chat', 'playing cards' and 'playing chess';	The elderly female is most through 'dancing', 'cards' and 'walking'.
The attractive elements of a neighbourhood park for the elderly people		. The elderly female shows more attractiveness in 'people' in the park
The frequently used area in the neighbourhood park	square	
	Waterfront, Lakeside the elderly male is more concerned and enjoying the relatively individual time and space	
For the relief of loneliness	Most older people feel less lonely when they came to the park and stay with people. The elderly male and elderly female shows the same trend	
A place where the elderly relief loneliness	<ul style="list-style-type: none"> ◦ 'square' (social functional site), ◦ 'people' (low-level social interaction), ◦ 'children' (family support or low-level social interaction) ◦ 'dancing' (middle-level social interaction) 	
	<ul style="list-style-type: none"> ◦ 'watching' (low-level social interaction to middle-level social interaction) ◦ 'chess' ((middle-level social interaction) ◦ 'chat' (high-level social interaction) 	<ul style="list-style-type: none"> ◦ 'singing' (middle-level social interaction), ◦ 'friends' (deeper level social interaction)
Limitations found by the elderly users of the current neighbourhood park	facilities	management

Table 7-1 the summary of the difference between elderly male and elderly female in thoughts, usage feature and desire in the neighbourhood park

7.3.2 Age group comparison;

This section aimed to investigate the differences and changes among the different age group of the ageing people in the desires, needs, and thoughts for the neighbourhood park. The outcomes will contribute to meet the special needs among elderly park users with different age and to predict the trend of changing needs for the ageing population in the future.

7.3.2.1 The attitude of join group activities

Figure 7-49 shows different percept in the different age group. The people aged 56-65 and 66-75 are the more active, the elderly ageing people and younger ageing people show relatively lower interests in joining group activities, but generally, there is nearly half elderly participant expressed they like to join group activities in the park. Based on the above analysis, we can predict some trend:

- Group activities are great entertainment and social functional exercise approach with popularity in ageing people, especially for the older people aged 56-75.
- Depending on this trend, the new ageing generation will have a lower interest in group activities, such as dancing and singing.

7.3.2.2 Perceptual friendliness from group activities

Figure 7-50 shows that the younger ageing group had the high percentage of received friendliness from group activities. Some key point is emerging that:

- The younger ageing generation is more active than the elder age group. Thus, the perceived friendliness of the group for them was high.
- The psychological statement has changed with the people became elderly; the raising isolated barriers in their mind will reduce the perceived friendliness from the others, lead the indicator became lower in the elderly group.
- This shows a trend that the perceived friendliness is raising in a new ageing generation.

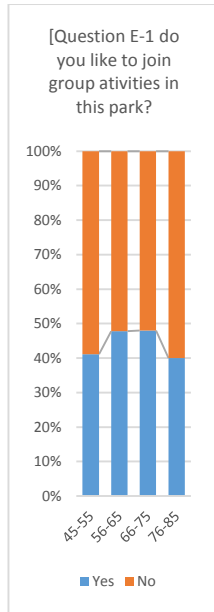


Figure 7-49

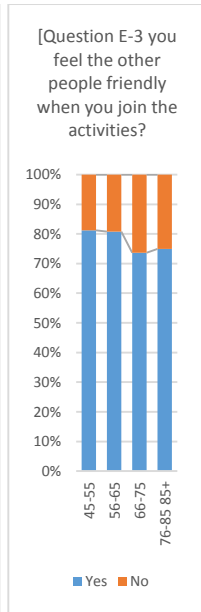


Figure 7-50

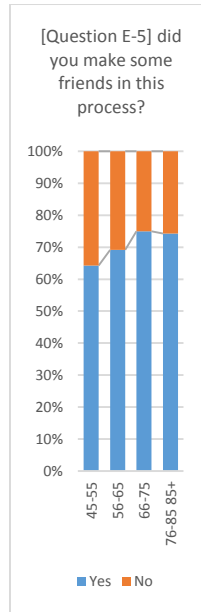


Figure 7-51

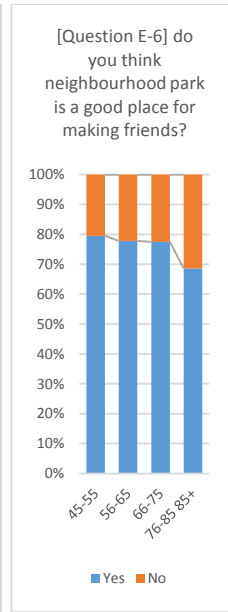


Figure 7-52

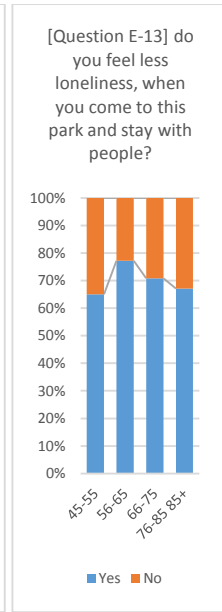


Figure 7-53

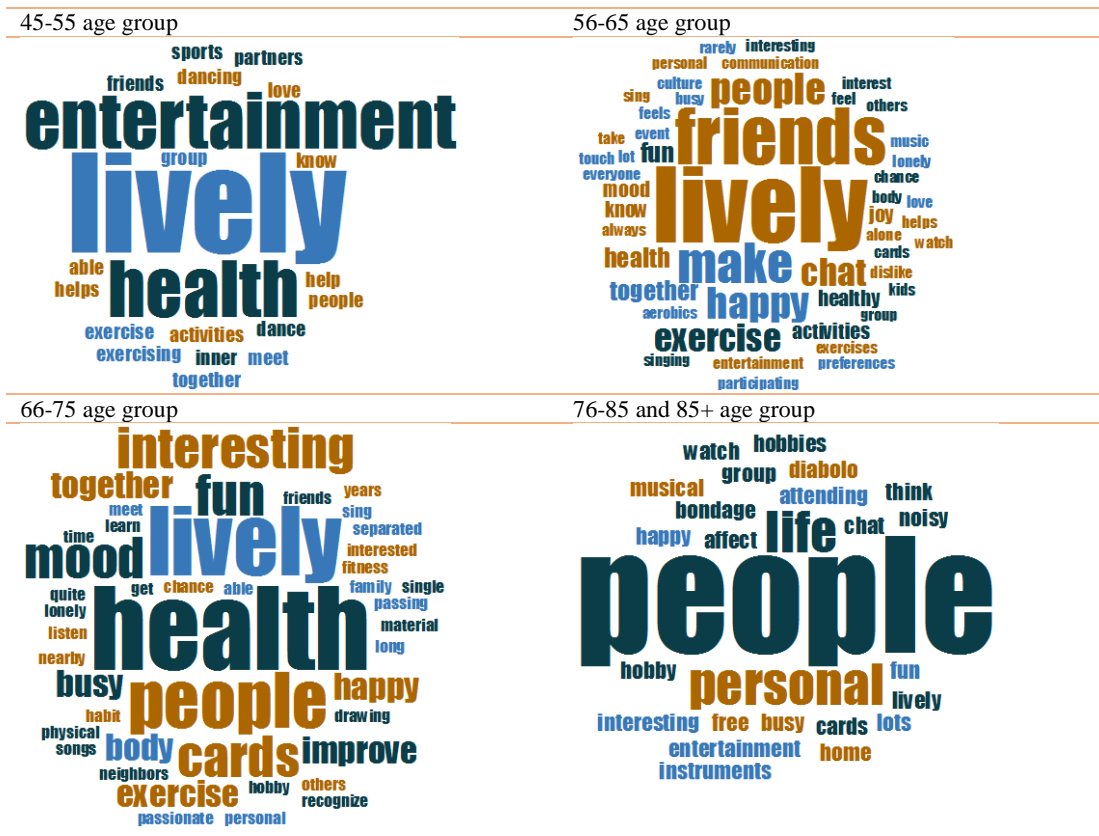


Figure 7-54 the comparison of drives of group activities among different age groups (Question-E-2)

45-55 age group



56-65 age group



66-75 age group



76-85 and 85+ age group

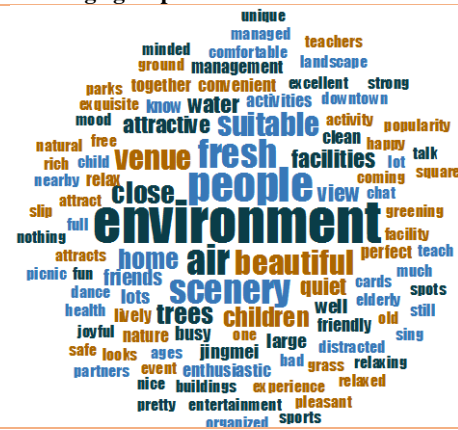


Figure 7-55 the comparison of social ability of activities of different age group (Question-E-7)

45-55 age group



56-65 age group



66-75 age group

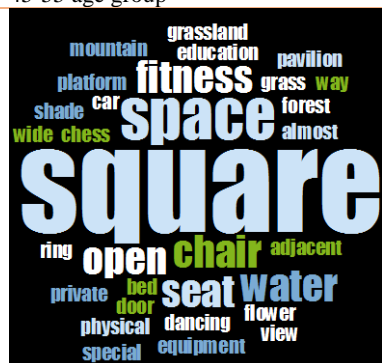


76-85 and 85+ age group

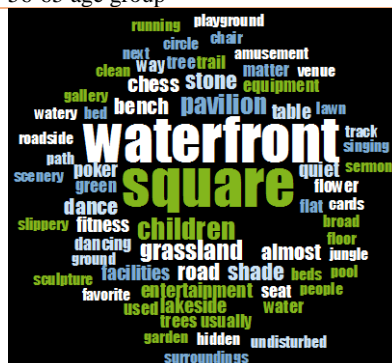


Figure 7-56 the comparison of attractive elements of park for different ageing group (Question E-9)

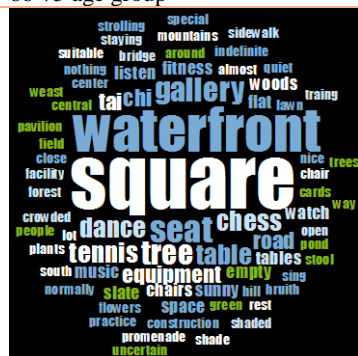
45-55 age group



56-65 age group



66-75 age group



76-85 and 85+ age group

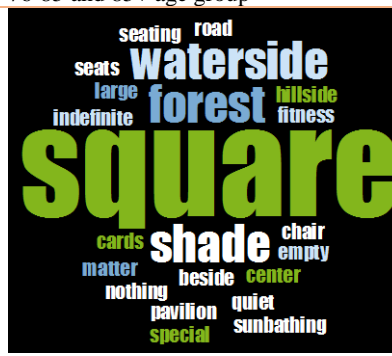
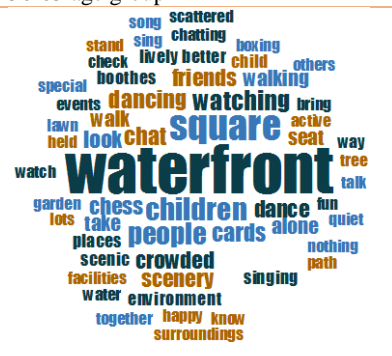


Figure 7-57 the comparison of the often use place of the different age group (Question-E-11)

45-55 age group



56-65 age group



66-75 age group



76-85 and 85+ age group

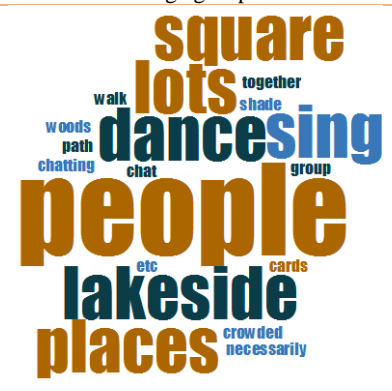


Figure 7-58 the comparison of area making you feel less lonely of different age group (Question-E-14)

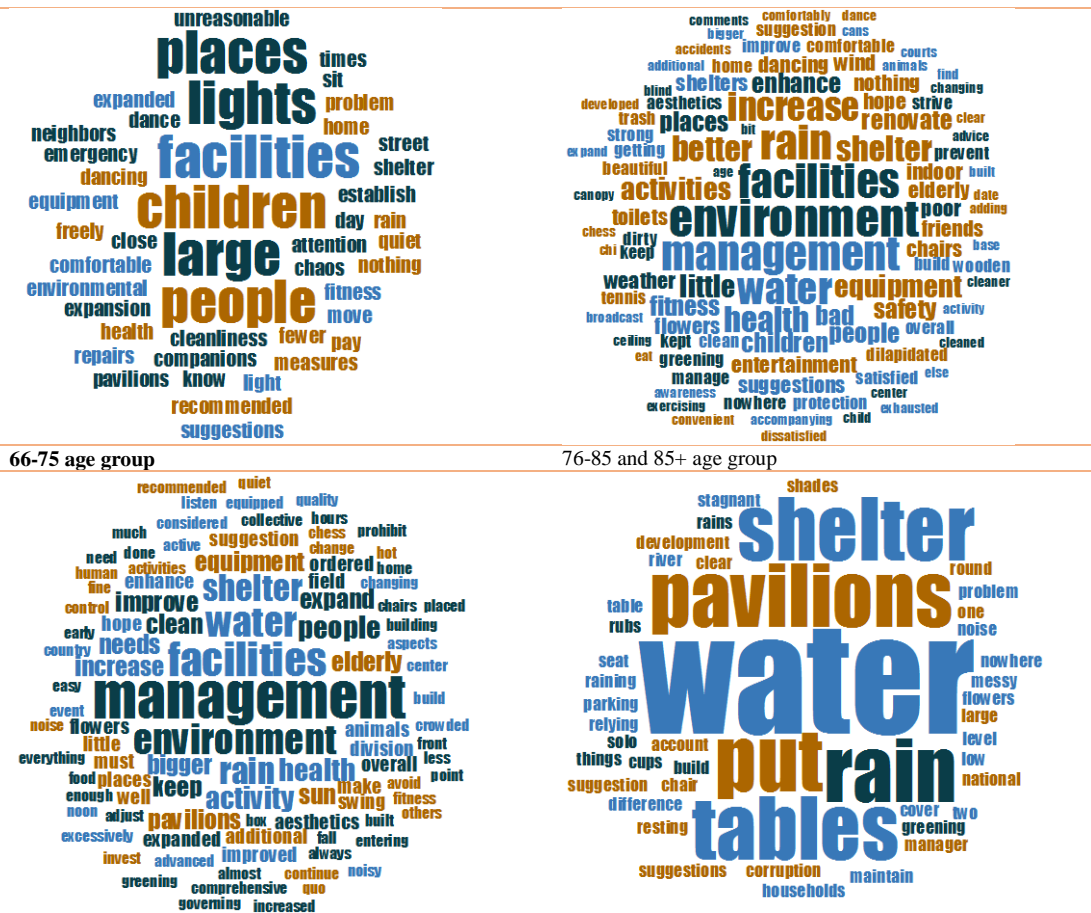


Figure 7-59 the comparison of suggestion of different age group (Question-E-14)

7.3.2.3 A deeper level of social interaction in-group activities

Figure 7-51 shows that the older people aged 66-75, aged 76-85 and over are more people have made friends in-group activities than the other age groups, building a deeper level of social interaction through group activities in the park.

7.3.2.4 The attitude of the elderly to social life in neighbourhood parks

Figure 7-52 shows that

- The younger ageing group people aged 45-55 who are just retired or just after retirement expressed the most positive interests in social life in the neighbourhood park.
- The attitude of social life shows considerably raising trend with the new ageing generation, which means the awareness of achievement of social psychological needs has increased in the new generation; they are more focus on the social function of the neighbourhood

park than the elder ageing generation.

7.3.2.5 For the relief of loneliness

Figure 7-53 shows that all age group shows that most people over 70% could feel less loneliness when they came to the park and stay with people. However, the older people aged 56-65 show a peak of nearly achieve 80% got a positive impact on reducing loneliness. This consist of a higher percentage of joining group activities and awareness of the social function of the neighbourhood, which has the possibility to influencing their psychological statement.

7.3.2.6 The attractive elements of joining group activities of different age group

Figure 7-54 shows the considerable differences of the main attractive elements, and each age group has their characters which have been explored as follows:

- For the 45-55 age group, the main factors that attract older people to participate in group activities are, in descending order,
 - perceptual dimension (lively) of the park;
 - entertainment;
 - personal health.
- For 56-65 age group, the main factors that attract older people to participate in group activities are, in descending order,
 - perceptual dimension (lively) of the park;
 - Friends - deeper level social interaction (social dimension);
 - People- lower level social interaction (social dimension);
- For 66-75 age group, the main factors that attract older people to participate in group activities are, in descending order,
 - Personal health;
 - perceptual dimension (lively) of the park;
 - People- lower level social interaction (social dimension);
- For 76-85 age group plus over 85, the main factors that attract older people to participate in group activities are, in descending order,
 - People- lower level social interaction (social dimension);
 - Personal life;

Thus, generally, the elements of the perceptual dimension and social dimension are significant for attracting the older people to participant across all ageing groups. The focus park and attractive elements had changed when got older; the importance of the social dimension of the

neighbourhood park for the high aged people is increased. Entertainment is relatively more important for the young retired people with rich free time and relatively good condition of the body. In the word cloud analysis, the important social dimension of the neighbourhood park, especially the deeper level of social interaction, shows a peak compared with the other age group.

7.3.2.7 The sociability of activities in the neighbourhood park for the elderly participants

The sociability of activities for the elderly uses has been identified depending on the responses that they made friends in what activities in the neighbourhood park. Figure 7-55 shows that,

- The social interaction in every activity mentioned by the elderly interviewee are mostly group activities, including group entertainment, and then they made friends, as deeper social interaction. This means the middle level of social interaction, that people do the activities together, could be identified as the primary foundation for older people achieving deeper level social interaction and to meet their social satisfaction maintaining the psychological health.
- For the elderly of all ages, collective activities provide the strongest sociality. However, the types of group activities have different characteristics with the age group of the elderly.
- The middle age groups, older people aged 55-65 and 66-75 shows the most diversity of the social-able activities, compared with the younger and older age group.
- Young people prefer the powerful collective dynamic movements of the coming year, such as dancing and singing, and as they get older, a large number of group activities are gradually reduced and replaced by relatively static group activity entertainment, such as chatting and poker.

To analysis in different age group could the contribute to discovering the deeper understanding of the interaction in social dimension between the elderly and park; clarifying characters and changes of sociability of activities with each steps of ageing, and to generalized a trends and concerns which direct the design; and giving specific support the new ageing generations in the future.

7.3.2.8 The attractive elements of a neighbourhood park for the elderly people

Figure 7-56 shows that

- The attractive elements of the park to the elderly is diverse among the elderly in all age groups.
- The two most essential elements that emerge in the analysis of each age group are still in the environmental and social dimensions.
- In the old age group, the perceived dimension is more prominent than the previous groups. This shows that the perceptual dimension (lively) of the park is more important for the elderly, and the 'air' element is also highlighted.

The old ageing group people aged 76-85 and over 85 shows considerable differences in the attractive elements of the neighbourhood park for them, compared with the other younger ageing groups. This implies the changes of body conditions and psychological statement delivered the changes of the usages, desires and the

7.3.2.9 The frequently used area in the neighbourhood park

The frequently used area of the older people is relating to their usage and their associations between them and the physical environment. The physical area is the foundation mostly providing the social function, possibility for the perception, and achievements of their psychological desires.

Figure 7-57 shows that in all age group, the square is the most frequently used place, which could provide the site for group activities, such as dancing and singing, rest with chairs around the square and lively atmosphere as the important element of perception dimension. For the social dimension, square provide the site for the elderly users to achieve all level of social interaction from lower as just seeing people to deeper as making friends. Thus, the square of the neighbourhood park is an important place for elderly users.

The waterfront and waterside emerging in the response of age group 56-65, 66-75, and 76-85 and 85+, are the second import site the relatively older retired people, where could provide a quiet and peaceful place for them to achieve a relax and balance in their psychological statement.

The response of age group 56-65 and 66-75 shows the diversity of their using areas, which means that their usages are more diverse than the younger group and the elder group. It also implies the retired people, who are aged 56 to 75, are the main park users with richer time and relatively better conditions of the body compared with the other older people.

7.3.2.10 A place where the elderly feel relief loneliness

Figure 7-58 shows the places let the older people feeling relief loneliness are different in different age groups, which implies the psychological desire and statement has changed with ageing. Some key features could be found in each age group summarized as following:

- 45-55 age group:
 - children's place;
 - square;
 - waterfront;
- 56-65 age group:
 - waterfront;
 - square;
 - children;
- 66-76 age group:
 - square;
 - waterfront;
 - dancing place;
- 76-86 and 85+ age group:
 - the place could stay with people;
 - lakeside;
 - dancing and singing place square.

In general, the places have been most frequently highlighted are square and waterfront. The square could provide the elderly people elements of the social dimension, perceptual dimension and physical place. The waterfront is a place provide perceptual relax, which is relatively individually psychological achievement based on the perception from the physical environment. It means the waterfront has a considerably positive impact on the psychological health of all age of the ageing people, especially for the older people aged 56-65.

On the other hand, looking for children playing place plays an important role for the younger ageing group reducing loneliness. It is possibly caused by that they bear more duty to look after their grandchildren compared with the other age group, and much empty time after just retirement was filled by this task. Moreover, group activities such as singing and dancing also play an important role in filling their empty time. Thus these places could let them feel relief loneliness.

Moreover, depending on changes in the diagram between 56-65 to 66-75, the importance of square is increased, the impact of children has reduced. It implies that the older people in these

ages, whose grandchildren are growing up to school, the duty for them are reduced. The empty of psychological support has changed from family to social interaction in the neighbourhood park. The square is the foundation for the social interaction of older people. This trend is echoed with the rate of making friends (see Figure 7-51), which means with building a deeper level of social interaction, the positive impact on relief loneliness has been enhanced.

Furthermore, the ageing elder group, which people aged 76-85 and 85+, has expressed the strong desire of staying with people as lower social interaction. As the age of the elderly grows and the body ages, many people can no longer participate in activities with a large amount of activity. Sitting and watching people's activities and staying with the crowd become their new primary way of building social interaction to meet their psychological satisfaction

However , the different condition of the different age step for the ageing people has impacted their usage, desire, and the approach to achieve psychological satisfaction. To clarify the difference could contribute to meet the specific needs of the elderly in different age step.

7.3.2.11 Limitations found by the elderly users of the current neighbourhood park

Figure 7-59 shows that the difference emerging in two aspects:

In general, the diversity of issues, mentioned in responses of the older people aged 56-65 and 66-75, are the most, compared with the younger age group and the elder age group. It implies these elderly users with a long time using the park have a deeper understanding of their own needs and the gap between them the current space. On the other hand, it means the needs of this age step are more than the other age groups. It caused by the older people in this age have more time compared with younger ageing people, and have relatively satisfied body condition, which could support them to do some more active activities compared with people aged over 76.

Especially, the younger age group (45-55) they are more concern about the children's facilities and well-built facilities. The elder age group (76-85 and 85+) are more concern about the facilities for protecting them from dangers and easy to use when the body condition is degradation.

7.3.2.12 Conclusion

The purpose of this section is to explore the different usage characteristics and usage needs of each age group. Through comparative content analysis, the differences in the needs of older

users of all age groups and the trend of change were discovered and summarized into the conclusions of this section shown in table 7.2. This finding can be used in the design of future neighbourhood parks, while meeting the needs of the entire elderly, targeted design of the different needs of each age group, and providing a predictable changing trend for the design of future neighbourhood park.

Table 7-2 the summary of key characters and changing trend emerging in the comparison among age groups toward desire, usage, inside thought of ageing people for the neighbourhood park

	45-55	56-65	66-76	77-85+
The attitude of join group activities		more active	more active	
	• Depend on this trend; the new ageing generation will have lower interest in group activities, such as dancing and singing.			
Perceptual friendliness from group activities		• The younger ageing generation are more active than the elder age group, thus the perceived friendliness of group for them was high.	• , the raising isolated barriers in their mind will reduced the perceived friendliness from the others, lead the indicator became lower in the elderly group.	
	A trend that the perceived friendliness is raising in new ageing generation.			
Deeper level social interaction in group activity			More people have made friends in-group activities than the other age groups, building a deeper level of social interaction through group activities in the park.	
The attitude of the elderly to social life in neighbourhood parks	People aged 45-55 who are just retired or just after retirement expressed the most positive interests in social life in neighbourhood park.	Second higher		
	• The attitude of social life shows considerably razing trend with new ageing generation, which means the awareness of achievement of social psychological needs has increased in new generation, they are more focus on the social function of the neighbourhood park than the elder ageing generation.			
For the relief of loneliness		The elderly people aged 56-65 show a peak nearly achieve 80% got the positive impact on reducing loneliness.		
	Over 70% could feel less loneliness, when they came to park and stay with people.			
The attractive elements of joining group activities of different age group	<ul style="list-style-type: none"> o perceptual dimension (lively) of the park; o entertainment; o personal health. 	<ul style="list-style-type: none"> o perceptual dimension (lively) of the park; o Friends - deeper level social interaction (social dimension); o People- lower level social interaction (social dimension); 	<ul style="list-style-type: none"> o Personal health; o perceptual dimension (lively) of the park; o People- lower level social interaction (social dimension); 	<ul style="list-style-type: none"> o People- lower level social interaction (social dimension); o Personal life;
The sociability of activities in neighbourhood park for the elderly participants		• The middle age groups, elderly people aged 55-65 and 66-75 shows the most diversity of the social-able activities, compared with the younger and older age group.		
	More dynamic activates		More static activates	
	• The social interaction in every activity mentioned by the elderly interviewee are mostly group activities including group entertainment, and then they made friends, as deeper social interaction. This means the middle level of social interaction, that people do the activities together, could be identified as the main foundation for elderly people achieving deeper level social interaction, to meet their social satisfaction maintaining the psychological health.			
The attractive elements of neighbourhood park for the elderly people				• In the old age group, the perceived dimension is more prominent than the previous groups. This shows that the perceptual dimension (lively) of the park is more important for the elderly, and the 'air' element are also highlighted.
The frequently using area in neighbourhood park	'Square' is the most frequently using place, which could provide the site for group activities, such as dancing and singing, rest with chairs around the square, and lively atmosphere as the important element of perception dimension. For the social dimension, square provide the site for the elderly users to achieve all level of social interaction from lower as just seeing people to deeper as making friends.			
		The waterfront and waterside emerging in the response of age group 56-65, 66-75, and 76-85 and plus, are the second import site the relatively older retired people, where could provide a quiet and peaceful place for them to achieve a relax and balance in their psychological statement.		
		The response of age group 56-65 and 66-75 shows the diversity of their using areas, which means that their usages are more diverse than the younger group and the elder group.		
A place where the elderly feel relief loneliness	<ul style="list-style-type: none"> o children's place; o square; o waterfront; 	<ul style="list-style-type: none"> o waterfront; o square; o children; 	<ul style="list-style-type: none"> o square; o waterfront; o dancing place; 	<ul style="list-style-type: none"> o place could stay with people; o lakeside; o dancing and singing place square.
	Looking children playing place plays an important role for the younger ageing group reducing loneliness. The group activities such as singing and dancing also play an important role in filling their empty time, thus these places could let them feel relief loneliness.			aged 76-85 and plus, has express the strong desire of staying with people as lower social interaction.
	Square: The square could provide the elderly people elements of social dimension, perceptual dimension and physical place. Waterfront: The square could provide the elderly people elements of social dimension, perceptual dimension and physical place.			
Limitations found by the elderly users of current neighbourhood park		, the diversity of issues, mentioned in responses of the elderly people aged 56-65 and 66-75, because these elderly users with long time using the park have a deeper understanding of their own needs and the gap between them the current space.		
	are more concern on the children's facilities and well-build facilities			more concern about the facilities for protecting them from dangers and easy to use when the body condition is degradation.

7.3.3 Summary

This section has discussed the different needs of older park user in different gender and different age group based on structural analysis. It contributed to achieve two research objectives:

- To uncover the ageing people's usage features, desire, and inside thought;
- To uncover the most influential factors for the well-being and mental health of the older people.

The key findings of this investigation could be summarised as:

- For gender, the older man and older woman show the different attitude in joining group, attractiveness of group, attractiveness of neighbourhood park, frequently using area in neighbourhood park, and a place where the elderly relieve loneliness. The differences shows the older woman need higher level of social interaction in neighbourhood park to achieve maintaining mental health and well-being, compared with older man.
- For age, the needs and desire from neighbourhood park of older people have changing with time going. The differences emerging between different age group. With people get older, the needs of high level of social interaction have changed to the need of low level of social interaction in the neighbourhood park. In the same time, the awareness of personal health is arising with ageing become the most attractive element in park users aged 66-76.

The details of differences emerging in structural comparison analysis has be summarised into two conceptual framework, which could be used to solve the special needs and desires of target population in the future and give a predict trend of the changing needs with ageing population.

The main finding in this section:

- The summary of the difference between elderly male and elderly female in thoughts, usage feature and desire in the neighbourhood park. Table 7-1
- The summary of key characters and changing trend emerging in the comparison among age groups toward desire, usage, inside thought of ageing people for the neighbourhood park. Table 7-2

7.4 Summary

This study achieved the research objectives by two steps as thematic analysis and structural analysis based on content analysis by both qualitative coding and quantitative coding. Thematic analysis was undertaken to uncover the usage features, desires, and inside thought of the ageing park users and to uncover the most influential factors for maintaining mental health and well-being of the ageing people. Furthermore, structural analysis base on the themes are designed for further understanding the characters, differences, changes in these aspects impacted by gender and ageing.

However, through analysis, this chapter has obtained many significant findings, including the following aspects:

- Four conceptual frameworks (Figure 7-35, Figure 7-36, Figure 7-37 and Figure 7-38) comprehensively reveals the needs and perceptions of the elderly in the neighbourhood park. These four frameworks answered why the elderly are attracted to the collective activities of the park, what the community park attracts the elderly, and where the park provides help for the elderly to reduce loneliness, and what are the needs and limitations of the elderly.
- Moreover, the results of the analysis provide some important points and bring a new way of understanding the motivations of the elderly and a new perspective in understanding the interaction between ageing people and neighbourhood park. For example, by analysing the older man's answer description, it is found that a large part of the reason that affects the use and psychological experience of the elderly is the social dimension and perceptual dimension, rather than the physical space in the traditional sense. The community park that the elderly say is a combination of a social dimension composed of people and a perceptual dimension influenced by humans and the physical environment.
- Finally, through comparative study, this chapter has obtained two sets of comparative feature tables (Table 7-1 and Table 7-2), which summarize the different usage motivations and demands of different gender and different age groups, as well as the trend of foresight for the ageing population in the future.

Chapter 8 Second stage correlation analysis around experienced psychological benefit.

8.1 Introduction

This chapter attempts to discover the associations among the indicators regarding to psychological issues including the experienced psychological benefit, experienced relief loneliness, self-rated psychological status, emotional bonding, and social dimension and perceptual dimension of neighbourhood park. These indicators captured from both questionnaire and semi-structure interview. The findings of this chapter used to supplement the comprehensive conceptual framework of interaction between the ageing people and neighbourhood park.

The second stage correlation analysis includes eight sections named S1 to S8 shown in diagram 8.1, which means there are eight associations between these concepts. In details, some concepts such as emotional bonding has a range of level, they will be measured one-by-one using Gamma correlation test in SPSS. The data results shown in the tables in this chapter are the statistically significant correlational associations that are selected after analysis. Based on these data result, the findings of this chapter have been presented in a textual description of the trend of the outcome. In this way, the data translated into a predictive description of the phenomena that are easy to understand.

Table 8-1 Reference table for the indicators among emotional bonding, psychological status and experienced psychological benefit and their description as questions in part C in questionnaire

	Question Number	Indicator -item	description of item (question)
PART C	C 1	Environmental Satisfaction	I feel comfortable with the whole environment of this park
	C2-1	emotional bonding (place attachment) person dimension - group level	Most of my fiends are in some way connected with my use of the place
	C2-2.1	emotional bonding - place dimension - social level	People I am attached to are mostly from this place.
	C2-2.2	emotional bonding - place dimension - social level	I never feel alone here.
	C2-3	emotional bonding - psychological processes dimension - emotional level	I miss this place when I am away.
	C2-4	emotional bonding - psychological processes dimension - cognitive level	This place is part of me.
	C2-5.1	emotional bonding - psychological processes dimension - behavioural level	This is my favourite place to go during my free time.
	C2-5.2	emotional bonding - psychological processes dimension - behavioural level	This is the best place for what I like to do

	C3-1	experienced psychological benefit: confidence	Through joining the activities in this park, you feel benefit my confidence
	C3-2	experienced psychological benefit: health	Through joining the activities in this park, you feel benefit my health
	C3-3	experienced psychological benefit: social network	Through joining the activities in this park, you feel benefit my social network
	C3-4	experienced psychological benefit: belonging	Through joining the activities in this park, you feel benefit my eeling of belonging
	C4	Self-evaluation and personality	How do you rate your life at present?
	C4-2	Self-evaluation and personality	How do you rate your health at present?
	C5-1	Self-evaluation and personality	Do you always look on the bright side of things? —
	C5-2	Self-evaluation and personality	Do you often feel fearful or anxious?
	C5-3	Self-evaluation and personality	Do you often feel lonely and isolated?
	C5-4	Self-evaluation and personality	Do you feel the older you get, the more useless you are? —
Part E	E11.2	Experienced relief loneliness	Do you feel less loneliness, when you come to this park and stay with people?

8.2 S-1: the association analysis between experienced relief loneliness and self-rated psychological status

The set of analyses examined the association between experienced relief loneliness (from semi-structure interview) and the self-rated psychological status (from questionnaire). The result shows only self-rated quality of life has the statistically significant association with experienced relief loneliness. (Table 8-2) The value ($r=0.258$) illustrate the experienced relief loneliness in neighbourhood park has positive impact on quality of life.

Thus, the finding could be described as:

- The ageing people who experienced relief loneliness have better self-rated quality of life.

Table 8-2 Supplement -1 the result with significance in Gamma's correlational analysis between self-rated psychological status (from questionnaire) and experienced relief loneliness (from semi-structure interview).

Self-rated psychological status	*	Experienced psychological benefit	Value (coefficient of correlation)	Approximate significance
Quality of life		Experienced relief loneliness	0.258	0.011

8.3 S-2: the association analysis between experienced psychological benefit and self-rated psychological status

There are two purposes in this section. Firstly, it is important to further understanding the experienced psychological benefit of the ageing people captured from neighbourhood park activity. Secondly, the data of that used to exam whether the experienced psychological benefit is correlating with their self-rated psychological status.

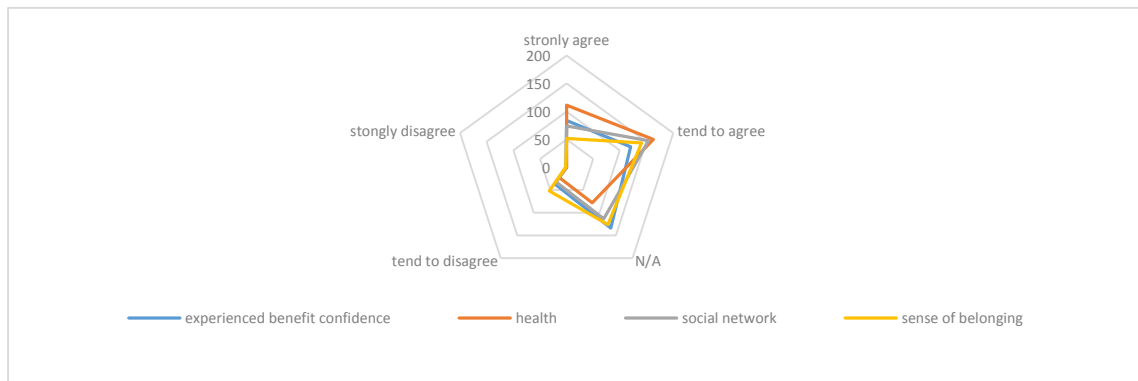


Figure 8-1 the responses for question C3.1 to C3.4

Firstly, Figure 8-1 shows over half of ageing people experienced the psychological benefit in confidence, health, social network, and sense of belonging when they did activity in neighbourhood park. What stand out in this table is that compared with the other three benefits, the number of people who felt healthy is the most, over two-thirds. Moreover, the number of people feeling benefit in social network is considerable high. On the other hand, very few people feel that park activity have not benefited them.

Overall, these results indicate that:

- Most ageing people can feel the psychological benefits of neighbourhood park activity;

In the second part, the Gamma correlation tests were used to analyse the relationship between experienced psychological benefit and self-rated psychological status. Table 8-3 shows the correlations with statistical significance in results. Overview, the indicator of psychological status has positive correlating with experienced psychological benefits, but each indicator linked difference psychological benefit.

What stand out in this table is that the benefit in confidence and belonging shows relatively high value on quality of life, which means the experienced benefit in confidence and belonging from neighbourhood park activity is stronger positive affecting the quality of life of the ageing people. In this way, the results illustrate that to improve the experience of ageing park users in neighbourhood park is an effective approach to improve the psychological health and quality

of life. This study discover a predictive view on which aspect of experience improved is more effective for the ageing people in daily quality of life. The same meaning used in the other indicators.

Moreover, these associations future illustrated the benefit of neighbourhood park on psychological health and well-being of the ageing people.

Overall, findings of these tests have been identified as:

- Experienced psychological benefits from neighbourhood park contribute to maintain the psychological health and to improve well-being of the ageing park users.
- The psychosocial benefits on confidence and belonging have the considerable contribution on improving quality of life of the ageing park users.

8.4 S-3: the association analysis between emotional bonding and experienced relief loneliness.

Table 8-4 Supplement -3 the result with significance in Gamma's correlational analysis between experienced relief loneliness (from semi-structure interview) and emotional bonding (from questionnaire).

Experienced psychological benefit	*	Emotional bonding	Value (coefficient of correlation)	Approximate significance
Experienced Psychological benefit	*	Emotional bonding -place dimension- social level	0.247	0.003
Experienced Psychological benefit	*	Emotional bonding -psychological process	0.243	0.003
Experienced Psychological benefit	*	Emotional bonding -psychological process	0.374	0.000
Experienced Psychological benefit	*	Emotional bonding -behaviour level 1	0.164	0.030
Experienced Psychological benefit	**	Emotional bonding -psychological process	0.334	0.0020
Experienced Psychological benefit	*	Emotional bonding -behaviour level 2	0.169	0.011
Experienced Psychological benefit	*	confidence	0,169	0.019
Experienced Psychological benefit	*	confidence	-0.154	0.021
Experienced Psychological benefit	*	health	-0.235	0.001
Experienced Psychological benefit	*	Social network	-0.205	0.002
Experienced Psychological benefit	*	health	-0.224	0.001
Experienced Psychological benefit	*	Social network	-0.185	0.004

These set of tests aimed to illustrate the association between experienced relief loneliness in neighbourhood park and emotional bonding in neighbourhood park and explore which

dimensions and levels of emotional bonding is real linking with psychological benefit. The findings of this section are the confirmation of conclusions of Scannell and Gifford (2017) who has explore the psychological benefit from the whole concept of emotional bonding in qualitative approach. In this way, this analysis is a further exploration and refinement in the details of emotional bonding.

Table 8-4 illustrates that the experienced psychological benefit on relief loneliness is statistically significant positive correlating with emotional bonding in neighbourhood park. Specifically, this positive correlation exists in these dimensions include emotional bonding-place dimension- social level, emotional bonding –psychological process dimension- emotional level, and emotional bonding –psychological process dimension- emotional level. Among them, the most significant impact is emotional bonding –psychological process dimension-behaviour level. This may mean that this aspect will become a powerful breakthrough to reduce the loneliness and maintain the mental health of the elderly. Of course, this also pointed out for future research that the feedback of the description of item 1 of emotional bonding-psychological process dimension-behaviour level is better and more effective in emotional bonding survey in China.

Thus, the finding of the part is:

- Emotional bonding of ageing people for the neighbourhood park is contributing to relief their loneliness, the effective aspects of the emotional bonding (the order is arranged by accounting influence), emotional bonding –psychological process dimension- behaviour level, the emotional bonding-place dimension- social level, emotional bonding –psychological process dimension- emotional level.

8.5 S-4: the association analysis between emotional bonding and experienced psychological benefit

This set of analyses examined the impact of the different dimensions of emotional bonding on the experienced psychological benefit and explore the relationship between them. In fact, the both concepts are belonging to psychology regarding to human-oriented issues. Thus, the impact in this section means correlating and influencing each other.

Gamma correlation test were used to analyse the relationship between the emotional bonding of the ageing participant for the neighbourhood park and psychological benefit from the neighbourhood park activity. Table 8-5below illustrates the statistical significant association between emotional bonding and psychological benefit. The result gives a strong and solid confirm in a quantitative approach for the qualitative finding of Scannell and Gifford (2017).

However, the result shows the significant correlating exist in which aspect of emotional dimension regarding to different psychological benefit. It means the ageing people who have higher emotional bonding will easy to obtain the psychological benefit from the neighbourhood

park. For example, an elderly park user who have higher emotional bonding especially in social level of place dimension will easy to obtain psychological belonging from neighbourhood park compared with the elderly park users didn't have emotional bonding. Depending on the result in Table 8-2, the psychological benefit on belonging is considerably positive affecting the self-rated quality of life of the elderly. Thus, the effective way for improving quality of life of the elderly is to increase the social level of place dimension of emotional bonding and then obtain the psychological benefit on belonging. In this way, a complex and dynamic system has been revealed based on a solid statistical foundation.

In details, the findings emerging in this section could be identified as below:

- All dimensions of emotional bonding have statistically significant correlation with the psychological benefit from neighbourhood park. It means increasing emotional bonding is contribute to improve the psychological benefit for the ageing people.
- The different dimension of the emotional bonding have different extent on impacting different kind of psychological benefit.

Experienced psychological benefit	*	Emotional bonding	Value (coefficient of correlation)	Approximate significance
Experienced benefit confidence	*	Emotional bonding-personal dimension – group level	0.307	0.000
	*	Emotional bonding-place dimension- social level1	0.375	0.000
	*	Emotional bonding-place dimension- social level2	0.280	0.000
	*	Emotional bonding –psychological process dimension- emotional level	0.325	0.000
	*	Emotional bonding –psychological process dimension- cognitive level	0.172	0.010
	*	Emotional bonding –psychological process dimension-behaviour level 1	0.221	0.001
	*	Emotional bonding –psychological process dimension-behaviour level 2	0.525	0.000
Experienced benefit health	*	Emotional bonding-personal dimension	0.172	0.006
	*	Emotional bonding-place dimension- social level1	0.227	0.000
	*	Emotional bonding-place dimension- social level2	0.336	0.000
	*	Emotional bonding –psychological process dimension- emotional level	0.193	0.001
	*	Emotional bonding –psychological process dimension- cognitive level	0.276	0.000
	*	Emotional bonding –psychological process dimension-behaviour level 1	0.256	0.000
	*	Emotional bonding –psychological process dimension-behaviour level 2	0.328	0.000
Experienced benefit Social network	*	Emotional bonding-personal dimension	0.278	0.000
	*	Emotional bonding-place dimension- social level1	0.425	0.000
	*	Emotional bonding-place dimension- social level2	0.434	0.000
	*	Emotional bonding –psychological process dimension- emotional level	0.320	0.000
	*	Emotional bonding –psychological process dimension- cognitive level	0.316	0.000
	*	Emotional bonding –psychological process dimension-behaviour level 1	0.259	0.000
	*	Emotional bonding –psychological process dimension-behaviour level 2	0.320	0.000
Experienced benefit belonging	*	Emotional bonding-personal dimension	0.292	0.000
	*	Emotional bonding-place dimension- social level1	0.392	0.000

*	Emotional bonding-place dimension- social level2	0.262	0.000
*	Emotional bonding –psychological process dimension- emotional level	0.410	0.000
*	Emotional bonding –psychological process dimension- cognitive level	0.293	0.000
*	Emotional bonding –psychological process dimension-behaviour level 1	0.208	0.001
*	Emotional bonding –psychological process dimension-behaviour level 2	0.310	0.000

Table 8-5 Supplement -4 the result with significance in Gamma’s correlational analysis between experienced psychological benefit and emotional bonding.

8.6 S-5: the association analysis between emotional bonding and social and perceptual dimension of neighbourhood park.

The Gamma correlational test were used to analyse the relationship between the range of dimensions of the emotional bonding and social and perceptual dimension of neighbourhood park. The significant result shows in Table 8-6, the association in table selected on approximate significance, which is less than 0.05. The first set of test aimed to explore the impact of social dimensions on the emotional bonding. The second set is used to explore the impact of perceptual dimension regarding to the received friendliness of social environment including in park and around park.

Some key point could be identified as:

- Overall, the table 8.5 present the statistical significant positive association between social dimension and perceptual dimension and emotional bonding.
- What stand out in the table is the impact of deeper level of social interaction in neighbourhood park and the attitude toward the deeper level of social interaction in neighbourhood park is considerable strong on the emotional bonding. It means creative the opportunities for social communication is a very effective way to enhance the emotional bonding and then improve the quality than mental health of the aging people. The social interaction, especially deeper social interaction plays a significant role in improve the well-being and mental health.
- On the other hand, for the perceptual dimension, a harmonious, inclusive and understanding social environment is also critical to the perceptual dimension of the neighbourhood park for the ageing people. The data demonstrates that the received friendliness from the park users and resident around the park has an impact on the extent of emotional bonding of the elderly people for the park.

Table 8-6 Supplement -5 the result with significance in Gamma’s correlational analysis between emotional bonding (from questionnaire) and attitude for social and perceptual dimension of neighbourhood park (from semi-structure interview).

Attitude of social and perceptual dimension	*	Emotional bonding	Value (coefficient of correlation)	Approximate significance
Join group activity	*	Emotional bonding-personal dimension	0.184	0.012
	*	Emotional bonding-place dimension-social level1	0.226	0.002
	*	Emotional bonding-place dimension-social level2	0.290	0.000
	*	Emotional bonding –psychological process dimension- emotional level	0.177	0.015
	*	Emotional bonding –psychological process dimension- cognitive level	0.233	0.002
	*	Emotional bonding –psychological process dimension-behaviour level 1	0.209	0.006
Deeper level social interaction in group activity (making friends)	*	Emotional bonding-personal dimension	0.336	0.000
	*	Emotional bonding-place dimension-social level1	0.348	0.000
	*	Emotional bonding –psychological process dimension- emotional level	0.169	0.035
	*	Emotional bonding –psychological process dimension-behaviour level 2	0.232	0.005
Attitude toward deeper level of social interaction in group activity for neighbourhood park	*	Emotional bonding-personal dimension	0.373	0.000
	*	Emotional bonding-place dimension-social level1	0.268	0.003
	*	Emotional bonding-place dimension-social level2	0.376	0.000
	*	Emotional bonding –psychological process dimension-behaviour level 1	0.204	0.023
	*	Emotional bonding –psychological process dimension-behaviour level 2	0.229	0.009
Received friendliness from local group in neighbourhood park	*	Emotional bonding-place dimension-social level2	0.198	0.021
Received friendliness from local resident	*	Emotional bonding-place dimension-social level1	0.180	0.004
	*	Emotional bonding –psychological process dimension- emotional level	0.131	0.026
	*	Emotional bonding –psychological process dimension-behaviour level 1	0.165	0.008
	*	Emotional bonding –psychological process dimension-behaviour level 2	0.167	0.007

8.7 S-6: the association analysis between experienced relief loneliness and social and perceptual dimension.

The correlation between experience relief loneliness and social and perceptual dimension of neighbourhood park was tested using Gamma correlation analysis in SPSS.

Overall, it could be seen from data in Table 8-7 that the received friendliness and social interaction are significantly positive impact the experienced relief loneliness. It means these four indicators of social and perceptual dimension of neighbourhood park plays an important role in reducing the loneliness of the ageing park users and maintaining their mental health.

Moreover, what stands out in the table is the values regarding to the social interaction are considerable high compared with other indicators. It means the deeper level of social interaction and the attitude toward the deeper social interaction for neighbourhood park are the critical step with high contribution on relief loneliness of ageing people.

Table 8-7 Supplement -6 the result with significance in Gamma's correlational analysis between social and perceptual dimension of neighbourhood park (from semi-structure interview) and experienced relief loneliness (from semi-structure interview)

Experienced loneliness	relief *	Attitude of social and perceptual dimension	Value (coefficient of correlation)	Approximate significance
Experienced loneliness	*	Received friendliness from local group in neighbourhood park	0.270	0.031
	*	Received friendliness from local resident	0.199	0.017
	*	Deeper level social interaction in group activity (making friends)	0.412	0.000
	*	Attitude toward deeper level of social interaction in group activity for neighbourhood park	0.474	0.000

In summary, the findings from this study could be identified as:

- The experienced relief loneliness is significantly positive correlating with social and perceptual dimension of neighbourhood park.
- Social interaction and attitudes toward social interaction have a significant positive impact on the experienced relief of loneliness by the elderly in neighbourhood park.

8.8 S-7: the association analysis between experienced psychological benefits and social and perceptual dimension.

This set of examined the impact of social and perceptual dimension of the neighbourhood park on the experienced psychological benefit, including confidence, health, social network, and belonging. In other to access the influence of social dimension and perceptual dimension, the Gamma correlational tests were used . The Table 8-8 below shows the statistically significant associations emerging in the analyses.

In general, the data results illustrate that the different experienced psychological benefit was linking with the different aspect of social or perceptual dimension. In addition, the all values of

the associations are positive, which means the positive impact of the social and perceptual dimension of the neighbourhood park are contribute to help the elderly people obtain the psychological benefit. On the contrary, a negative, not inclusive, and not friendly environment of neighbourhood park will make the elderly park user hard to capture the psychological benefits.

Moreover, the attitude toward deeper level of social interaction in neighbourhood park shows a considerable influence on all four psychological benefits with a relatively high value, which should be given more concerns on developing neighbourhood park. Specifically, an older park user who have a positive and acceptable attitude for making friends (the deeper level of social interaction) in neighbourhood park will more easier to obtain the benefits in social network and maintain his health.

Overall, the finding of data results could be identified as:

- The good social dimension of neighbourhood park regarding social interaction and attitude of social interaction has contribution to bring psychological benefit for the ageing park users.
- A healthy, inclusive perceptual dimension built by the friendly residents around neighbourhood park gives the positive influence on improving health, social network, belonging of the ageing park users.
- The attitude for neighbourhood park toward deeper level social interaction is important for benefiting mental health of ageing people, especially for social network.
- Joining group activity in neighbourhood park is contributing to improve the health, social network, belonging of the ageing people.

Table 8-8 Supplement -7 the result with significance in Gamma’s correlational analysis for association between social and perceptual dimension of neighbourhood park (from semi-structure interview) and experienced psychological benefit (from questionnaire).

Experienced benefit	psychological	*	Attitude of social and perceptual dimension	Value (coefficient of correlation)	Approximate significance
Experienced confidence	benefit	*	Attitude toward deeper level of social interaction in group activity for neighbourhood park	0.194	0.038
Experienced benefit health		*	Joining group activity	0.278	0.001
			Received friendliness from local resident	0.157	0.019
			Attitude toward deeper level of social interaction in neighbourhood park	0.307	0.001
Experienced benefit social network		*	Joining group activity	0.302	0.000
			Received friendliness from local resident	0.160	0.016
			Deeper level social interaction in group activity (making friends)	0.287	0.001
			Attitude toward deeper level of social interaction in neighbourhood park	0.377	0.000
Experienced benefit belonging		*	Join group activity	0.204	0.010
			Received friendliness from local resident	0.206	0.001
			Deeper level social interaction in group activity	0.238	0.006

	(making friends)		
*	Attitude toward deeper level of social interaction in group activity for neighbourhood park	0.184	0.050

8.9 S-8: the association analysis between self-rated psychological status of the ageing users and social and perceptual dimension of the neighbourhood parks

The purpose of supplement 8 was to test the association between self-rated psychological status of the ageing park users and social and perceptual dimension of the neighbourhood park. The correlation between psychological status and attitudes of social and perceptual dimension was tested using Gamma test in SPSS, and the results with statistical significance were selected and shown in Table 8-9.

Overview, the table below illustrates that some correlating association emerging between the psychological status of the ageing park user and the social dimension of neighbourhood park regarding to deeper level social interaction and attitude toward neighbourhood park for social interaction. On the other hand the results of test between self-rated psychological status and perceptual dimension of neighbourhood park did not show statistic significance, and not shown in table.

Specially, the values of the associations shows the impact of social interaction and positive attitude for that are contributing to improve the well-being of the ageing people including: improving self-rated quality of life, health, positive mental health, reducing self-rated lonely and useless.

In summary, the findings of this part could be identified as:

- Deeper level of social interaction in neighbourhood park and positive attitude for the neighbourhood park toward social interaction are contributing to improve the quality of life and to maintain the mental health of the ageing people.
- It reveals a new approach to understanding the improvement of quality of life and mental health through development of urban open space.

Table 8-9 Supplement -8 the result with significance in Gamma's correlational analysis for association between self-rated psychological status (from questionnaire) and social and perceptual dimension of neighbourhood park (from semi-structure interview).

8.10 Summary

Scannell and Gifford (2017, p.257) argued that 'these studies support the idea that proximity

to one's place of attachment is important, but they say little to describe the ways in which the bond may benefit well-being'. However, this study meet the lack of solid quantitative foundation to association between experienced psychological benefits and emotional bonding, and explored which dimension is most contributing to which psychological benefits. The

Self-rated psychological status	*	Attitude of social and perceptual dimension	Value (coefficient of correlation)	Approximate of significance
Self-rated Quality of life		Deeper level social interaction in group activity (making friends)	0.210	0.036
		Attitude toward deeper level of social interaction in group activity for neighbourhood park	0.362	0.000
Self-rated Health		Deeper level social interaction in group activity (making friends)	0.196	0.023
		Attitude toward deeper level of social interaction in group activity for neighbourhood park	0.202	0.024
Self-rated Positive mental health		Deeper level social interaction in group activity (making friends)	0.216	0.017
Self-rated lonely		Attitude toward deeper level of social interaction in group activity for neighbourhood park	-0.258	0.005
Self-rated useless		Attitude toward deeper level of social interaction in group activity for neighbourhood park	-0.270	0.003

Table 8.8

findings of this study echoes with conclusions of Scannel and Gifford (2017), and illustrates the relationship between emotional bonding and experienced psychological benefit, and gives future understanding of the complex and dynamic psychological benefit system with heuristic insights.

This chapter set out with the aim of contributing to discover the inner structure and key features of the dynamic system of interaction relationship and to uncover the most influential factors for the well-being and mental health of the ageing people. In addition, this chapter is a supplement to the main conceptual framework discovered. The data using to analyses for this chapter is an integration of questionnaire and semi-structured interview.

The conceptual framework emerging in this study is a complex and dynamic system with many details. It means that the subset of concepts is intertwined or affected a certain part of other concepts. However, all the findings could be integrated with the findings from chapter 6 and 7 into a comprehensive conceptual framework.

Overall, there are some key findings identified in this chapter need to emphasis as following:

- the results of this study indicate that the range of associations are existing and positively correlating with each other among the self-rated psychological status, experienced psychological benefit, experienced relief loneliness, emotional bonding, and social and perceptual dimension.
- Another important finding was that the value of each indicator is different. What need to be highlight here are:
 - The social dimension of the neighbourhood park in this study shows a significant positive impact on experienced psychological benefit, self-rated psychological status, and emotional bonding. It means the social interaction in

neighbourhood park and a positive attitude toward social function of neighbourhood park are contributing to help the elderly to obtain the psychological benefit and to maintain the mental health.

- The perceptual dimension of the neighbourhood park shows the contribution in experienced relief loneliness and benefiting in health, social network and belonging. It means that both inside and outside experienced friendly environment combined a completely perceptual dimension of the neighbourhood park, and it influencing the elderly park users' psychological benefit.

In addition, the findings from this chapter contributes to two conceptual framework:

- Table 8-10 the integrated conceptual framework of the associations between social and perceptual attributes and the indicators among emotional bonding, experienced psychological benefit, and self-rated psychological status.the integrated conceptual framework of the associations between social and perceptual attributes and the indicators among emotional bonding, experienced psychological benefit, and self-rated psychological status.
- Table 10-3 the integrated conceptual framework of associations among psychological statement, emotional bonding, social interaction, experienced psychological benefit, and usage behaviour of the elderly neighbourhood park users.

Table 8-10 the integrated conceptual framework of the associations between social and perceptual attributes and the indicators among emotional bonding, experienced psychological benefit, and self-rated psychological status.

Attitude of social and perceptual dimension	*	Emotional bonding	Value	*	Experienced psychological benefit	Value	*	Self-rated psychological status	Value
Join group activity	*	Emotional bonding-personal dimension	0.184	*	Experienced benefit health	0.278	*		
	*	Emotional bonding-place dimension- social level1	0.226	*	Experienced benefit social network	0.302	*		
	*	Emotional bonding-place dimension- social level2	0.290	*	Experienced benefit belonging	0.204	*		
	*	Emotional bonding – psychological process dimension- emotional level	0.177	*			*		
	*	Emotional bonding – psychological process dimension- cognitive level	0.233	*			*		
	*	Emotional bonding – psychological process dimension-behaviour level 1	0.209	*			*		
Deeper level social interaction in group activity (making friends)	*	Emotional bonding-personal dimension	0.336	*	Experienced benefit social network	0.287	*	Self-rated Quality of life	0.210
	*	Emotional bonding-place dimension- social level1	0.348	*	Experienced benefit belonging	0.238	*	Self-rated Health	0.196
	*	Emotional bonding – psychological process dimension- emotional level	0.169	*	Experienced relief loneliness	0.412	*	Self-rated Positive mental health	0.216
	*	Emotional bonding – psychological process dimension-behaviour level 2	0.232	*			*		
Attitude toward deeper level of social interaction in group activity for neighbourhood park	*	Emotional bonding-personal dimension	0.373	*	Experienced benefit confidence	0.194	*	Self-rated Quality of life	0.362
	*	Emotional bonding-place dimension- social level1	0.268	*	Experienced benefit health	0.307	*	Self-rated Health	0.202
	*	Emotional bonding-place dimension- social level2	0.376	*	Experienced benefit social network	0.377	*	Self-rated lonely	- 0.258
	*	Emotional bonding – psychological process dimension-behaviour level 1	0.204	*	Experienced benefit belonging	0.184	*	Self-rated useless	- 0.270
	*	Emotional bonding – psychological process dimension-behaviour level 2	0.229	*	Experienced relief loneliness	0.474	*		
Received friendliness from local group in neighbourhood park Received friendliness from local resident	*	Emotional bonding-place dimension- social level2	0.198	*	Experienced relief loneliness	0.270	*		
	*	Emotional bonding-place dimension- social level1	0.180	*	Experienced benefit health	0.157	*		
	*	Emotional bonding – psychological process dimension- emotional level	0.131	*	Experienced benefit social network	0.160	*		
	*	Emotional bonding – psychological process dimension-behaviour level 1	0.165	*	Experienced benefit belonging	0.206	*		
	*	Emotional bonding – psychological process dimension-behaviour level 2	0.167	*	Experienced relief loneliness	0.199	*		

Chapter 9 The behaviour analysis based on questionnaire and observation

9.1 Introduction

This chapter aimed to investigate the features of behaviours of ageing people in the neighbourhood parks. The questionnaire survey and the non-participant observation in the sites were used to collect the behavioural data. The advantage of using questionnaires to collect data on behavioural characteristics is that multiple pieces of information can be accurately acquired and multi-dimensional stereo analysis can be performed. Observing and documenting the scope of the more comprehensive behaviours that are unknown and the relationship between behaviour and place.

This chapter plays an essential role in achieving three goals for this research; they are:

- To uncover the features of usage of the ageing people in the neighbourhood parks;
- To produce the behaviour map of ageing people;
- The findings from this chapter will be discussed in next chapter,
- To discover the gap between current statement of urban open space and desire of the ageing people.

In this chapter, there are two sections, as follows:

- Dimensions analysis of the behaviour of ageing people:
 - Single-dimension analysis: number of participant of activity; dependence of the neighbourhood park; dependence of place in the neighbourhood park; rest place; most using place; time range of using the park; who come with; frequency of using park; duration of using park; means to go; the distance between park and home.
 - Double-dimensions analysis: there are three series including behaviour-oriented analysis (activity – most using place, activity – rest place, activity – time range, activity – which come with) and place-oriented (park – activity, park – most using park, park – rest place, park – time range, park – who come with)
 - Triple-dimensions analysis: this section aimed to assess the differences of the relations mentioned above in different gender and age group to investigate the impact of gender and ageing of the older park users, and also to investigate the features of gender-age-time range and gender-age-rest place.
- Behaviour map (spatial behaviour analysis?) of ageing people based on observation and

mapping

This section attempts to discover the features of usage behaviours of older people in the neighbourhood park and to produce a behaviour map of ageing people based on spatial-distribution of behaviours. In other to achieve these goals, this section divided into two parts to separately answering: where did the older people most use; and how they most use these places. A cross-comparative analysis based on a non-participant observation and behaviour mapping in Map Box with editing database were used to achieve these aims.

9.2 The dimensions analysis of features of usage behaviour of ageing people in the neighbourhood park

This section set out to uncover the features of usage of ageing people in the neighbourhood park. It includes three parts as single dimension analysis, double-dimension analysis, triple-dimension analysis, the integrated analysis process gives a clear and essential future understanding of the behaviour of older park users. In this section, descriptive data analysis and comparative cross-table figures were used to discover the characters of behaviours using the park and the differences in places, gender, ageing steps.

9.2.1 Single-dimension analysis

The single dimension analysis used the descriptive data analysis approach to directly explore the features from the responses of the questions in part A of the questionnaire. The issues covered: number of participant of activity; dependence of the neighbourhood park; dependence of place in the neighbourhood park; rest place; most using place; time range of using the park; who come with; frequency of using park; duration of using park; means to go; the distance between park and home. The characters of usage of ageing people were abstracted from figures.

9.2.1.1 The most popular activities of ageing people in the neighbourhood park

Figure 9-1 shows that the first five most popular activities of ageing people are walking or jogging (25%), sitting in the sun (13%), enjoy scenery (11%), playing poker or chess (10%), and playing with children (9%).

For the social dimension, there are 37% of ageing people chose activities regarding the middle level of social interaction as doing the same activity with others and high level of social interaction as chatting with the others in the neighbourhood park. (playing poker or chess, dancing, singing, playing with children, chatting). On the other hand, there are 27% of ageing people chose relatively individual activity and the activities focusing on the physical environment of the neighbourhood park. (enjoy the scenery and sitting in the sun, reading a newspaper or listen to the radio).

The interesting point emerged as follows:

- The number of older people who choose park activities with social possibilities is higher than the number of older people who prefer individual activities. Space, where the park has the functions of social interaction, should receive more attention.

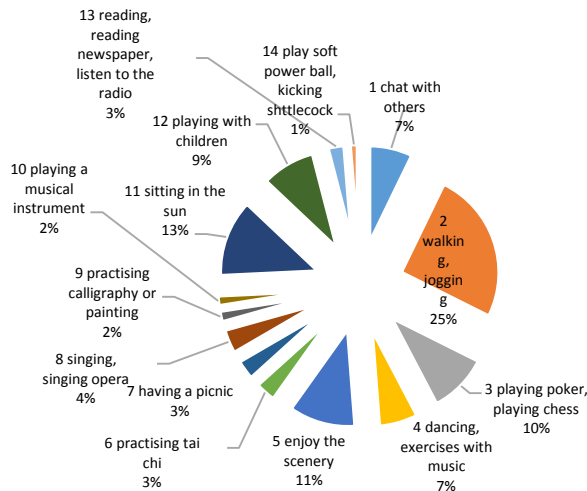


Figure 9-1 the result of part A-1 Question: the activities you do most in this park, max choose three main options

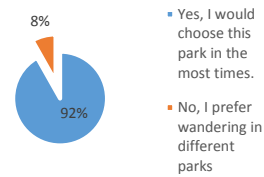


Figure 9-2 the result of part A-2 Question: will you normally choose to take a rest in this park?

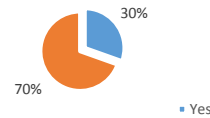


Figure 9-3 the result of part A-3 Question: do you have a favorite rest place in the park?

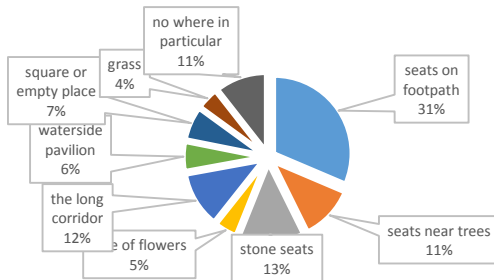


Figure 9-4 the result of part A-4 Question: which is your prefer rest place ?

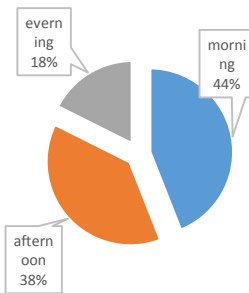


Figure 9-5 the result of part A-6 question when do you most often come to the park?

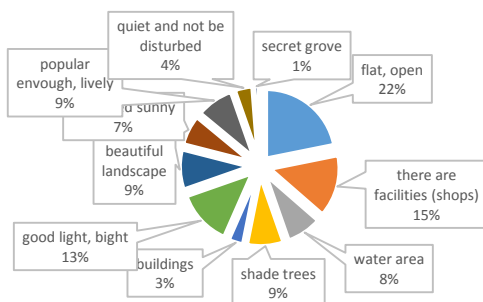


Figure 9-6 the result of part A-5 question: what are description of place in the park you often use? (multiple choice)

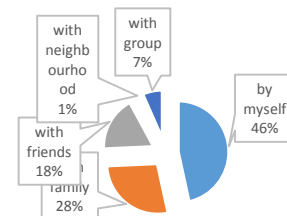


Figure 9-7 the result of part A-7 who you often come with?

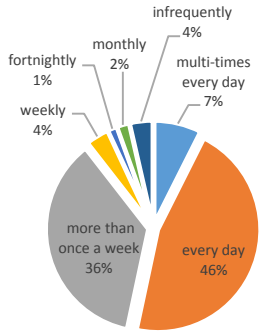


Figure 9-8 the result of part A-8 Question: how often do you come o this park?

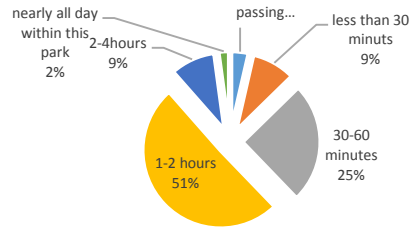


Figure 9-9 the result of part A-9 How long do you usually stay in the park?

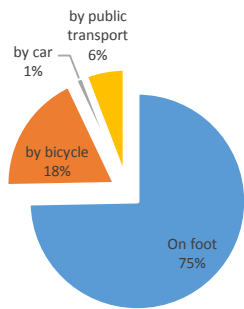


Figure 9-10 the result of part A-10 Question: means go this park?

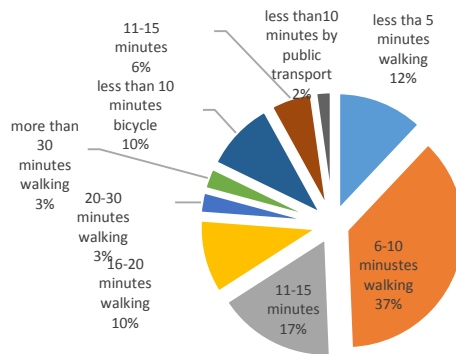


Figure 9-11 the result of part A-11 How far have you come here?

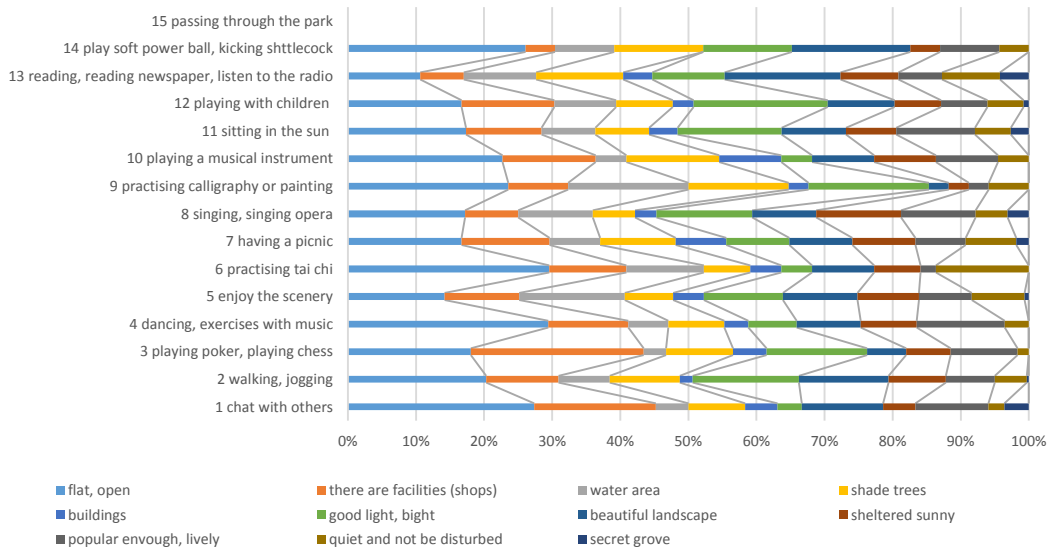


Figure 9-12 the comparative analysis of most using places in different patterns of activity

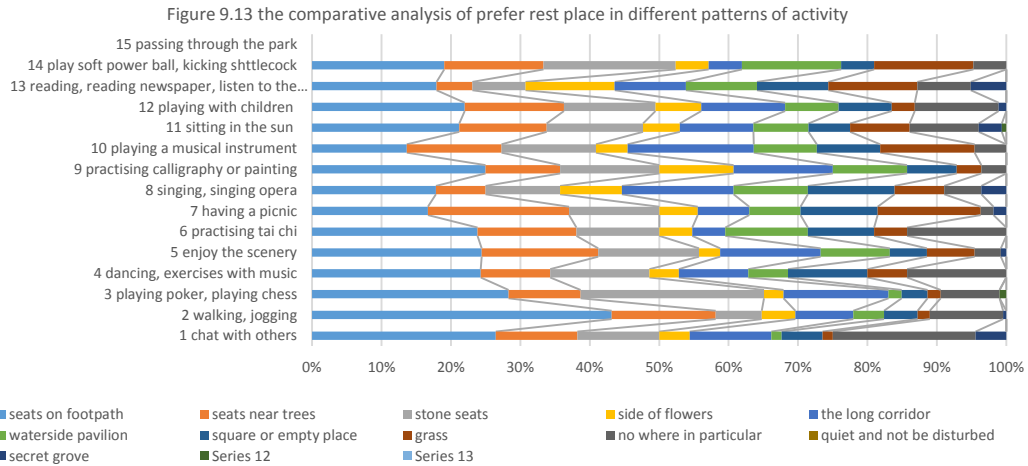


Figure 9-13 the comparative analysis of prefer rest place in different patterns of activity

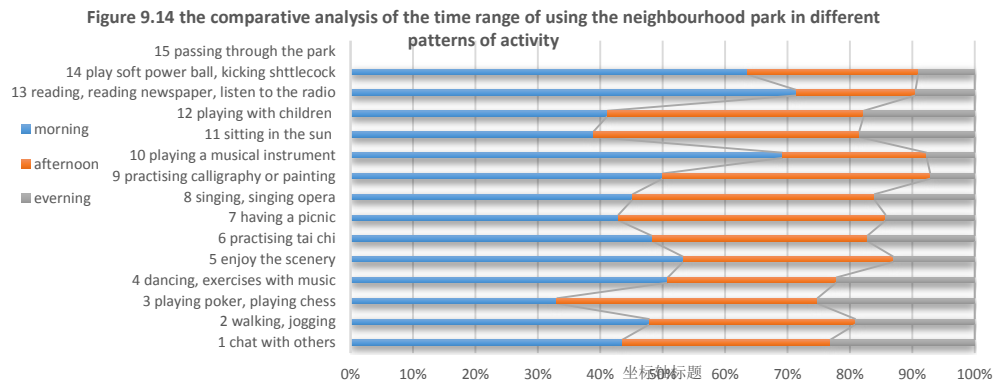


Figure 9-14 the comparative analysis of the time range of using the neighbourhood park in different patterns of activity

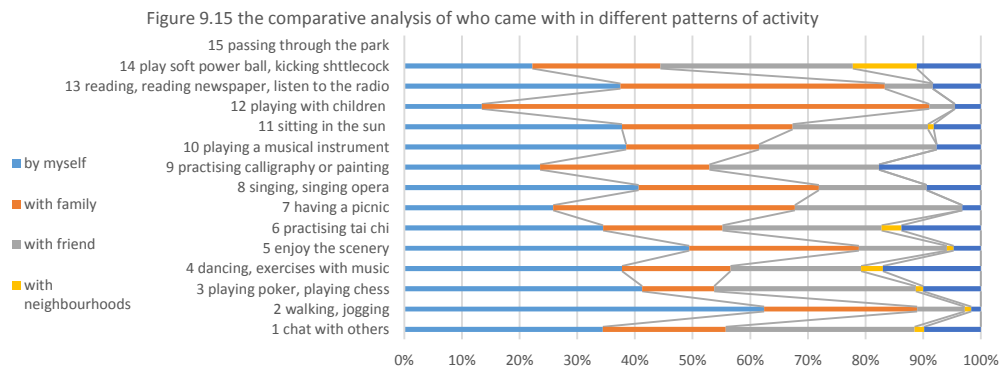


Figure 9-15 the comparative analysis of who came with in different patterns of activity

9.2.1.2 Dependence of the neighbourhood park

The result of question A-2 (Figure 9-2) shows there are 92% of the ageing people usually chose the same neighbourhood park to take a rest. It implies that the dependence of the neighbourhood park is relatively high and the neighbourhood park plays a more significant role in the daily life of the ageing people compared with the other types of urban green space.

9.2.1.3 Dependence of place in the neighbourhood park

The result of question A-3 (Figure 9-3) shows that 30% of the ageing people had a favourite rest place in the neighbourhood park. The dependence of the single place is relatively weak, but it is still considerably existing. The dependence for this part of ageing people could engage them to use this park, which gives a positive impact on their mental health and well-being.

9.2.1.4 The preferred rest place of the ageing park users

The result of question A-4 (Figure 9-4) shows that seats on the footpath are most of the ageing people (31%) choosing preferred rest places compared to the other places. It implies that degraded body function impacts their using behaviour. When the elderly feel tired, they need to sit down and rest immediately. It may be a potential reason for roadside seats to be favoured by the elderly. Besides, some other places show a relatively high percentage. They are stone seats (13%), the long corridor (12%), the seat near trees (11%). Thus, the ageing friendly design should be improved, focusing on these places where are most frequently used by older people.

9.2.1.5 The often used place by the ageing park users

The result of question A-5 (Figure 9-6) shows the three descriptions of familiar places where the elderly choose the most are 'flat, open' (22%), 'there are facilities' (15%), 'good light, bright' (13%). The decline in action and vision may prompt older people to choose flat, bright local activities. Facilities can provide shade or shelter for the elderly, which provides comfort and convenience for older people who are slow-moving.

9.2.1.6 When do the elderly most often come to the park?

Figure 9-5 shows the primary time range of coming to the neighbourhood park is morning (44%), the second time range is afternoon (38%), the ageing people who came at evening are 18%. The most ageing people prefer the bright time to use the neighbourhood park.

9.2.1.7 Who are you often come with to the neighbourhood park?

Figure 9-7 presents that the number of older people who came to the park alone accounted for 46%, followed by family members, 28%, and 18% of the elderly who came to the park with friends, and 7% of the elderly with the partners. Only 1% of people came with their neighbours. It implies that the needs for social interaction and social psychological satisfaction from the neighbourhood park should be paid more attention.

9.2.1.8 The frequency of using the neighbourhood park.

Figure 9-8 shows that more than half of ageing park users came to the neighbourhood park every day include 46% of them coming to the park once every day and 7% of them coming to the park multi-times every day. The second most group is the ageing park users who used the

park more than once a week. It implies that most ageing park users have a frequently and regularly behaviour in using the neighbourhood park. The quality of the neighbourhood park very carefully likes with their daily life and quality of life.

9.2.1.9 Duration of using the neighbourhood park

Figure 9-9 shows that the half of the ageing people (51%) spent 1-2 hours in the neighbourhood park each time and 11% of the ageing park users spent more than 2 hours in the park each time. It implies the importance of the neighbourhood park for them.

9.2.1.10 Means of going to the neighbourhood park

Figure 9-10 shows there are 75% of ageing park users going to the neighbourhood park on foot. It implies the most of older park users in a relatively satisfying distance between their home and the neighbourhood park. On the other hand, there are 25% of the older park users going to the neighbourhood park by traffic tools such as bicycle (18%), car (1%), public transport (6%). It not only shows the far distance but also implies the attractiveness of the neighbourhood park plays an essential role in engaging them in using the park.

9.2.1.11 The distance

Figure 9-11 shows the most of ageing park users using the nearby neighbourhood park by less 20 minutes walking. However, there are still 21% of ageing park users who lives far and spend more than 30 minutes by walking or the other traffic tools. It implies that the current number of the neighbourhood park is insufficient. On the other hand, it shows the neighbourhood park is very attractive for the ageing people.

9.2.1.12 Summary

This section set out to uncover the features of usage of the ageing people in the neighbourhood park by using descriptive data analysis based on the results of part A of the questionnaire. In general, the features of usage and some essential point emerged as follows:

- The number of older people who choose park activities with social possibilities is higher than the number of older people who prefer individual activities. Space, where the park has the functions of social interaction, should receive more attention.
- 92% of the elderly have specific parks to go to activities, which means that dependence on neighbourhood parks is common among the elderly. However, the dependence on a special place in the neighbourhood park is not a common phenomenon among the ageing people. However, only 66% of ageing people could go to the neighbourhood park by walking for less than 20 minutes, but the current number of neighbourhood park is insufficient. On the other hand, it shows the neighbourhood park is very attractive for the ageing people.

- The most ageing park users prefer using a flat and open with good light and look bright place where were built with some facilities could shade or provide shelter for them. Moreover, the ageing friendly design should be improved focusing on these places where are most frequently used by the older people to have a rest; the place are: seats on the footpath; stone seats; the long corridor; the seat near trees
- The time range of the ageing park users: morning > afternoon > evening. Besides, the most ageing park users have a frequently and regularly behaviour in using the neighbourhood park, every day once and more than once a week are typical among the older park users. The quality of the neighbourhood park very close links with their daily life and quality of life. However, the ageing park users who came alone are the majority, in this way, the needs of social interaction and social psychological satisfaction from the neighbourhood park should be paid more attention

9.2.2 Double-dimensions analysis

This section set out to investigate the effect of two aspects, including the effect of patterns of activity on the other aspects of usage feature, the effect of the place on the features of usage. Double-dimensions analysis: there are three series including behaviour-oriented analysis (activity – most using place, activity – rest place, activity – time range, activity – who come with) and place-oriented (park – activity, park – most using park, park – rest place, park – time range, park – who come with) The cross-table figures were used to achieve this aim.

9.2.2.1 Behaviour-oriented analysis

In general, the elderly who choose each activity, due to the characteristics of the activities, show certain differences in the choice of often using places and usually resting places. With whom, there is a clear difference in the selection activities. The activity time only shows differences in a few activities, and the time ratios of other activities are similar.

- **Activity & most using place in the neighbourhood park**

Figure 9-12 shows that some activities have obvious differences and preferences in the field compared to other activities, they are

- Chatting: flat, open, there are facilities, beautiful landscape, popular and lively;
- Group activity: dancing in a group with music: flat, open, popular and lively;
Singing songs in the group: flat, open, good light, sheltered sunny;
- Entertainment: there are facilities, good light, bright;
- Playing with children: good light, bright

- **Activity & rest places**

Figure 9-13 shows that the resting place had some difference when the ageing people chose a

different activity. Some features show as follows:

- Walking or jogging: seats on footpath;
- Group activity: dancing: square or empty place;
- Singing songs: square or empty place; the long corridor;
- Playing a musical instrument: the long corridor;
- Entertainment activity as playing chess or poker: the lone corridor, stone seats;
- Individual static activity as enjoys the scenery, practice Tai Chi: waterside pavilion.

- **Activity & time range of using the park**

Figure 9-14 shows all activity what chose by the ageing people are cover three range of time, but there are still some relatively obvious differences in the time range depending on the patterns of activity:

- More in the morning: playing a musical instrument, reading a newspaper or listen to the radio, playing soft power ball or kicking the shuttlecock, enjoy the scenery;
- More in the afternoon: playing poker or chess, having a picnic, sitting in the sun, playing with children;
- More in the evening: playing chess or poker, dancing, exercise with music, chatting with others; walking.

- **Activity & who came with**

Figure 9-15 shows the ageing people who have some obvious difference in preferring patterns of activity, were coming with a different person or alone.

- By themselves: walking or jogging, enjoy the scenery, singing songs or opera, playing a musical instrument, sitting in the sun, reading a newspaper or listening radio;
- With family: playing with children, having a picnic, enjoying the scenery;
- With friends: chatting with others, playing poker or chess, dancing, practising Tai Chi, playing musical instruments, playing soft power ball, or kicking shuttlecock;
- With neighbourhood: playing soft power ball, or kicking shuttlecock, dancing or exercise with music, chatting with others, walking;
- With a group: dancing or exercise with music, practising Tai Chi, playing poker or chess, chatting with others, singing songs or opera.

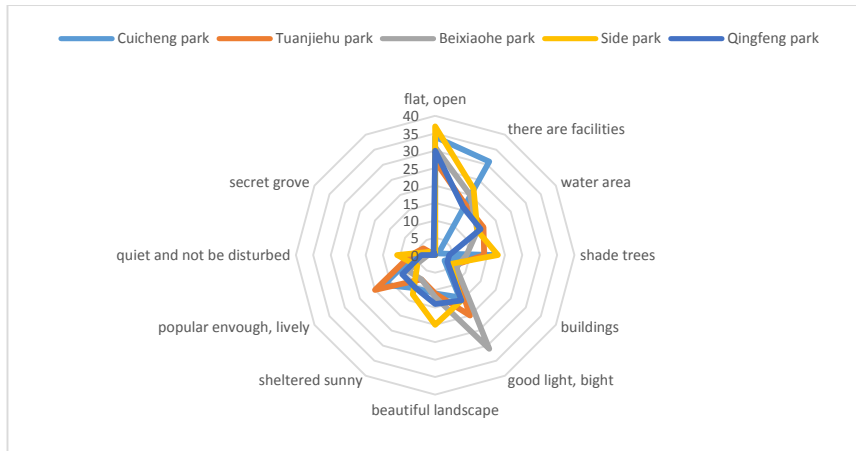


Figure 9-16 the comparative analysis of the most using places in the 5 neighbourhood parks

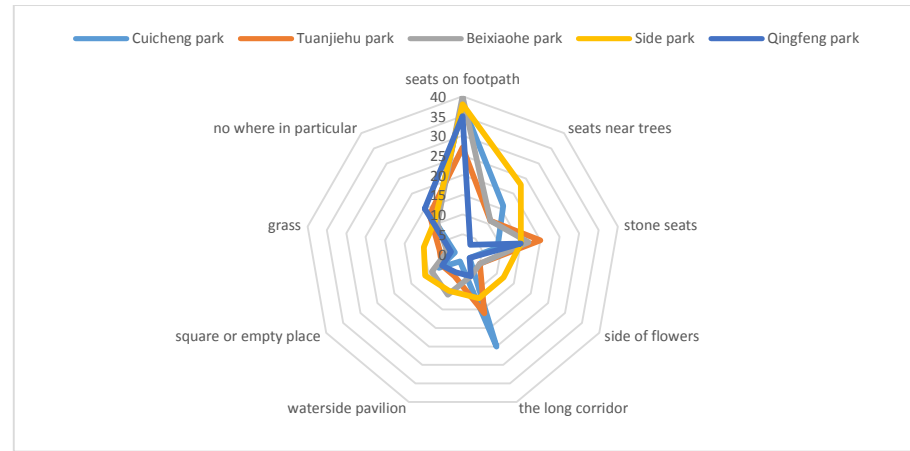


Figure 9-17 the comparative analysis of the prefer resting places in the 5 neighbourhood parks

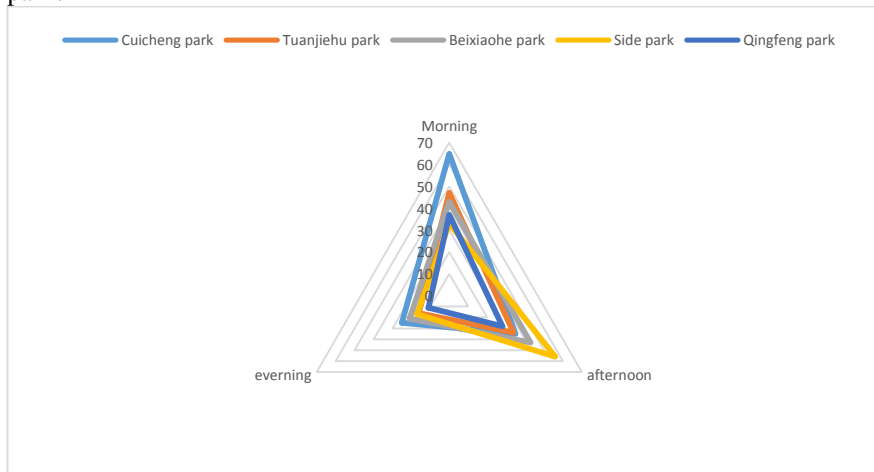


Figure 9-18 the comparative analysis of time range of using park in the 5 neighbourhood parks

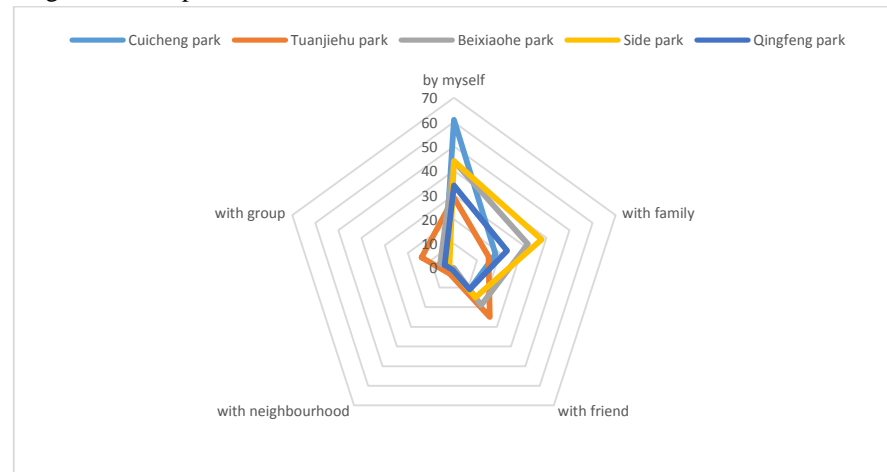


Figure 9-19 the comparative analysis of the who came with the ageing park users in the 5 neighbourhood parks

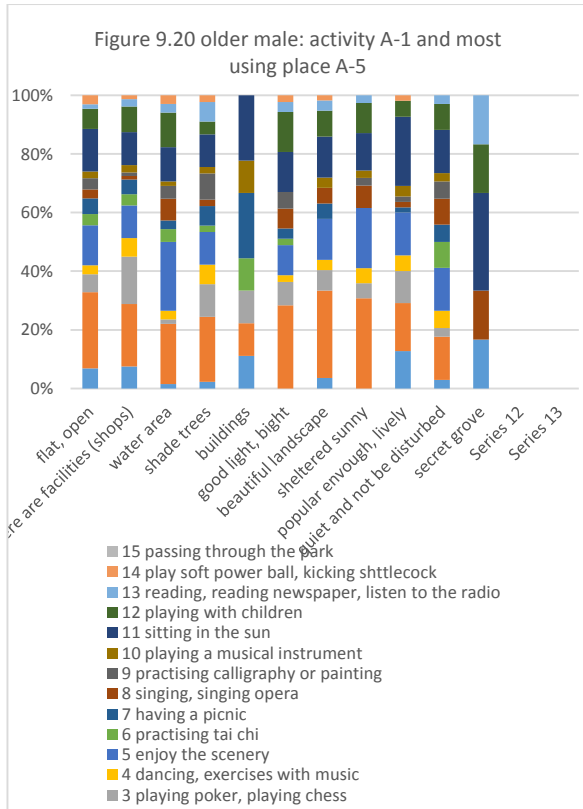


Figure 9-20 older male: activity A-1 and most using place A-5

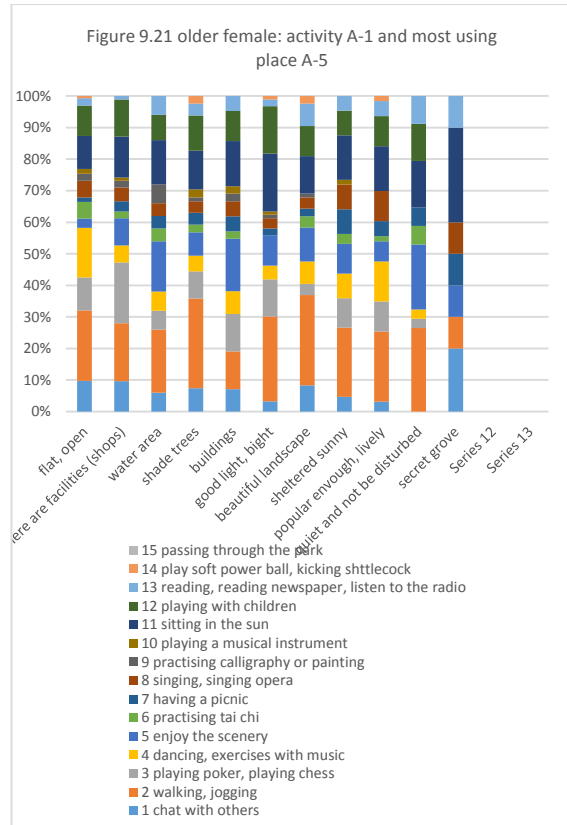


Figure 9-21 older female: activity A-1 and most using place A-5

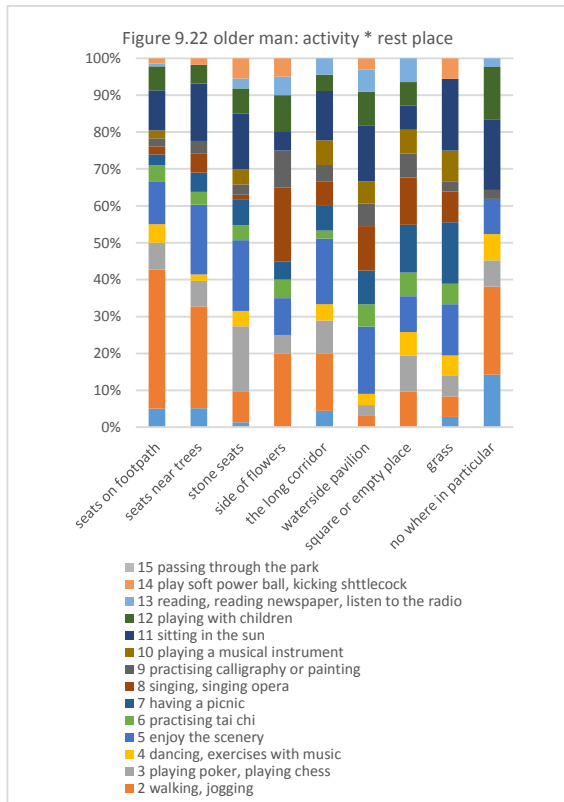


Figure 9-22 older man: activity * rest place

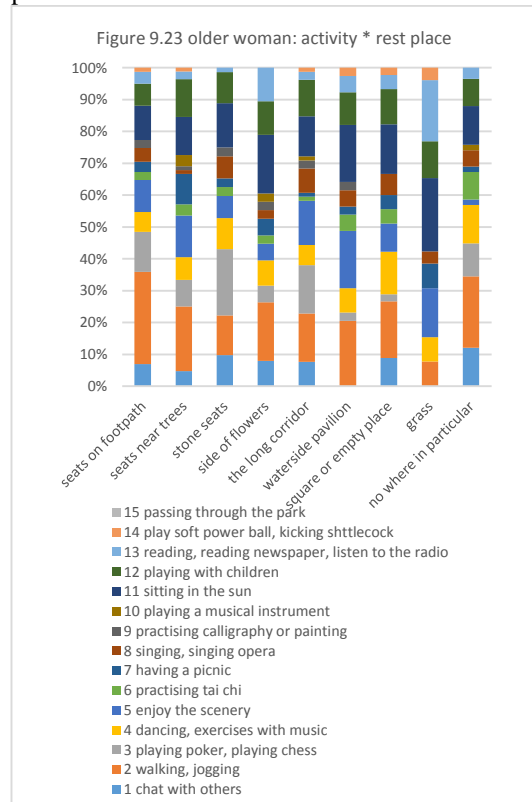


Figure 9-23 older woman: activity * rest place

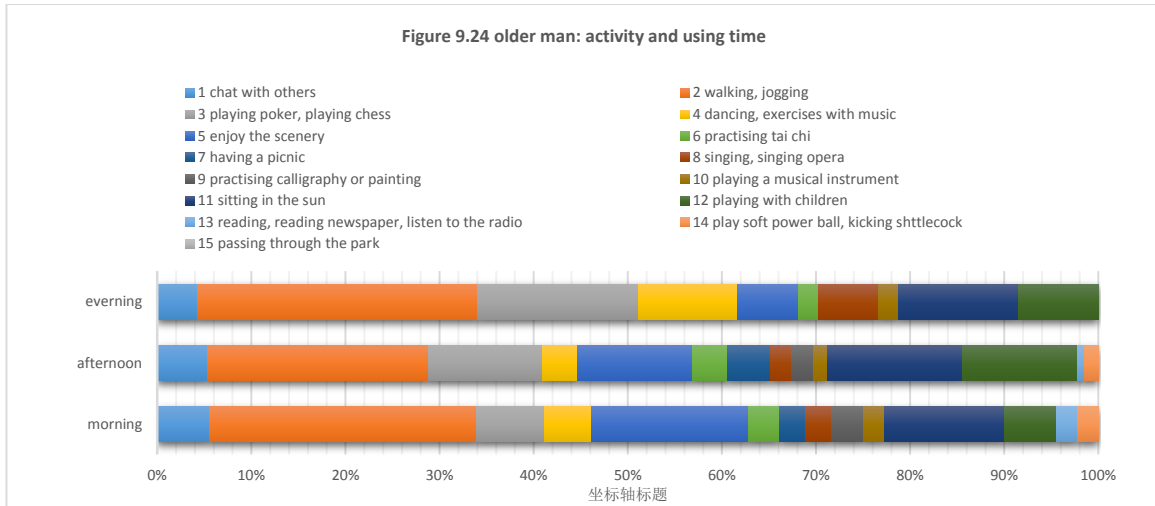


Figure 9-24 older man: activity and using time

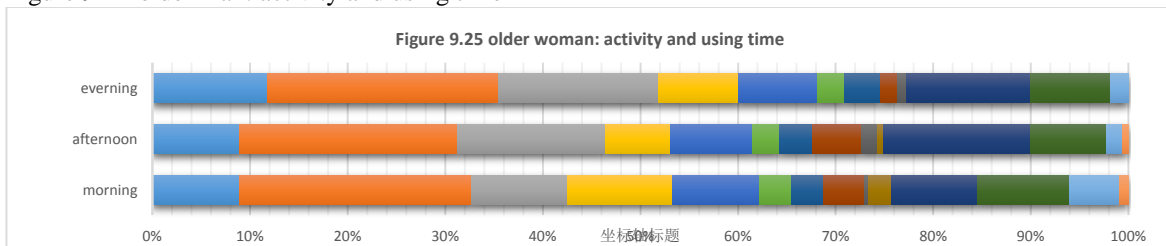


Figure 9-25 older woman: activity and using time

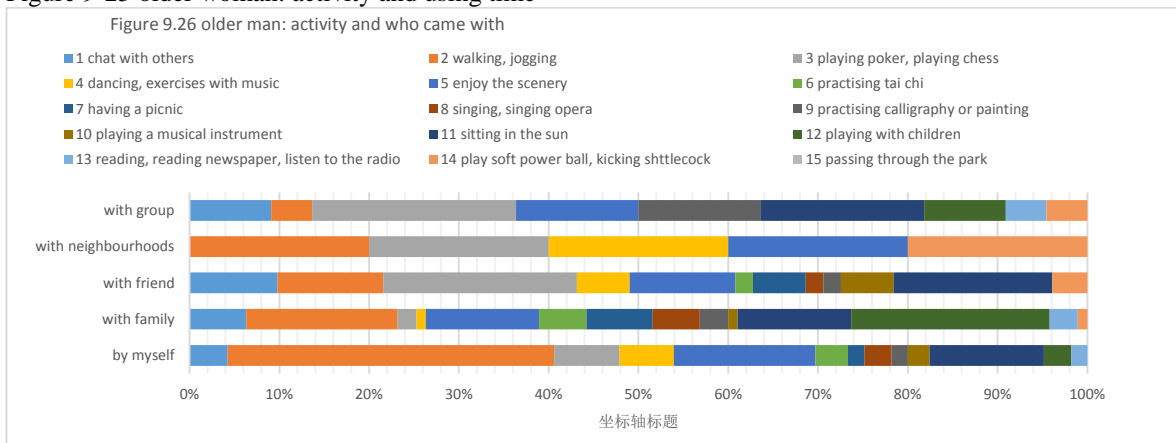


Figure 9-26 older man: activity and who came with

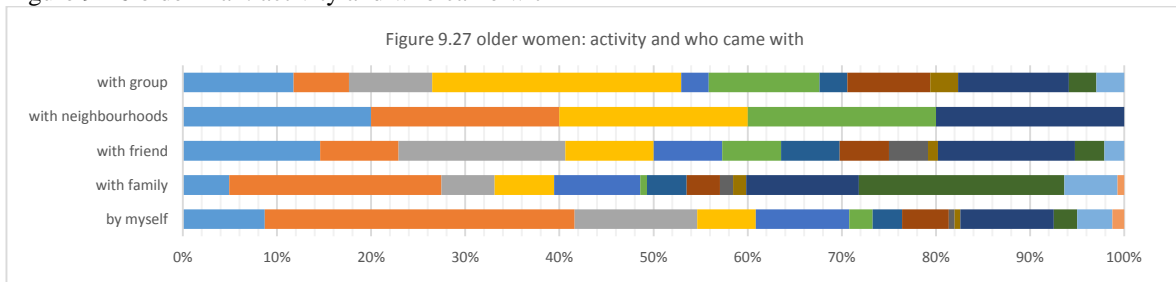


Figure 9-27 older women: activity and who came with

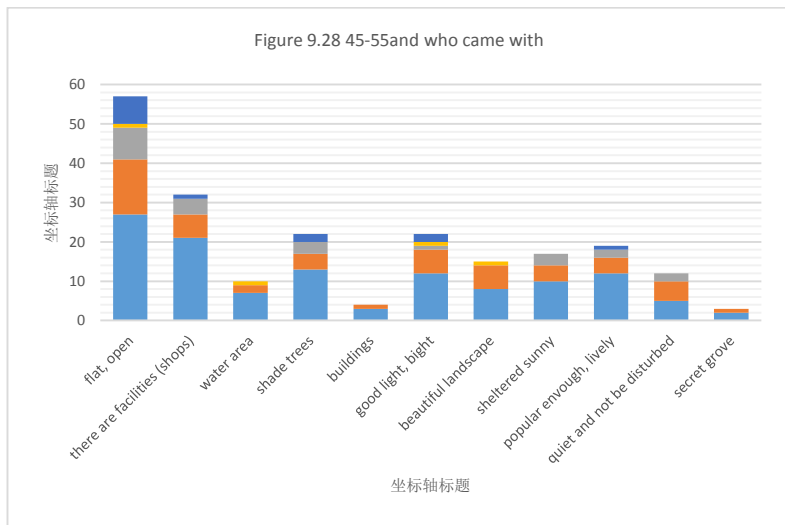


Figure 9-28 45-55 and who came with

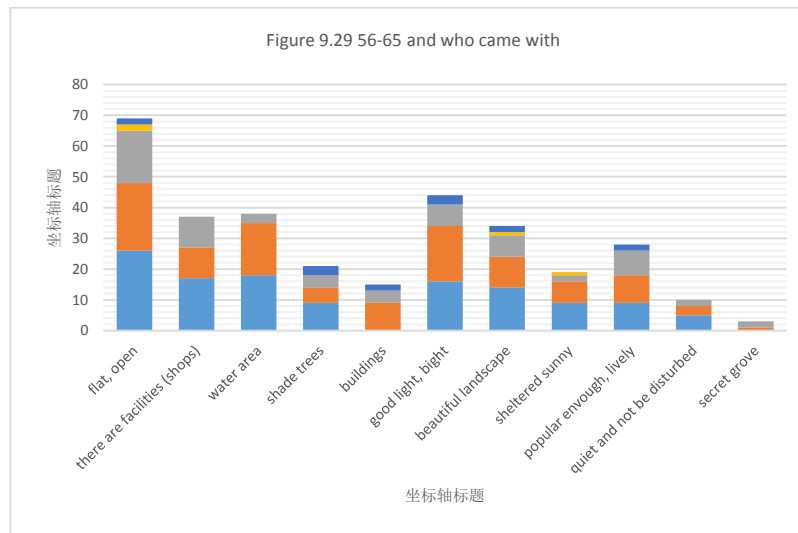


Figure 9-29 56-65 and who came with

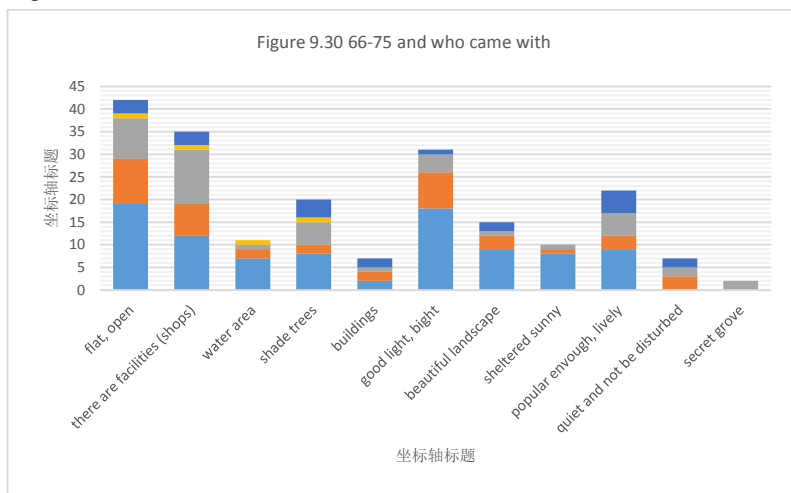


Figure 9-30 66-75 and who came with

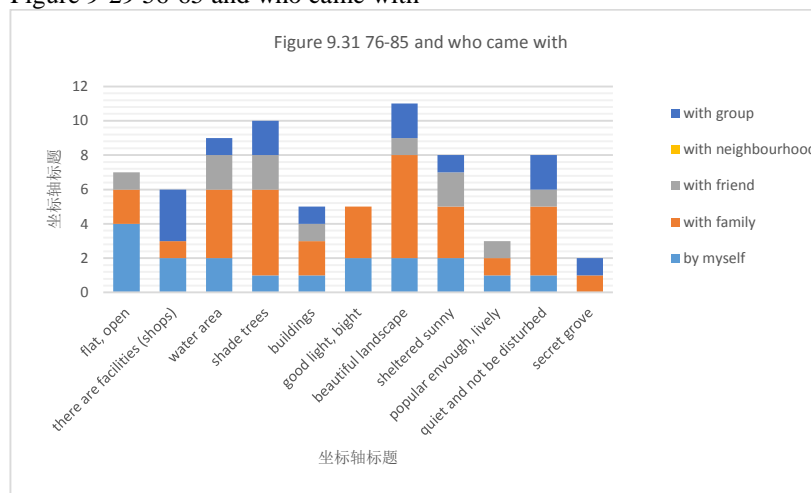


Figure 9-31 76-85 and who came with

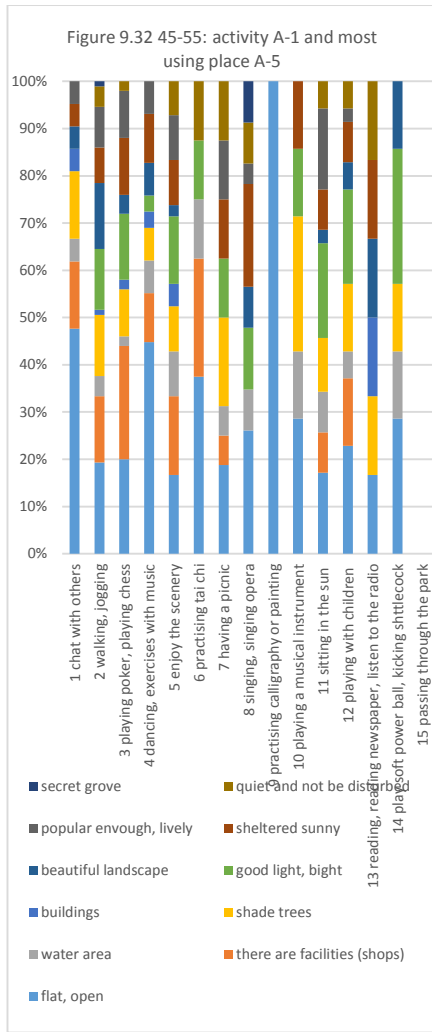


Figure 9-32 45-55: activity A-1 and most using place A-5

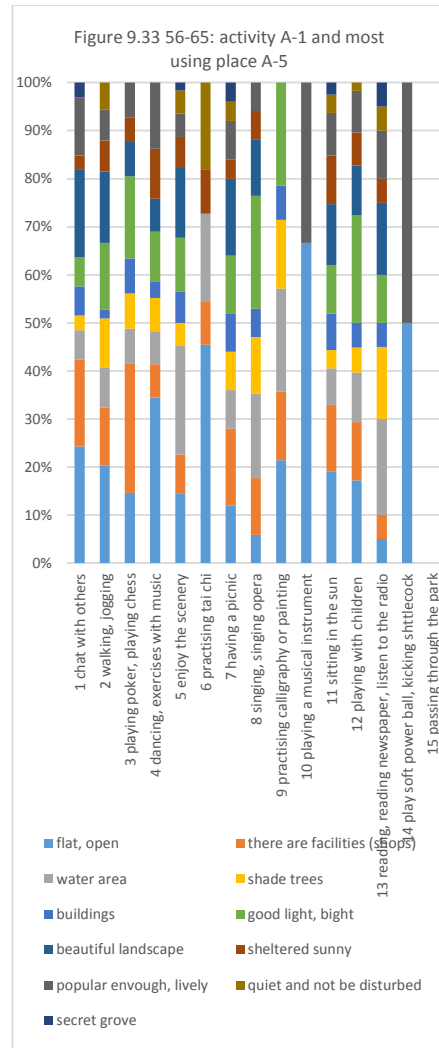


Figure 9-33 56-65: activity A-1 and most using place A-5

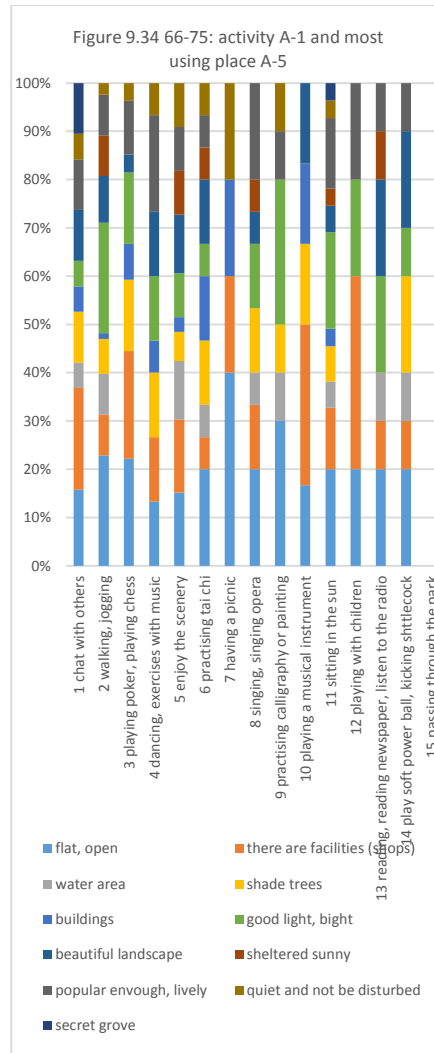


Figure 9-34 66-75: activity A-1 and most using place A-5

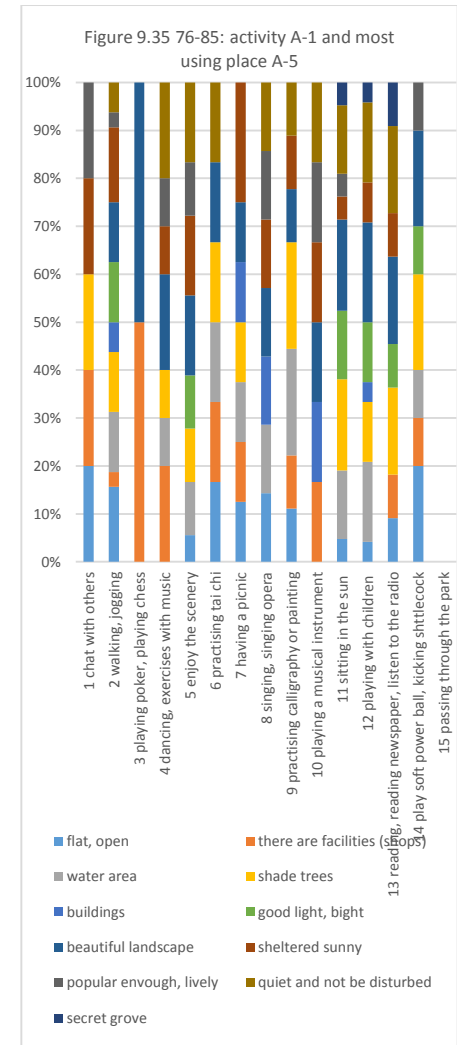


Figure 9-35 76-85: activity A-1 and most using place A-5

time range of using neighbourhood park in different gender and different age group

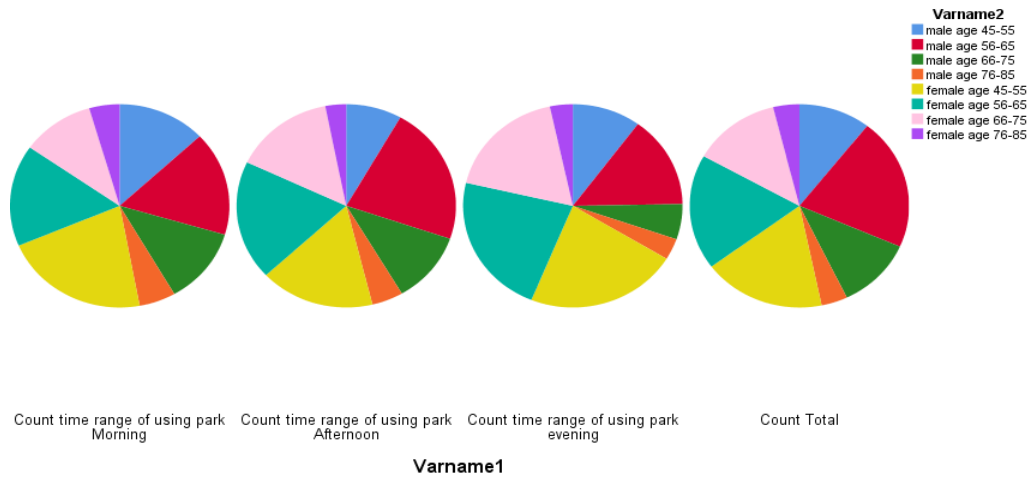


Figure 9-36 the pie chart comparison of the time range of using a neighbourhood park in different age group in different gender.

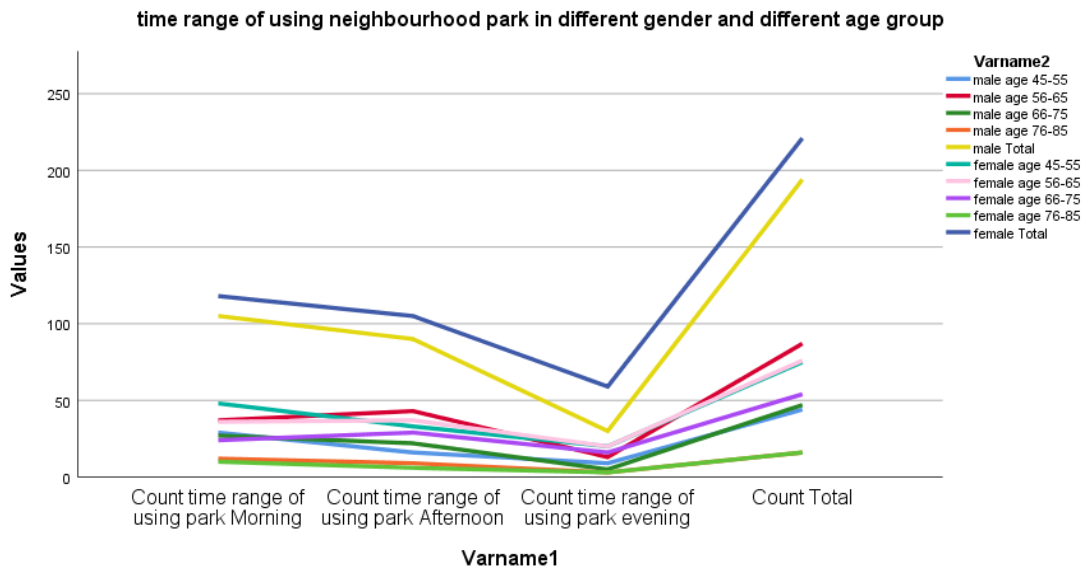


Figure 9-37 the line chart comparison of the time range of using a neighbourhood park in different age group in different gender.

the prefer rest place in different gender and different age group

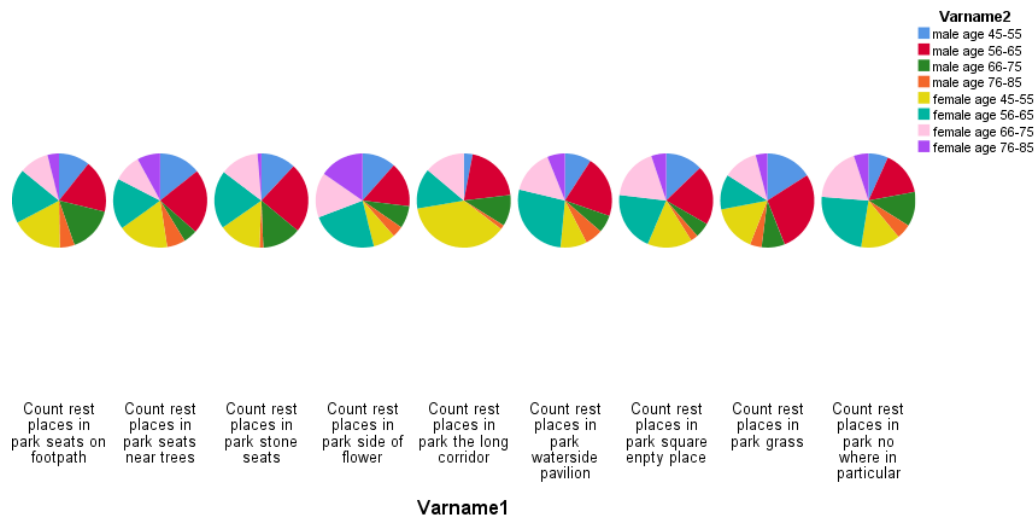


Figure 9-38 the pie chart comparison of the performance of different age group in different gender in the prefer rest in neighbourhood park

the prefer rest place in different gender and different age group

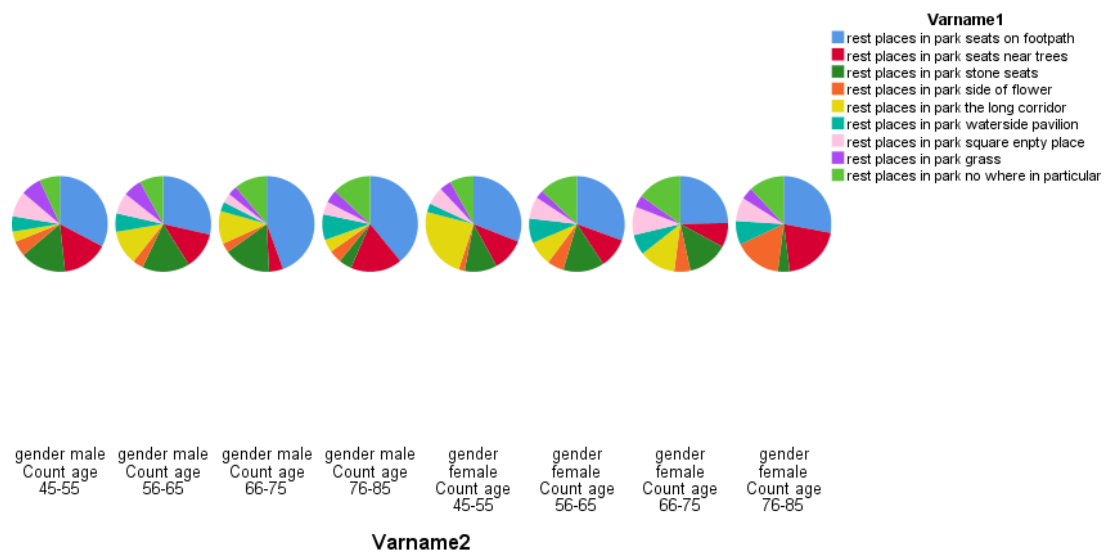


Figure 9-39 the pie chart comparison of prefer using places in neighbourhood park in different age group in different gender.

9.2.2.2 Place-oriented analysis

In general, the trend of time range and who come with the ageing people are relatively similar with the overview state, but the most used places and rest places show some obvious differences in different neighbourhood parks.

- **The neighbourhood parks & the most using places**

Figure 9-16 shows the number of ageing people of some most using places in neighbourhood park is obviously higher than the other parks. Thus the features of these parks preferred by ageing people have emerged as follows:

- Side park: flat, open, shade trees, beautiful landscape, sheltered sunny, quiet and not be disturbed;
- Tuanjiehu park: popular and lively, water area;
- Cuicheng park: there are facilities, popular and lively;
- Beixiaohe park: good light, bright;

- **The neighbourhood parks & the resting places**

Figure 9-17 shows the resting places are considerably different in different neighbourhood park as follows:

- Cuicheng park: the long corridor;
- Tuanjiehu park: stone seats, the long corridor;
- Beixiaohe park: seats on a footpath, waterside pavilion;
- Side park: seats on a footpath, seats near trees, side of flowers, square or empty place;
- Qingfeng park: grass.

- **The neighbourhood park & time range**

Depending on the Figure 9-18 shown, the similar trend of the time range of using park is mainly in the morning, the second afternoon, third evening. However, Side park shows a different trend; its peak time range is afternoon.

- **The neighbourhood park & who came with the ageing park users**

Figure 9-19 shows the result of who came with the ageing park users are generally similar, but in Cuicheng park, the percentage of going alone is considerably higher than the other four parks and in Tuanjiehu park, the perceptual of going with friends and with members of the group are higher than the others.

- Cuicheng park: going alone;
- Tuanjiehu park: with friends and with groups.

9.2.3 Triple-dimensions analysis

The triple-dimension analysis used to discover the mixed features hiding in different aspects of the behaviours of the ageing park users in different ageing stages and gender. This section includes three parts of the triple-dimension analysis, as follows:

- Gender * patterns of activity – most using places;
 - * patterns of activity – often rest places;
 - * patterns of activity – time range of using the park;
 - * patterns of activity – who often came with;
- Age group * most using places – who often came with;
 - * most using places – patterns of activity;
- Gender * Age group * time range of using the park;
 - * often rest places;

The cross-table figures were used to achieve this aim. The significant difference emerged in each analysis.

9.2.3.1 Gender in patterns of activity in four aspects

- Gender * patterns of activity – most using places

There are some essential features of most using places chosen by the ageing people prefer different activities compared to older male with older female. The comparison on Figure 9-20 and Figure 9-21 shows:

- The flat and open place service older women were choosing group activities as dancing in a group, social activity as chatting and looking after children than the older man.
 - Older women have a certain percentage of people chatting in various places, while older men's chat behaviour mainly appears in several places: flat, open, place with facilities, place with building, popular enough, lively place and secret grove.
 - In the side of the water area, older men tend individual activity, such as enjoy the scenery, while older women tend to socialize, such as chatting.
 - Both older man and older women prefer using a place with facilities and buildings, when they tend entertainment activity, such as playing poker or chess.
- Gender * patterns of activity – most resting places;

The comparison on Figure 9-22 and Figure 9-23 shows some important features of activity of

the older women and the older man in different rest places. These features are:

- The older women have social behaviour, such as chatting, in most resting places; while the social behaviour of the older man mainly occurred in seats on the footpath or near some trees;
 - The older man has a relatively high percentage of individual activities walking or enjoy the scenery on seats nearby trees, stone seats, the long corridor, waterside pavilion.
 - Both older man and female have a relatively high percentage of them like sitting in the sun; the difference is the older women shows more interests in place with a beautiful view such as a side of flowers and waterside pavilions. The older man who likes to rest at a side of flowers is more percentage in a group activity such as singing songs.
- Gender * patterns of activity – time range of using neighbourhood park

Figure 9-24 and Figure 9-25 presents the difference in patterns of activity of the older man and older women in a different time range of using neighbourhood park. These different characters are:

- In all time ranges, the percentage of social behaviour of the older women are higher than, the older man. Especially, the percentage of social behaviour of older women is the highest in evening compared with other time range.
 - Both of older man and older women attend group activity such as dancing in a group or exercise with music, but the percentage emerging in different time range is different. The percentage of older men attending dancing in the evening is the highest percentage compared with morning and afternoon, while the time of the highest percentage of the older women is morning compared with afternoon and evening.
- Gender * patterns of activity – who often came with

Figure 9-26 and Figure 9-27 shows the difference between the impacts of who came with the ageing park users in choosing patterns of activity in older man and older woman.

- Both older man and older women show a certain percentage of social behaviour in the group of coming by themselves. Besides, the percentage of individual activity in the ageing people who came by themselves are significantly higher compared with the other groups.
- The perceptual of social behaviour and enjoying group activity of older women

are considerably higher than the older women came with family or by themselves.

9.2.3.2 Age group in most used places in two aspects

- Age group * most using place – who often came with

Figure 9-28, Figure 9-29, Figure 9-30 and Figure 9-31 compare the features of most using place of the ageing people who often came within different age groups. Some essential features emerged as follows:

- The ageing people in age group 46-55, 56-65, 66-75, were mostly using flat and open space, such as square. Besides, people who came to the neighbourhood park by themselves are the majority part occupied half of each section.
- The ageing people who came with friends are higher in age groups 56-65 and 66-75, compared with the other younger and older groups. The ageing people who came with friends always using flat, open, popular enough, lively place with facilities.
- The proportion of older people aged 76-85 with family members is significantly higher than that of other age groups. They became the main part of 76-85, and their most using place is also very different from other age groups, they are more attending to static activities in these places, such as water edge, under the shade of the trees, beautiful scenery, shaded places, quiet and undisturbed places.

- Age group * most using places – patterns of activity;

The comparison among Figure 9-32, Figure 9-33, Figure 9-34 and Figure 9-35 shows the impact of the ageing stage on the association between most using places and patterns of activity of the ageing park users. Some features emerged as follows:

- For the elderly aged 45-55, 56-65, 66-75, the flat and open, well-lit areas are their main venues, and they account for a large proportion of activities. At the same time, overall, the venues they use are more diverse.
- Older people over the age of 76 are in the opposite state. Their overall venue is relatively similar, and the number of venues is less than that of the previous three groups. The proportion of the venues is more than that of buildings, shades and these places appear in a large proportion of activities.

9.2.3.3 Gender *Age group in two aspects

- Gender * Age group * time range of using the park;

Figure 9-36 and Figure 9-37 shows the proportion of older men and women of all ages in the three activity periods is similar, which is basically consistent with the overall average ratio. However, there have been some minor changes as follows:

- Older women aged 56-65 and 66-75 have significantly increased their proportion of park activities during the evening hours. In the evening, older women aged 45-55, 56-65, 66-75 became the main part of the elderly who were active in the park, with a total proportion close to 60%.
- Gender * Age group * often rest places

Figure 9-38 shows the comparison of rest place of the ageing park users between the older man and older women in different age groups. Some interesting features emerged in this comparison as follows:

- Older men and older women between the ages of 56-65 and 66-75 showed a similar proportion in each field, meaning that the rest of the park was used more evenly.
- However, older women aged 66-75 have become more interested in waterside pavilions.
- Older men of the age group prefer the roadside seats and the seats near the trees.
- Older women between the ages of 46-55 prefer to rest on the long corridor and seats on footpath.
- Older women aged 76-85 showed a clear preference for sitting on the edge of the flower bed.

According to Figure 9-39, from another perspective, the preference of the elderly and older adults in these four age groups from high to low is very clearly presented.

- Overview, the most favourite rest place the older man and older women aged in these four groups are the seats on a footpath, which has the highest percentage in every group. The group with the highest proportion of roadside seats is older men aged 66-75. Nearly half of them will choose a roadside seat to rest.
- The largest proportion of seats that prefer to be close to the tree are older men and older women over the age of 76. The largest proportion of seats that prefer to be close to the tree are older men and older women over the age of 76. The older female group older than 76 is the favourite to sit next to the flower bed, which is consistent with the previous one.

9.2.4 Summary

This section set out to uncover the features of usage behaviour of the ageing people in the neighbourhood park. A series of cross-comparative analyses in single dimension, double dimension, and triple dimension have been used to achieve this aim in a systematically and comprehensive approach.

The key findings could be identified as below:

- The summary of behaviour-oriented features of using neighbourhood park of ageing people. (see Table 9-1)
- The summary of features of behaviour analysis of older man and older woman in different ageing stage. (see Table 9-2)

It could direct the designers enhance the ageing friendly arrangement at special place where what kind of ageing people usually use and what extent of support should give in the place depending on the characters of target group.

There are some important points emerged as below:

- The number of older people who choose park activities with social possibilities is higher than the number of older people who prefer individual activities. Space, where the park has the functions of social interaction, should receive more attention.
- The 92% of the elderly have specific parks to go to activities, which means that dependence on neighbourhood parks is common among the elderly.
- Only 66% of ageing people could go to the neighbourhood park by walking for less than 20 minutes, but the current number of neighbourhood park is insufficient. On the other hand, it shows the neighbourhood park is very attractive for the ageing people.
- The most ageing park users prefer using a flat and open with good light and look bright place where were built with some facilities could shade or provide shelter for them.
- The ageing park users who came alone are the majority, in this way, the needs of social interaction and social psychological satisfaction from the neighbourhood park should be paid more attention

Table 9-1 the summary of behaviour-oriented features of using neighbourhood park of ageing people.

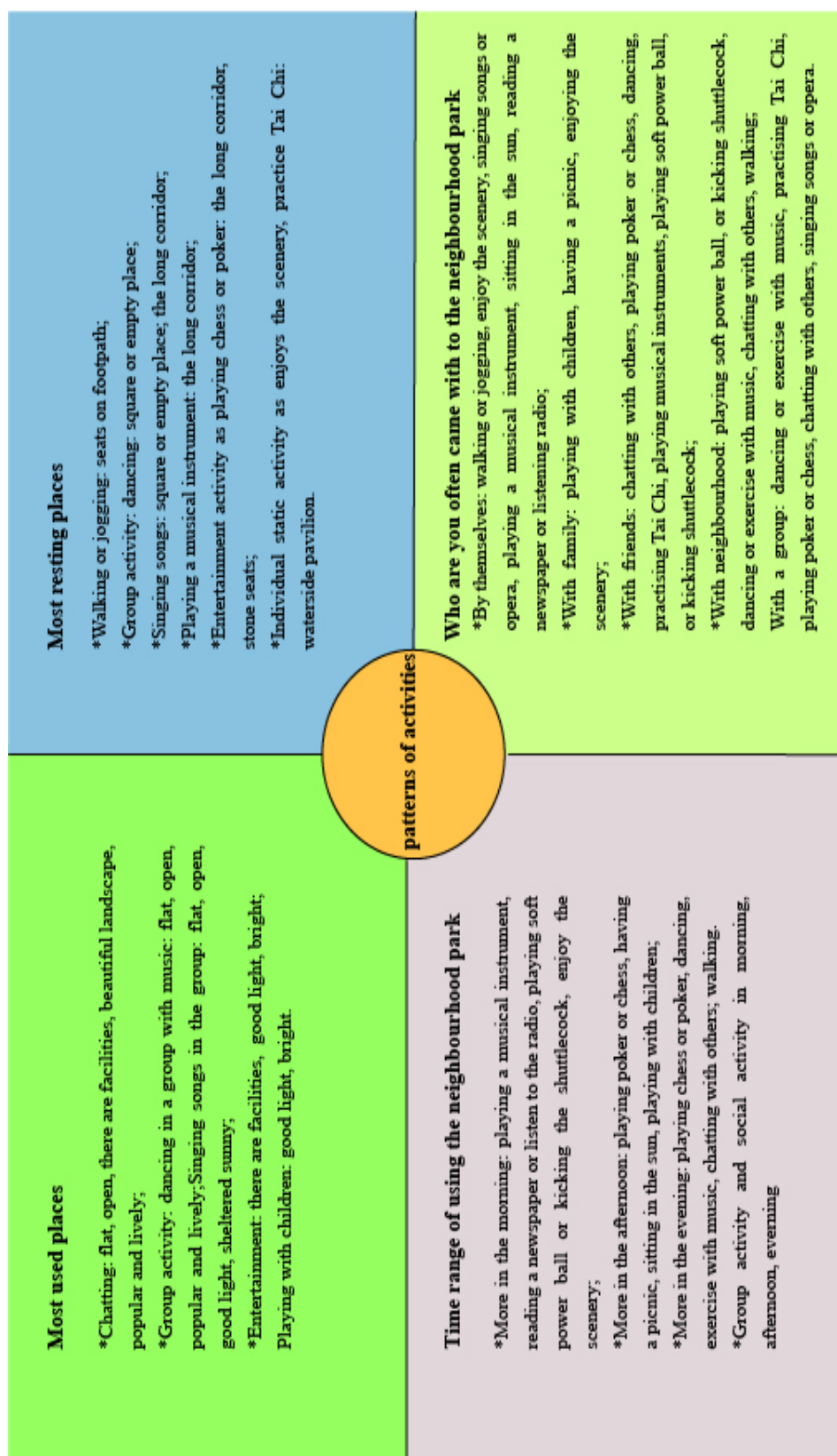


Table 9-2 the summary of features of behaviour analysis of older man and older woman in different ageing stage.

		Older man				Older women			
patterns of activity – most using places	Older men’s chat behaviour mainly appears in several places: flat, open, place with facilities, place with building, popular enough, lively place and secret grove. In the side of the water area, older men tend individual activity, such as enjoy the scenery				The flat and open place service older women were choosing group activities as dancing in a group, social activity as chatting and looking after children than the older man. Older women have a certain percentage of people chatting in various places Waterside: older women tend to socialize, such as chatting.				
	Both older man and older women prefer using a place with facilities and buildings, when they tend entertainment activity, such as playing poker or chess.								
patterns of activity – most resting places	while the social behaviour of the older man mainly occurred in seats on the footpath or near some trees; The older man has a relatively high percentage of individual activities walking or enjoy the scenery on seats nearby trees, stone seats, the long corridor, waterside pavilion. The older man who likes to rest at a side of flowers is more percentage in a group activity such as singing songs.				The older women have social behaviour, such as chatting, in most resting places The older women shows more interests in place with a beautiful view such as a side of flowers and waterside pavilions.				
patterns of activity – time range of using neighbourhood park	The percentage of older men attending dancing in the evening is the highest percentage compared with morning and afternoon, while the time of the highest percentage of the older women is morning compared with afternoon and evening.				The percentage of social behaviour of the older women are higher than, the older man. The percentage of social behaviour of older women is the highest in evening compared with other time range.				
patterns of activity – who often came with	Both older man and older women show a certain percentage of social behaviour in the group of coming by themselves. Besides, the percentage of individual activity in the ageing people who came by themselves are significantly higher compared with the other groups.								
					The perceptual of social behaviour and enjoying group activity of older women are considerably higher than the older women came with family or by themselves.				
		46-55		56-65		66-75		76-85	
most using place – who often came with	Mostly using flat and open space, such as square. Besides, people who came to the neighbourhood park by themselves are the majority part occupied half of each section.								
					The ageing people who came with friends are higher in age groups 56-65 and 66-75, compared with the other younger and older groups. The ageing people who came with friends always using flat, open, popular enough, lively place with facilities.				
most using places – patterns of activity	For the elderly aged 45-55, 56-65, 66-75, the flat and open, well-lit areas are their main venues, and they account for a large proportion of activities. At the same time, overall, the venues they use are more diverse.				Older people over the age of 76 are in the opposite state. Their overall venue is relatively similar, and the number of venues is less than that of the previous three groups. The proportion of the venues is more than that of buildings. , shades and these places appear in a large proportion of activities.				
		Older man				Older woman			
		46-55	56-65	66-75	76-85	46-55	56-65	66-75	76-85
time range of using the park	Morning>afternoon>evening	Afternoon>morning >evening	Afternoon>morning >evening	Morning>afternoon>evening	Morning>afternoon>evening	Morning>afternoon>evening	Afternoon>morning >evening	Morning>afternoon>evening	
					Older women aged 56-65 and 66-75 have significantly increased their proportion of park activities during the evening hours. In the evening, older women, aged 45-55, 56-65, and 66-75 became the main part of the elderly who were active in the park, with a total proportion close to 60%.				
often rest places	Overview, the most favourite rest place the older man and older women aged in these four groups are the seats on a footpath, which has the highest percentage in every group.								
	Older men of the age group prefer the roadside seats and the seats near the trees.								
				The group with the highest proportion of roadside seats is older men aged 66-75. Nearly half of them will choose a roadside seat to rest.	close to the tree			Older women aged 66-75 have become more interested in waterside pavilions.	Older women aged 76-85 showed a clear preference for sitting on the edge of the flowerbed. close to the tree

9.3 Behaviour map of ageing people based on observation and mapping


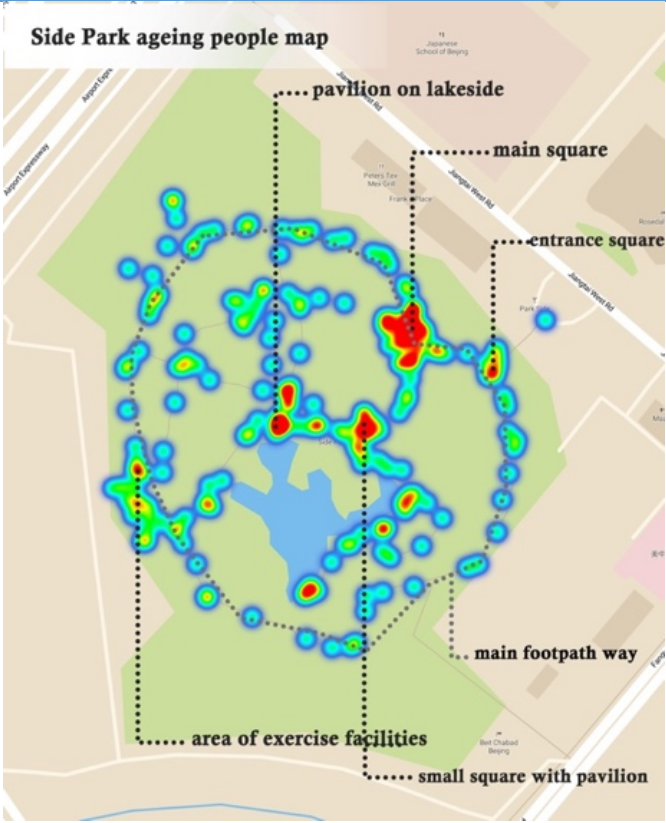
This section aimed to uncover the features of usage behaviour of the older park users and characters of the place where they most used in the neighbourhood park, and to produce a behaviour map of ageing people in for the neighbourhood park .A non-participant observation and behaviour mapping in Map Box with editing database were used to achieve these aims. It could contribute to discover the target places where focusing on ageing friendly design and provide a convenient and satisfactory environment for the ageing park users. In order to achieve this aim, there are two questions should be answers as where did they most use, and how they most use?

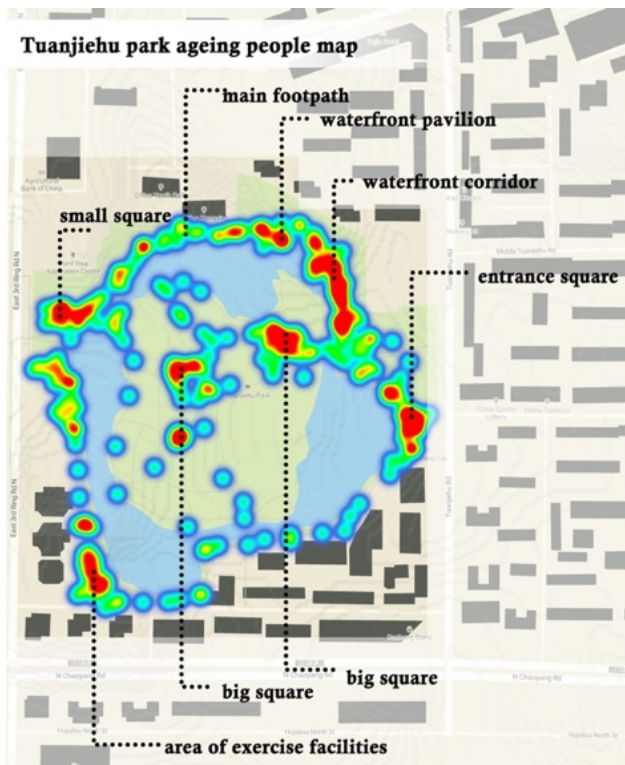
9.3.1 Where did ageing people most use in a neighbourhood park?

9.3.1.1 A place with high density of ageing park users

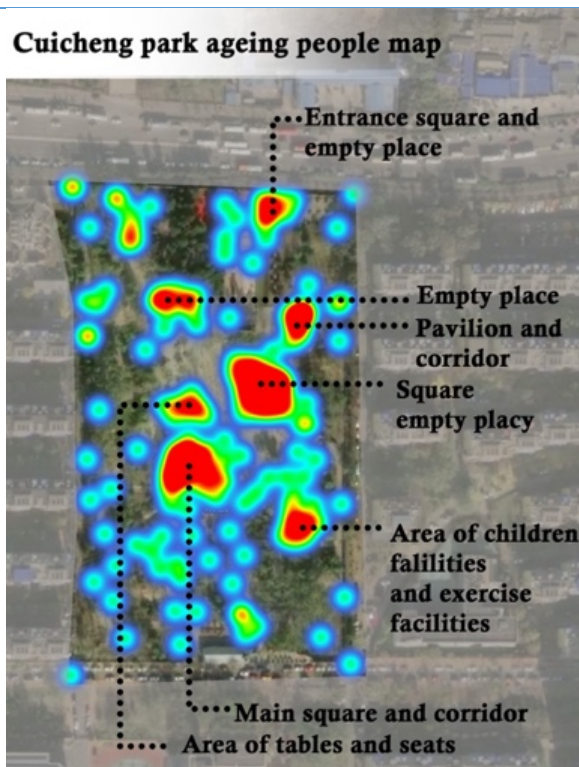
Depending on the observation, the superimposed database of the data of the use position of the elderly person is displayed by the density map shown in Table 9-3. The red area is the most densely populated area, followed by yellow, green, and blue. The main using places by elderly have been highlighted.

Table 9-3 the density map of 5 sites and main using places by elderly

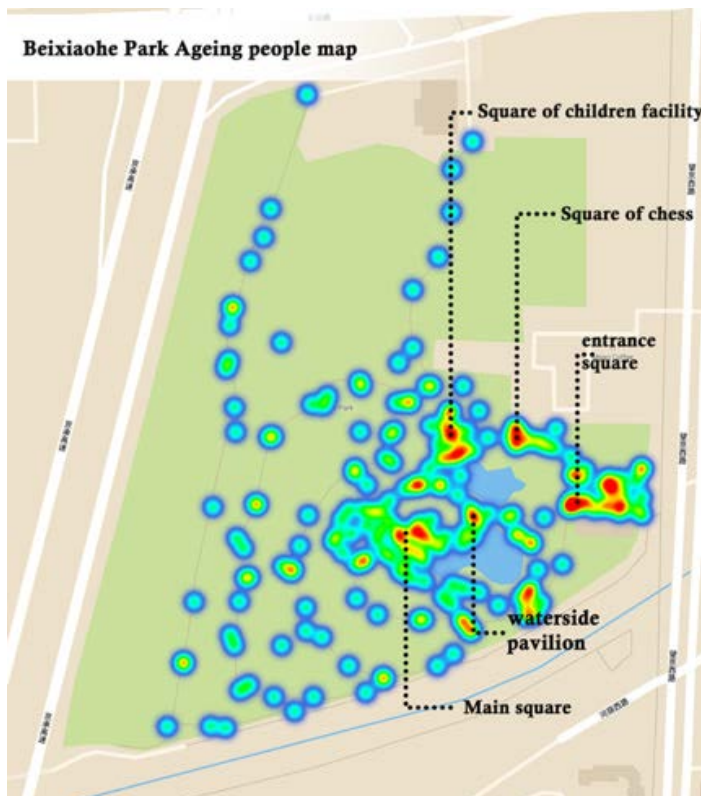
<p><i>Density of elderly users in 5 neighbourhood parks</i></p>  <p><i>Low to high density of elderly users (from 1 person to over 5 persons per 5 m²)</i></p>	<p>Character of main using place</p>
	<ul style="list-style-type: none"> ○ Side park: main square, small square with pavilion, pavilion on lakeside, area of exercise;



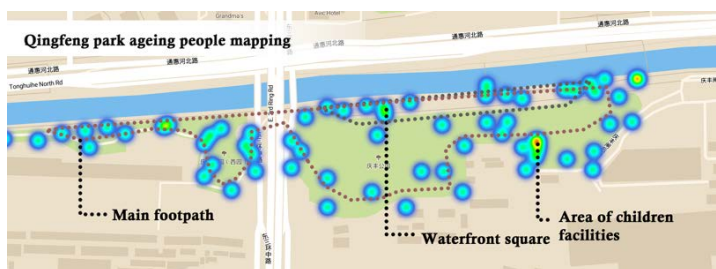
- Tuanjiehu park: entrance square, waterfront pavilion, big square, small square and area of exercise;



- Cuicheng park: square with empty place, main square with corridor, area of tables and seats, pavilion and corridor;



- Beixiaohe park: square of children facility, entrance square, waterside pavilion, square of chess;

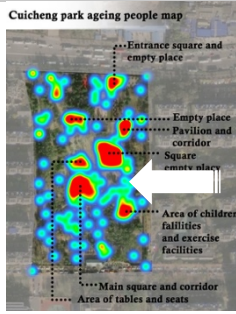


In summary, the places of highest density of distribution of ageing people include big and small square, area of tables and seats for chess and poker, area of exercise facilities, area of children facilities, and strolling footpath.

9.3.1.2 A place where multi-times used by ageing people

Some main square service not only one group of ageing people doing group activity. They have been used four times a day by different group activities such as morning exercise group, morning chorus, dancing group in afternoon, and exercise group in evening.

Three times used by groups of ageing people – big empty place in Cuicheng park



Morning, 9.00 am
Ageing people practising Tai Chi in group with music;
Big square in Cuicheng park.



Figure 9-40 photograph of Tai Chi group of ageing people in Cuicheng park.

Evening, 6.00 pm
Older women dancing in group with music;
Big square in Cuicheng park.



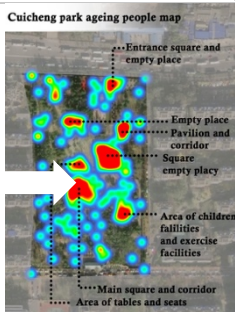
Figure 9-41 photograph of dancing group of older women in Cuicheng park.

Evening, 7.30 pm
Older women dancing in group with music;
Big square in Cuicheng park.



Figure 9-42 photograph of dancing group in Cuicheng park

Three times used by groups of ageing people – main square in Cuicheng park



Morning, 10.00 am
The corridor around the main square in Cuicheng park.



Figure 9-43 photograph of chorus group of ageing people in Cuicheng park.

Evening, 6.00 pm

Big square in Cuicheng park.



Figure 9-44 photograph of ballroom dancing group of older women in Cuicheng park

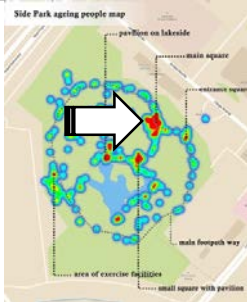
Evening, 8.00 pm

Big square in Cuicheng park.



Figure 9-45 photograph of dancing group in Cuicheng park

Four times used by group of ageing people – main square in Side park



Morning, 7.30
Ageing people in morning exercise group with music;
Main square in Side park



Figure 9-46 photograph of morning exercise group in Side park

Morning, 10.30
Ageing people in chorus group;
Main square in Side park



Figure 9-47 photograph of chorus of ageing people in Side park

Afternoon, 3.30
Ageing women in dancing
group with music;
Main square in Side park.



Figure 9-48 photograph of dancing group of older women in Side park

Evening, 7.30
Ageing people in exercise
group with music,
Main square in Side park.



Figure 9-49 photograph of exercise group of ageing people in Side park

The conditions of these places for the group activity of ageing people

It is important to understand spatial articulation and the physical conditions for the common kind of use by ageing people, the distribution and physical dimension of the behaviour of group activities have implied what are ageing friendly environment and usable place. These common characters of these could be identified as follows:

- Ground: The floor of the square is hard and non-slip, flat and open.
- Scale of square for group activity for ageing people: For group activities of the elderly, such as square dance or dance, the activists are more inclined to carry out activities in the centre of the square or in the centre of the open space, and will keep a certain distance from the surrounding buildings or railings. The capacity of a group is about 20 to 50 people, so there is a certain demand for the capacity of the square.
- Plant: Compared with the third square, the first two have multiple use during the day. This shows that the shade is essential condition for the place for the group activities of the elderly in neighbourhood park, especially for the long and hot summer in Beijing. One group activity in the main square in Cuicheng park was Chorus of ageing people who choose the corridor around this square and hold some big umbrella to protect from the big sunshine. Tall trees can be used to shade the elderly in the square, and can also help block the music sound of group activities and reduce the impact on others or the environment outside the park.
- Bench: the group activity provide a good lively atmosphere for the others to join the low level of social interaction through watching them. Bench plays an important role to provide a convenient and comfortable place for the ageing people attracted by the lively atmosphere. It also provide a opportunities for the ageing people to chat with others who seat beside them.
- Building, rain shelter, and corridor: the important building for the older people to avoid wet from suddenly raining. It has been mentioned many times in the semi-structured interviews in the neighbourhood parks.

9.3.2 How were ageing people using the neighbourhood park?

Depending on the observation in five neighbourhood parks, a neighbourhood park services nearly three hundreds of ageing people every day. Overall, the mainly usage behaviours include six categories, such as group activity, children supervision, entertainment, strolling, chatting, resting. The participants in these six categories of activity behaviours may be mostly repeated and replaced, such as group activities and chatting, walking and rest, and these categories are only classified according to the data of the scene at the time of the photo recording. Nevertheless, it shows the common behaviour of ageing park users.

9.3.2.1 The main usage behaviour of the ageing people in a neighbourhood park

Table 9-4 shows that the number of ageing people using neighbourhood park is very high, it means the quality of neighbourhood park impacts the quality of daily life of a large number of ageing people. Moreover, the main part is group activity existing in every neighbourhood park becoming a new urban culture in the ageing population. Moreover, the strolling is a very common physical exercise for the ageing people. There are 262 older people recorded in photos when they are strolling in footpath in neighbourhood park. There are 183 older people joined in the other kinds of physical exercise activities. In addition, the number of ageing people bear the duty of children supervision is relatively high, the facilities for the ageing people around area of children facilities should be considered. Thus, the most frequent neighbourhood park using behaviour of the elderly from high to low are: group activity, strolling, resting and seating, physical exercise, chatting with others, children supervision, entertainment.

Table 9-4 sum of participant in main categories of usage behaviour of ageing neighbourhood park users

Usage behaviour	Total sum of ageing participants in 5 neighbourhood parks
Group activity (dancing in group, singing in group)	734
Children supervision and playing with children	158
Entertainment (poker and chess)	119
Physical exercise (exclude strolling)	183
strolling	262
Chatting with others	160
Resting and seating	258
Total sum	1691

Group activity



Figure 9-50 photograph of dancing group of ageing people in main square in the neighbourhood park

Very old people in wheelchair



Figure 9-51 photograph of very old people in wheelchair seating together and chatting in the neighbourhood park

Children supervision



Figure 9-52 photograph of older people looking after grandchild together and chatting with each other in the neighbourhood park

Recreation



Figure 9-53 photograph of older people playing poker and chess in the neighbourhood park.

Physical exercise



Figure 9-54 photograph of older people playing exercise facilities in the neighbourhood park.

strolling



Figure 9-55 photograph of older people strolling in the neighbourhood park.

Playing musical instrument



Figure 9-56 photograph of older people playing musical instrument in the neighbourhood park.

Seating and resting



Figure 9-57 photograph of older people resting on seats on side of footpath in the neighbourhood park.

9.3.2.2 Diversity of behaviours of the ageing people in the neighbourhood park

Table 9-5 illustrates that the diversity of purpose of the usage of ageing people in neighbourhood parks. The table summarised from behaviour recording of five neighbourhood parks, and the behaviour list is in 错误!未找到引用源。 (see appendix B). The behaviour of using the park is divided into 10 categories according to the content of the behaviour, and the activity behaviour of each category is recorded as the sub-category according to the observable behaviour purpose.

In summary, the behaviour of the elderly in the park is diverse, which also implies the diversity of the needs of the elderly and the diversity of spatial relationships. In addition, this study develops a comprehensive list of behaviours based on systematic observations and records. Future designers can refer to this list for the behavioural characteristics of older people based on targeted park design for caring for the elderly.

Table 9-5 the sum of kind of behaviour in categories of ageing people in neighbourhood park

Categories of usage behaviour	Number of kinds of behaviour with different purpose
Group activities	14
Elder people in wheelchair	14
Children supervision	8
Recreation	2
Physical exercise	9
Strolling	5
Playing music	5
Painting	1
Sitting	28
Standing	12
Sum of kinds of usage behaviour	93

9.3.2.3 The social dimension of the behaviours of ageing people

For the social dimension, there are three levels of social interactional behaviour could be observed and recording. (see appendix A behaviour list) shows, the statement of social interaction behaviours of ageing people in the neighbourhood park was shown as follows:

- Low level of social interaction – people around you;

It shows that older people participate in the crowd through the behaviour of watching. The sum of ageing people with behaviour of watching is 145. The behaviour of watching is usually accompanied by other behaviours, usually standing on the side-lines, sitting on the side-lines, and sitting in a wheelchair. The main things that the elderly like to watch are square dance, chorus, chess, playing cards, music performances, and children's play.

- Middle level of social interaction- people doing activities together;

It presents that there are 734 ageing people have middle level of social interaction by joining group activity on one day in five neighbourhood parks. It means that the middle level of social interaction significantly and commonly exists in current neighbourhood park and plays an important role to build positive social dimension of the neighbourhood park.

- High level of social interaction – people chat with others and familiar with others.

It shows that 160 ageing park users were chatting in the neighbourhood park on one day in 5 neighbourhood park. The behaviour of chatting also accompanied with other behaviour, such as strolling, seating on bench together, resting in area of exercise, or doing exercise, even standing together to chat. It shows that Tuanjiehu park has the highest number of ageing people chatting with others. It means high level of social interaction commonly exists in Tuanjiehu park.

Low level of social interaction



Figure 9-58 photograph of ageing people watching the dancing group on square in the neighbourhood park

Middle level of social interaction



Figure 9-59 photograph of ageing people playing poker and chess together in the neighbourhood park

High level of social interaction



Figure 9-60 photograph of ageing people chatting with friends when they were strolling in the neighbourhood park.

Figure 9.40 The number of ageing park users in different level of social interaction in 5 neighbourhood parks

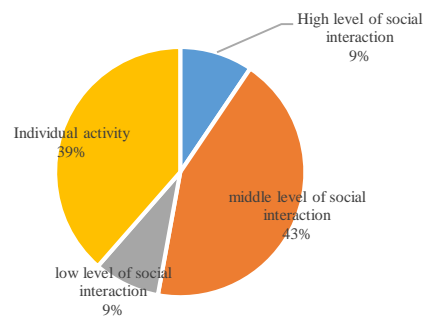


Figure 9-61 the number of ageing park users in different level of social interaction in 5 neighbourhood parks

In summary, the majority of ageing park users have social interaction in neighbourhood park, which is a positive approach to achieve social psychological satisfaction. In addition, Figure 9-61 shows that middle level of social interaction of ageing people shows a relatively higher popularity compared with low level of social interaction and high level of social interaction.

9.3.3 Summary

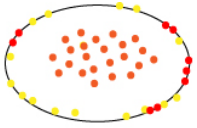

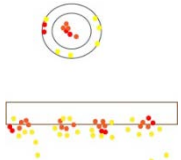
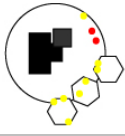
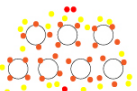
This section set out to produce the behaviour map of the ageing people in the neighbourhood park. In order to achieve this aim, there are two question need to be answered. a cross-comparative analysis of the distributional density maps ageing people in five neighbourhood parks and analysis of usage behaviour in five sites depending on number of participant, categories of behaviour, social dimension of usage behaviour of older park users. Some key findings could be summarised as follows:

- The behaviour list of the older people in neighbourhood park (see Table A.14 in appendix)
- The summary of behaviour map of the ageing people in neighbourhood park. (see Table 9-6)
- The place-oriented features emerged in analysis has been summarised and integrated into Figure 10.5.

In addition, there are some key points emerged in this section as follows:

- Places where the elderly have a high spatial density include main/big square, area of tables and seats for chess and poker, area of exercise facilities, area of children facilities.
- The most frequent neighbourhood park using behaviour of the elderly from high to low are: group activity, strolling, resting and seating, physical exercise, chatting with others, children supervision, entertainment.
- The usage behaviour of the elderly in the park is diverse.
- Group activity bring lots of opportunities for older people to have social interaction, even from low level of social interaction as staying with people and watching them to join the group activity together, to high level of social opportunities as chatting with others.

Table 9-6 the summary of behaviour map of the ageing people in neighbourhood park in social dimension and spatial dimension

Spatial distribution of social interaction in common	Main usage behaviour	Place in neighbourhood park	Service capital	Common conditions	Attractive conditions
<p>Low level of social interaction; Middle level social interaction; high level of social interaction;</p> 	<p>Watching people; Resting and seating; Group activity: group dancing, group exercise with music; chorus group. Chatting with others.</p>	MAIN/BIG SQUARE	30 – 50 ageing people	Flat, empty, open	<p>Rain shelter/ corridor; Seats/ benches; High trees for shadow;</p>
<p>Low level of social interaction; Middle level social interaction; High level of social interaction;</p> 	<p>Strolling; Strolling with chatting;</p>	FOOTPATH	The width of the main footpath could be 5 people passed. Older people are more likely to walk in two or three when they were strolling with chatting.	<p>Flat, no slip; Sufficient seats and benches on the side of footpath for older people resting.</p>	<p>The footpath is covered by shades of trees on both sides. Walking is the main exercise approach for the elderly, and circular walkway design can increase the exercise for the elderly in limited space in neighbourhood park.</p>
<p>Low level of social interaction; middle level of social interaction.</p> 	<p>Resting and seating; Playing chess or poker; Singing beijing opera; Playing musical instrument in group or individual; Enjoying the scenery; Enjoying the lake sight. Practicing Tai Chi.</p>	PAVILION; CORRIDOR; SMALL SQUARE;	<p>10-15 people 10-30 people 15-25 people</p>	<p>Shade from sun in summer, shelter from the rain; Space and place for resting and seating; Enough space for chess and poker.</p>	<p>Pavilion or corridor built on lakeside or waterfront. Benches or stone seats and tables.</p>
<p>Low level of social interaction; Middle level social interaction; High level of social interaction;</p> 	<p>Children supervision;</p>	AREA OF CHILDREN FACILITIES	5-15 children and their family	Children facility with safety design and quality	<p>Seats and benches nearby and around the children facility which is easy for older people to rest when they waiting and watching the children. Round seats and half circle benches provide more opportunities for the older people to get social interaction.</p>
<p>Low level of social interaction; Middle level social interaction; high level of social interaction;</p> 	<p>Physical exercise Exercise with chatting</p>	AREA OF EXERCISE FACILITIES	15-30 people	Basic exercise facilities	<p>Multi-kinds of exercise facilities; Seats and benches around the exercise facilities for older people resting and getting social interaction. Rain shelter; Trees shades.</p>

9.4 Summary

The first aim of this section was to uncover the features of usage of the ageing people in the neighbourhood park. It was achieved by a series of cross-comparison based on questionnaire data in single dimension, double dimension, and triple dimension, and data of non-participant observation and mapping. The key findings are:

- The summary of behaviour-oriented features of using neighbourhood park of ageing people. (see Table 9-1)
- The summary of features of behaviour analysis of older man and older woman in different ageing stage. (see Table 9-2)
- The behaviour list of the older people in neighbourhood park. (see table A.14 in appendix)

The second aim of this section was to produce a behaviour map of the ageing people in neighbourhood park. It was achieved by the analysis on a non-participant observation and behaviour mapping in map box with editing database. The key finding could be identified as:

- The summary of behaviour map of the ageing people in neighbourhood park. (see Table 9-6)
- The comparison list of place-oriented features of usage of the older people, physical conditions of park, the emotional bonding, and attitude in perception of ageing park users in the five neighbourhood parks.

However, the key findings discussed in next chapter integrated with findings from chapter 7 about the desire and inside thought of the older people in order to achieve aim:

- To discover the gap between current statement of urban open space and desire of the ageing people.

In addition, there are some key points emerged in this section as follows:

- The number of older people who choose park activities with social possibilities is higher than the number of older people who prefer individual activities. Space, where the park has the functions of social interaction, should receive more attention.
- The 92% of the elderly have specific parks to go to activities, which means that dependence on neighbourhood parks is common among the elderly.
- Only 66% of ageing people could go to the neighbourhood park by walking for less than 20 minutes, but the current number of neighbourhood park is insufficient. On the other hand, it shows the neighbourhood park is very attractive for the ageing people.
- The most ageing park users prefer using a flat and open with good light and look bright place where were built with some facilities could shade or provide shelter for them.
- The ageing park users who came alone are the majority, in this way, the needs of social interaction and social psychological satisfaction from the neighbourhood park should be paid more attention.

- The most frequent neighbourhood park using behaviour of the elderly from high to low are: group activity, strolling, resting and seating, physical exercise, chatting with others, children supervision, entertainment. Places where the elderly have a high spatial density include main/big square, area of tables and seats for chess and poker, area of exercise facilities, area of children facilities.
- The usage behaviour of the elderly in the park is diverse.
- Group activity bring lots of opportunities for older people to have social interaction, even from low level of social interaction as staying with people and watching them to join the group activity together, to high level of social opportunities as chatting with others.

PART III TO DEVELOPMENT

Chapter 10 Integrated findings

This chapter aims to integrate the findings from comparisons between the perceptual, behavioural, psychological, social, emotional, and physical dimensions from the data analysis chapter 6 to 9, to build the links between them into a comprehensive conceptual framework (system) which helps us to understand the interaction relationship between ageing people and urban open space and to discover ways to promote the quality of life and well-being of ageing people through improving the environment and making interventions.

10.1 The integrated conceptual frameworks of real findings

The findings from the four chapters of data analysis above can be integrated into three broad conceptual elements to help explain the relationships between the neighbourhood parks and ageing people, in terms of their gender and ageing steps, in the perceptual, social, psychological and behavioural dimensions. They are briefly explained below:

10.1.1 A summary of gender differences in the psychological, perceptual, social, and behavioural dimensions of elderly neighbourhood park use. (Table 10-1)

This conceptual framework contributes to clarifying the differences which characterise the different genders in the psychological, perceptual, social, and behavioural dimensions, and to understanding the motivations of the differing preferences by gender in a multi-dimensional overview. This conceptual framework is rooted in the findings from questionnaire analysis and the semi-structured interviews described in chapter 6, chapter 7, and chapter 9. It integrates findings from four sections as below:

- 6.4.2 The comparison of performance in the psychological status of the older men and women engaging in various activities in neighbourhood parks;
- 6.4.3 The comparison of psychological status between older males and females;
- 7.3.1 Gender comparison (7.3 structural analysis)
- 9.2.3.1 Gender in patterns of activities in four aspects (9.2.3 triple-dimension analysis)

10.1.2 A summary of the differences between ageing steps in social, perceptual, and behavioural dimensions in a neighbourhood park. (Table 10-2)

This conceptual framework contributes to clarifying the different characteristics of various ageing groups (46-55, 56-65, 66-75, and 76-85) in the social, perceptual and behavioural dimensions. It presents an overview of changes in desires and performance as people getting older and older. It is based on the findings from these four sections as below:

- 6.4.4 The comparison of psychological status of older people in different age groups;
- 7.3.2 Age group comparison (7.3 structural analysis);
- 9.2.3.2 Age group in most using places in two aspects;
- 9.2.3.3 Gender*age groups in two aspects.

10.1.3 The integrated conceptual framework of associations between psychological statement, emotional bonding, social interaction, experienced psychological benefit, and usage behaviour of elderly neighbourhood park users. (Table 10-3)

This conceptual framework contributes to evidence showing the associations between the psychological, social and behavioural dimensions of the relationship between ageing people and the neighbourhood parks. It describes the links between elements of each dimension to provide a deeper understanding of the interaction relationships in relation to the benefits to the mental health of the ageing people. The conceptual framework integrates findings from five sections as below:

- 6.3.6 Association 6 (behaviour –psychological states): the association between different activities of ageing people in neighbourhood parks and their psychological status;
- 6.3.7 Association 7 (emotional bonding – psychological status the association between different extent of emotional bonding of ageing people in the neighbourhood parks and their psychological status;
- 8.2 Supplement 1: association analysis between the experience of relief, loneliness and self-rated psychological status;
- 8.3 Supplement 2: association analysis between the experience of psychological benefit and self-rated psychological status;
- 8.9 Supplement 8: association analysis between the self-rated psychological status of ageing park users and their attitudes to the social and perceptual dimensions of neighbourhood parks.

10.1.4 List of the integrated conceptual frameworks in this study

In summary, there are eleven integrated conceptual frameworks have been identified, based on four chapters of data analysis. They contribute to showing the associations between the social, perceptual and psychological dimensions, the physical dimensions of the relationship between neighbourhood parks and ageing people with personal characteristics. These conceptual frameworks are listed below:

1. The integrated conceptual framework of features of usage, emotional bonding with parks, self-rated psychological issues and the characteristics of ageing people (Table 6-16)
2. The integrated conceptual framework of the frequency of usage, emotional bonding with parks, self-rated psychological issues and characteristics of ageing people (Table 6-17)
3. The integrated conceptual framework of the duration of usage, emotional bonding with parks, self-rated psychological issues and characteristics of ageing people. (Table 6-18)
4. The integrated conceptual framework of the associations between social and perceptual attributes and the indicators of emotional bonding, the experience of psychological benefit, and self-rated psychological status. (Table 8-10)
5. A summary of the gender differences in the psychological, perceptual, social, and behavioural dimensions of elderly neighbourhood park use. (Table 10-1)
6. A summary of the differences in ageing steps in social, perceptual, and behavioural dimensions in a neighbourhood park. (Table 10-2)
7. The integrated conceptual framework of associations among psychological statement, emotional bonding, social interaction, experienced psychological benefit, and usage behaviour of the elderly neighbourhood park users. (Table 10-3)

8. The summary of behaviour map of the ageing people in neighbourhood parks in the social dimension and spatial dimension. (Table 9-6)
9. The conceptual framework of the experienced attractive elements of joining the group activities in the neighbourhood parks. (Figure 7-37)
10. The conceptual framework of the experienced attractiveness of the neighbourhood parks for the ageing people. (Figure 7-36)
11. The conceptual framework of a place relieve loneliness for ageing people. (Figure 7-35)
12. The conceptual framework of limitation of current neighbourhood park for ageing people and their desires. (Figure 7-38)

Table 10-1 A summary of the gender differences in the psychological, perceptual, social, and behavioural dimensions of elderly neighbourhood park uses

Gender		Male	Female	
<i>The comparison of the older male and older female of performance in the psychological status engaging in various activities in the neighbourhood park</i>	Self-rated quality of life	Playing with children; playing poker or chess; sitting in the sun	Sitting in the sun; enjoy the scenery; playing with children.	
	Self-rated health	Playing with children, walking and jogging, 11 sitting in the sun	Dancing, exercise with music; playing poker or chess; sitting in the sun.	
	Self-rated positive mental health	Chatting with others is a very significant activity for the elderly male. Its positive influence for the elderly male park user is stronger than the elderly female park users.	Dancing, exercises with music give a significantly positive impact on their psychological statement, which lead them thinking and look on the bright side of things on their daily life. It also has an important positive impact on the elderly male, but the impact is less than the elderly female.	
		Playing with children play a key role in keeping the bright psychological statement of the elderly male park users. Compared with the elderly female, it has more significance for the elderly male in maintain bright and positive psychological health.		
	Self-rated fearful	Dancing, exercise with music shows significant potential for the elderly male to anti-fearful or anti-anxious. It also plays an important role for the elderly female, but the positive impact for the female is less than male	To a certain extent, the fearful and anxiety of older female are higher than those older males in nearly all activities.	
		Chatting with others is the most important activity to help them relief from fearful or anxious. Chatting with others as a higher level of social interaction has a considerably positive impact on anti-fearful or anti-anxious on both elderly male and female.		
	Self-rated loneliness	Older man are more easy to obtain the social satisfaction from social interaction activities.	Older women show more serious loneliness than men in most activities. Older women prefer to participate in activities that have more collective and social opportunities, consistent with their psychological loneliness and desire for social satisfaction.	
		Chatting with others, dancing and exercise with music, and playing with children, as the activities with social interactions are playing significantly in maintaining their psychological statement from loneliness.		
	Self-rated useless	A certain percentage of their sense of uselessness.		
		Chatting with others; playing with children	Dancing and exercise with music, playing with children.	
The comparison of older male and older female in self-rated psychological statement	Similar distribution in self-rated quality of life and health.			
		More affected by fear and anxiety		
		Older women affected by loneliness is considerably higher than older men.		
<i>The comparison of the difference in attitude in semi-structure interview by gender</i>	The attitude of joining group activities		More interest in joining group activities	
	The attractive elements of joining group activities of different age group	'Lively', 'people', 'friends', and 'health'.	More 'happy' as enjoy group activities such as square dancing and singing.	
	Perceptual friendliness from group activities	The accessibility of group activities is the same for the elderly male and female.		
	A deeper level of social interaction in group activities	Most older people have made a deeper social relationship in the process of group activities and confirmed the social function of the neighbourhood parks.		
	The sociability of activities in the neighbourhood park for the elderly participant.	The elderly male achieved deeper social relationship through 'chat', 'playing cards' and 'playing chess';	The elderly female is most through 'dancing', 'cards' and 'walking'.	
	The attractive elements of a neighbourhood park for the elderly people		. The elderly female shows more attractiveness in 'people' in the park	
	The frequently used area in the neighbourhood park	Square		
		Waterfront, Lakeside The elderly male is more concerned and enjoying the relatively individual time and space		
	For the relief of loneliness	Older people feel less lonely when they came to the park and stay with people. The elderly male and elderly female shows the same trend		
	A place where the elderly relief loneliness	° 'square' (social functional site),		
° 'people' (low-level social interaction),				
° 'children' (family support or low-level social interaction)				
° 'dancing' (middle-level social interaction)				
° 'watching' (low-level social interaction to middle-level social interaction)		O 'singing' (middle-level social interaction),		
° 'chess' ((middle-level social interaction)		O 'friends' (deeper level social interaction)		
° 'chat' (high-level social interaction)				
Limitations found by the elderly users of the current neighbourhood park	Facilities	Management		
<i>The differences of features of behaviour analysis of older man and older woman</i>	Patterns of activity – most using places	Older men's chat behaviour mainly appears in several places: flat, open, place with facilities, place with building, popular enough, lively place and secret grove. In the side of the water area, older men tend individual activity, such as enjoy the scenery	The flat and open place service older women were choosing group activities as dancing in a group, social activity as chatting and looking after children than the older man. Older women have a certain percentage of people chatting in various places Waterside: older women tend to socialize, such as chatting.	
		Both older man and older women prefer using a place with facilities and buildings, when they tend entertainment activity, such as playing poker or chess.		
	Patterns of activity – most resting places	While the social behaviour of the older man mainly occurred in seats on the footpath or near some trees; The older man has a relatively high percentage of individual activities walking or enjoy the scenery on seats nearby trees, stone seats, the long corridor, waterside pavilion. The older man who likes to rest at a side of flowers is more percentage in a group activity such as singing songs.	The older women have social behaviour, such as chatting, in most resting places The older women shows more interests in place with a beautiful view such as a side of flowers and waterside pavilions.	
	Patterns of activity – time range of using neighbourhood park	The percentage of older men attending dancing in the evening is the highest percentage compared with morning and afternoon, while the time of the highest percentage of the older women is morning compared with afternoon and evening.		The percentage of social behaviour of the older women are higher than, the older man. The percentage of social behaviour of older women is the highest in evening compared with other time range.
	Patterns of activity – who often came with	Both older man and older women show a certain percentage of social behaviour in the group of coming by themselves. Besides, the percentage of individual activity in the ageing people who came by themselves are significantly higher compared with the other groups.		
		The perceptual of social behaviour and enjoying group activity of older women are considerably higher than the older women came with family or by themselves.		

Table 10-2 A summary of the differences in ageing steps in social, perceptual, and behavioural dimensions in a neighbourhood park.

		45-55	56-65	66-76	77-85+
Key characters and trend emerging in the comparison among age groups toward desire, usage features, inside thought for the neighbourhood park.	The attitude of join Group activities		More active	More active	
	Perceptual Friendliness from Group activities	Depend on this trend; the new ageing generation will have lower interest in-group activities, such as dancing and singing.		The raising isolated barriers in their mind will reduced the perceived friendliness from the others, lead the indicator became lower in the elderly group.	
	Deeper level social Interaction in Group activity	The younger ageing generation are more active than the elder age group, thus the perceived friendliness of group for them was high.		A trend that the perceived friendliness is raising in new ageing generation.	
	The attitude of the Elderly to social life In neighbourhood Parks	People aged 45-55 who are just retired or just after retirement expressed the most positive interests in social life in neighbourhood park.		Second higher	
	For the relief of Loneliness	The attitude of social life shows considerably raising trend with new ageing generation, which means the awareness of achievement of social psychological needs has increased in new generation, they are more focus on the social function of the neighbourhood park than the elder ageing generation.		The elderly people aged 56-65 show a peak nearly achieve 80% got the positive impact on reducing loneliness.	
	The attractive Elements of joining Group activities of Different age group	Over 70% could feel less loneliness, when they came to park and stay with people.		Personal health; Perceptual dimension (lively) of the park; People- lower level social interaction (social dimension);	
	The sociability of Activities in Neighbourhood Park for the elderly Participants	Perceptual dimension (lively) of the park; Entertainment; Personal health.		Perceptual dimension (lively) of the park; Friends - deeper level social interaction (social dimension); People- lower level social interaction (social dimension);	
	The attractive Elements of neighbourhood park for the elderly people	The middle age groups, elderly people aged 55-65 and 66-75 shows the most diversity of the social-able activities, compared with the younger and older age group.		More dynamic activates	
	The frequently Using area in Neighbourhood Park	More static activates		The social interaction in every activity mentioned by the elderly interviewee are mostly group activities including group entertainment, and then they made friends, as deeper social interaction. This means the middle level of social interaction, that people do the activities together, could be identified as the main foundation for elderly people achieving deeper level social interaction and to meet their social satisfaction maintaining the psychological health.	
	A place where the Elderly feel relief Loneliness	The two most important elements that emerge in the analysis of each age group are still in the environmental and social dimensions.		In the old age group, the perceived dimension is more prominent than the previous groups. This shows that the perceptual dimension (lively) of the park is more important for the elderly, and the 'air' element are also highlighted.	
	Limitations for the elderly users Of current Neighbourhood Park	'Square' is the most frequently using place, which could provide the site for group activities, such as dancing and singing, rest with chairs around the square, and lively atmosphere as the important element of perception dimension.		For the social dimension, square provide the site for the elderly users to achieve all level of social interaction from lower as just seeing people to deeper as making friends.	
	Most using place – who often came with	The waterfront and waterside emerging in the response of age group 56-65, 66-75, and 76-85 and plus, are the second import site the relatively older retired people, where could provide a quiet and peaceful place for them to achieve a relax and balance in their psychological statement.		The response of age group 56-65 and 66-75 shows the diversity of their using areas, which means that their usages are more diverse than the younger group and the elder group.	
	Most using places – patterns of activity	Children's place; Square; Waterfront;		Waterfront; Square; Children;	
	Often rest places	Looking children playing place plays an important role for the younger ageing group reducing loneliness. Moreover, the group activities such as singing and dancing play an important role in filling their empty time, thus these places could let them feel relief loneliness.		Square; Waterfront; Dancing place;	
	Time range of using the park	Square: The square could provide the elderly people elements of social dimension, perceptual dimension and physical place. Waterfront: The square could provide the elderly people elements of social dimension, perceptual dimension and physical place.		Place could stay with people; Lakeside; Dancing and singing place square.	
	The diversity of issues, mentioned in responses of the elderly people aged 56-65 and 66-75, because these elderly users with long time using the park have a deeper understanding of their own needs and the gap between them the current space.		Aged 76-85 and plus, has express the strong desire of staying with people as lower social interaction.		
	Are more concern on the children's facilities and well-build facilities		More concern about the facilities for protecting them from dangers and easy to use when the body condition is degradation.		
	Mostly using flat and open space, such as square. Besides, people who came to the neighbourhood park by themselves are the majority part occupied half of each section.		The proportion of older people aged 76-85 with family members is significantly higher than that of other age groups. They became the main part of 76-85, and their most using place is also very different from other age groups, they are more attending to static activities in these places, such as water edge, under the shade of the trees, beautiful scenery, and shaded places, quiet and undisturbed places.		
	The ageing people who came with friends are higher in age groups 56-65 and 66-75, compared with the other younger and older groups. The ageing people who came with friends always using flat, open, popular enough, lively place with facilities.		Older people over the age of 76 are in the opposite state. Their overall venue is relatively similar, and the number of venues is less than that of the previous three groups. The proportion of the venues is more than that of buildings. , shades and these places appear in a large proportion of activities.		
	Older man		Older woman		
	46-55	56-65	66-75	76-85	
	Morning>afternoon>evening	Afternoon>mornning >evening	Afternoon>morning >evening	Morning>a fternoon>evening	
				Morning>afternoon>evening	
				Older women aged 56-65 and 66-75 have significantly increased their proportion of park activities during the evening hours.	
				In the evening, older women, aged 45-55, 56-65, and 66-75 became the main part of the elderly who were active in the park, with a total proportion close to 60%.	
	Overview, the most favourite rest place the older man and older women aged in these four groups are the seats on a footpath, which has the highest percentage in every group.		Older men of the age group prefer the roadside seats and the seats near the trees.		
		The group with the highest proportion of roadside seats is older men aged 66-75. Nearly half of them will choose a roadside seat to rest.	Close to the tree	Older women aged 66-75 have become more interested in waterside pavilions.	
				Older women aged 76-85 showed a clear preference for sitting on the edge of the flowerbed. Close to the tree	

Table 10-3 the integrated conceptual framework of associations among psychological statement, emotional bonding, social interaction, experienced psychological benefit, and usage behaviour of the elderly neighbourhood park users.

Association emotional bonding – psychological statement + Supplement 8 + Supplement 2 + Supplement 1 + Association behaviour - psychological statement	7:	Self-rated psychological statement	Benefit from Associations with Emotional bonding	Benefit from Association with attitude of social dimension and perceptual dimension in semi-structure interview	Associated with psychological benefit	Experienced	First five activities with high score in psychological issue.	
		6:	Self-rated quality of life	→ Emotional bonding – personal dimension – group level;	→ Deeper level social interaction in group activity (making friends)	→ Confidence	→	1. Sitting In The Sun
Emotional bonding – place dimension – social level;				Positive Attitude toward deeper level of social interaction in group activity for neighbourhood park	Social network		2. Playing Chess Or Poker	
Emotional bonding – psychological progressed dimension – emotional level					belonging		3. Enjoy Scenery	
Emotional bonding – psychological progressed dimension – cognitive level;					Experienced relief loneliness		4. Playing With Children	
Emotional bonding – psychological progressed dimension – behaviour level.							5. Walking	
Self-rated health				→ Emotional bonding – personal dimension – group level;	→ Deeper level social interaction in group activity (making friends)	→ confidence	→	1. Sitting In The Sun
				Emotional bonding – place dimension – social level;	Attitude toward deeper level of social interaction in group activity for neighbourhood park			2. Practice Tai Chi
				Emotional bonding – psychological progressed dimension – emotional level ;				3. Playing With Children
				Emotional bonding – psychological progressed dimension – behaviour level.				4. Sitting In The Sun
								5. Enjoy Scenery
Self-rated positive mental health				→ Emotional bonding – personal dimension – group level;	→ Deeper level social interaction in group activity (making friends)	→ confidence	→	1. Dancing in group
				Emotional bonding – place dimension – social level;				2. Practice Tai Chi
				Emotional bonding – psychological progressed dimension – emotional level ;				3. Playing With Children
								4. Sitting In The Sun
								5. Enjoy Scenery
Self-rated fearful				→ Emotional bonding – personal dimension – group level;	→	→	→	1. Dancing in group
				Emotional bonding – place dimension – social level;				2. Walking
								3. Chatting
								4. Playing With Children
								5. Playing softball, kicking
Self-rated loneliness			Emotional bonding – place dimension – social level;	→ Attitude toward deeper level of social interaction in group activity for neighbourhood park	→ confidence	→	1. Dancing in group	
			Emotional bonding – psychological progressed dimension – emotional level ;		health		2. Playing With Children	
			Emotional bonding – psychological progressed dimension – cognitive level;		Social network		3. walking	
							4. Chatting	
							5. Playing softball, kicking	
self-rated useless			→ Emotional bonding – personal dimension – group level;	→ Attitude toward deeper level of social interaction in group activity for neighbourhood park	→ health	→	1. Dancing in group	
			Emotional bonding – place dimension – social level;		Social network		2. Walking	
			Emotional bonding – psychological progressed dimension – emotional level ;				3. Playing With Children	
			Emotional bonding – psychological progressed dimension – cognitive level;				4. Practice Tai Chi	
							5. Chatting	

10.2 The gap between the current state of neighbourhood parks and the desires of ageing people

The comparison between the findings of preferences and suggestions of the older participants from semi-structured interviews (from 7.2.9), the findings from observation of usage and behaviour (from 9.3.2.1) and the findings of attractiveness of neighbourhood parks for the elderly (from 7.2.5) illustrate the gap between the current state of neighbourhood parks and the desires of ageing people are in two main parts, ageing friendly arrangement (shown in Figure 10-1) and the design in its physical dimension (shown in Figure 10-2). Some aspects of each are illustrated.

10.2.1 The gap in ageing friendly arrangements in neighbourhood parks

Figure 10-1 shows four aspects of the gap between ageing friendly arrangements, which are closely linked to the social and perceptual dimensions of the attractiveness of the neighbourhood park to engage ageing people, to improve their well-being and maintain their health by using the park. These four aspects of this gap are listed below.

10.2.1.1 The gap between the elderly's desire for diversity of activities and the current simple state of activity in the neighbourhood parks

The participants surveyed expressed the desire for diversity of activity in the semi-structured interviews. According to this research, the gap is mainly on three levels:

First is the unbalanced distribution of park activities in the neighbourhood parks. The diversity of activities of some parks (Cuicheng and Tuanjiehu, shown in Table 10.5) is significantly better than in other parks. There is a gap between the richness of activities and simple activities in spatial distribution.

The second gap lies between the current diversity of activities carried out by the elderly spontaneously and the limitations in the conditions of current neighbourhood parks. During the observation, it was found that in some activities, the older people spontaneously prepared equipment and facilities for temporary transformation to provide suitable conditions for their activities. For example, they prepared many very large parasols during the chorus, and prepared the illumination, sound and low power generation equipment required to run it when they danced at night. The types of activity grow with the increasing spiritual needs of the elderly, but the traditional design of the neighbourhood parks no longer meet their needs. The healthy development of these activities still requires regeneration of the spatial design of some sites in the neighbourhood parks and their extensive promotion to more ageing people. This requires correct and suitable guidance and support from the manager and the designers, who play a very important role in this process.

The third gap arises from the awareness of healthy life and the development of informatization and multiculturalism. The spiritual pursuits and aspirations of the elderly have increased, and the current kinds of activities no longer meet their desires. The content of activities relates to the spontaneity of the elderly and requires the guidance of the designer and manager. The spontaneous consciousness of the elderly for a diverse entertainment life has formed gradually and has been carried out in some neighbourhood parks. It is already insufficient for ageing people, and will be even less adequate in the future. The development of information and network technology has enabled the elderly to accept more new concepts and ideas. Healthier and younger life concepts have prompted the elderly to be dissatisfied with traditional exercise and a monotonous life. With the ageing trend development, the lifestyle of the elderly is gradually updated, and an informationised lifestyle is a symbol of contemporary people. Age

is no longer a condition for restricting the content of activities, so in new design, technology and information networks to support new and modern activities should be introduced for ageing-friendly design of the neighbourhood parks.

In summary, the gap between the elderly's desire for diversity of activities and the current simple state of activity in the neighbourhood parks is on three levels: the gap in unbalanced spatial distribution of diverse of activities, the gap between new activities and traditional neighbourhood park design, and the gap between the increased spiritual pursuits and aspirations of the elderly and current types of activities with development of information and network.

10.2.1.2 The gap between the elderly's desire for spatial functional diversity and the single function of places in current neighbourhood parks

The comparison of the findings relating to desires, usage and attractiveness in neighbourhood parks illustrate the gap in functional spatial diversity at three levels:

The findings from interview about the elderly's preferences show that they want the neighbourhood parks to cover a range of spatial functions including safe areas for the blind, performance and watching spaces, social, sports and exercise spaces, entertainment space and space for rest and food. The list of patterns of usage shows that current neighbourhood parks generally provide the space for large and small group and social activities, entertainment, rest space and physical exercise. But this leaves gaps in the provision for the sight-impaired, and in performance and watching space. Areas with these functions could enhance the attractiveness of the parks in their social and perceptual dimensions, engaging more people to use the parks to improve their well-being and maintain both physical and mental health.

Comparison of the usage in the five neighbourhood parks shows the distribution is unequal, and that the function and quality of the spaces in the parks is not of equal quality. It is difficult to design all functions in every neighbourhood park with the limitations of the current state. The best way to settle this problem is to categorise the functions as either basic or high-level functions. The basic functions, such as exercise, rest, social and group activities, entertainment, should be achieved in every neighbourhood park. The high level functions, such as space for the blind and performance space, could be planned and designed in a few neighbourhood parks in each district.

With new activities and the new habits of the ageing population, the functions of the neighbourhood parks should be updated. The design of these new functions should take into account the characteristics of the elderly. For example, in the observation carried out for this research, the group dancing activity took place on a flat open space or square with marble or slate floor covering, where many stone seams were loose and uneven, making it easy for older people to slip or stumble. The uneven floor accumulated water and further affected its use. The new soft paving materials are non-slip, resist water and have a certain degree of softness which is more suitable for the collective activities of the elderly like dancing, aerobics, Tai Chi and so on. In the interviews, some elderly people mentioned that recently roller skating activities had gradually become popular among some elderly people. In today's society, roller skating is only an adolescent activity, but the development of the internet has made more elderly people willing to try new things. The functional renewal of community parks cannot be stopped, and is constantly changing. The update of the parks should be carried out through the government's greening management system, which can set up a network theme or community park app, and conduct annual or biennial research and partial updates according to the opinions of local residents. This will help to meet the ever-increasing spiritual and cultural needs of the new generations of older people.

The gap between the preferences of ageing people and the current state of the neighbourhood parks in their spatial functionality is on three levels: new functions desired are by current older park users, such as spaces for the sight-impaired, performance space and watching space. There is a lack of balance and inequality in the planned functions of the various neighbourhood parks in the district. And an update system of spatial functions is required to meet the changing needs of the elderly.

10.2.1.3 The gap between the needs of the elderly for comfortable spatial capital and current crowded space in the neighbourhood parks

The number of neighbourhood parks is insufficient for current older park users and for the increasing ageing population over the next two decades. Observation shows that the limited space is crowded, and many older people are concerned and expressed their desire for a more comfortable spatial capital in their interview. The inadequacy of the space for the large number of park users seriously influences their quality of use and environmental satisfaction; the crowding militates against an ageing friendly perceptual dimension for the elderly because of the conflict over the occupation of limited spaces. A comfortable spatial capital for neighbourhood parks is important for future planning, especially given the rapid urbanization and the trend in the numbers of the ageing population in China.

10.2.1.4 The gap between the elderly's desire for ageing friendly services and the current design of the neighbourhood parks in respect of exercise facilities (the physical dimension)

Comparison of the desires of the elderly and their usage shows that some things which older people would like are not presently available in current neighbourhood parks. These include:

- Regularly organize elderly matchmaking events in neighbourhood parks;
- Provide some food and drink for elderly park users;

The gaps in provision for the elderly in the neighbourhood parks fall into four categories. There is a gap between the elderly's desire for diversity of activities and the current simple fixed form of activity in the parks. There is unbalanced spatial distribution of diverse activities, a gap between new activities and traditional neighbourhood park design, and a gap between the increased desire for spiritual pursuits and aspirations along with the development of the information network. There is a gap between the elderly's desire for spatial functional diversity and the single function of most places in current neighbourhood parks. New functions are desired by current older park users, there is an imbalance and unequal provision of comfortable spatial capital in the crowded spaces of the neighbourhood parks. And there is a gap between the elderly's desire for ageing friendly services and the current design of the parks in respect of their exercise facilities.

10.2.2 The gap existing in spatial design of the neighbourhood park in physical dimension

The design of facilities in the neighbourhood parks should meet the needs of the current users in order to improve their quality of life. The specific facilities which the elderly asked to be improved is listed in Figure 7-38. Figure 10-2 illustrates five design attributes need to improve based on the comparison between preferences and usage:

10.2.2.1 Accessibility

Neighbourhood parks should enable older people and the elderly in wheelchair to reach, enter, use and walk around the places they wish to visit. It is necessary to improve the accessibility of these places and facilities as below:

- Rain shelter;
- Pavilion;
- Toilets;
- Entertainment facilities
- Square.

The elderly often have difficulty in walking. A barrier-free environment is very important for their access. The traditional designs of these places always have steps, which are difficult for the elderly. The space and location of rain shelters is important for the elderly in coping with the weather, rain or shine. Spaces with rain shelters should be non-slip with hand rails at the entrance. People in wheelchairs like to join group activities by watching and joining in with chatter, so the square is a key place to improve accessibility and the friendliness of the design. Spaces with hand rails near benches help them to join in with social activities.

10.2.2.2 Social accessibility

Social accessibility means that spaces in neighbourhood parks should provide possibilities for the elderly, who like to enjoy social interaction at different levels. The key places to improve social accessibility are as below:

- Seats and bench;
- Square;
- The rest areas near children's entertainment facilities.

The semi-structure interview found that elderly people wanted more seats and tables for rest and socially beneficial functions, more seats near the children's entertainment area and seating for around six people together. Sitting together in larger groups provides more opportunities for the elderly to chat with each other than the current two seats, which are always occupied by just one person. A long and circular bench is suitable for elderly people. Benches should be provided around the square, offering opportunities for the elderly preferring a low level of social interaction to connect with people just by watching them and absorbing the lively atmosphere. A bench near the children's entertainment area will benefit the elderly who are responsible looking after grandchildren to have a rest and social opportunities with other older people. In the interviews, some people said that they like to enjoy the joyful atmosphere of the children's playing area even though they came, or live alone. The social accessibility of these areas is very important for the ageing people.

10.2.2.3 Comfort

The space and facilities should enable older people to visit places and to do activities of their choice without physical or mental discomfort and to enjoy being out of their homes. The semi-structured interview showed that comfort was felt in some specific places:

- Rest place shaded by tree, shelter, pavilion to avoid sun in the summer, wind or rain;
- Rain shelter for entertainment area to enjoy being out of the house as long as they wish;
- Semi-indoor public space for the elderly;
- Wooden seats and tables to avoid heat in summer or cold in the winter;
- Illumination equipment for the square and activity sites;

10.2.2.4 Safety

The space and facilities should enable older people to use and enjoy the environment without fear of falling or being attacked. Concerns about safety expressed by the elderly participants in semi-structured interview included:

- Good-quality illumination equipment for the footway;
- To control animals;
- To control stall behaviours;
- To strengthen patrols to ensure the safety of the older people in the evening;
- To establish first aid service system.

10.2.2.5 Flexibility

The space should enable older people to engage in a wide range of individual preferences at different ability levels, and be adaptable to change. The elderly desire spatial functional diversity for the diversity of their entertainment and activities. Flexibility is important in the design of the physical environment of the neighbourhood park. Here are some examples:

- A hidden power system that plays music for daily group activities, avoiding the dangers of the elderly bringing their own generators and air pollution. This can also support festival-style events held in the neighbourhood parks.
- A flexible space design of the square for a wide range of activities.

10.2.3 Summary

The gaps between the current state of the neighbourhood parks and the preferences of ageing people are part of the social and perceptual dimensions, and spatial design in the physical dimension. For an ageing friendly arrangement, the gaps include the desire for a diversity of activities, preference for spatial functional diversity, a desire for comfortable spatial capital and a desire for ageing friendly services. For the spatial design, the gaps can consist of five design attributes: accessibility, social accessibility, comfort, safety and flexibility.

Figure 10-1 the comparison among the desires, usage behaviour and attractiveness of the ageing people in ageing friendly arrangement

DESIRES AND SUGGESTIONS (from 7.2.9)

USAGE AND BEHAVIOURS (from 9.3.2.1)

THE ATTRACTIVENESS OF THE NEIGHBOURHOOD PARKS IN SOCIAL AND PERCEPTUAL DIMENSIONS (from 7.2.5)

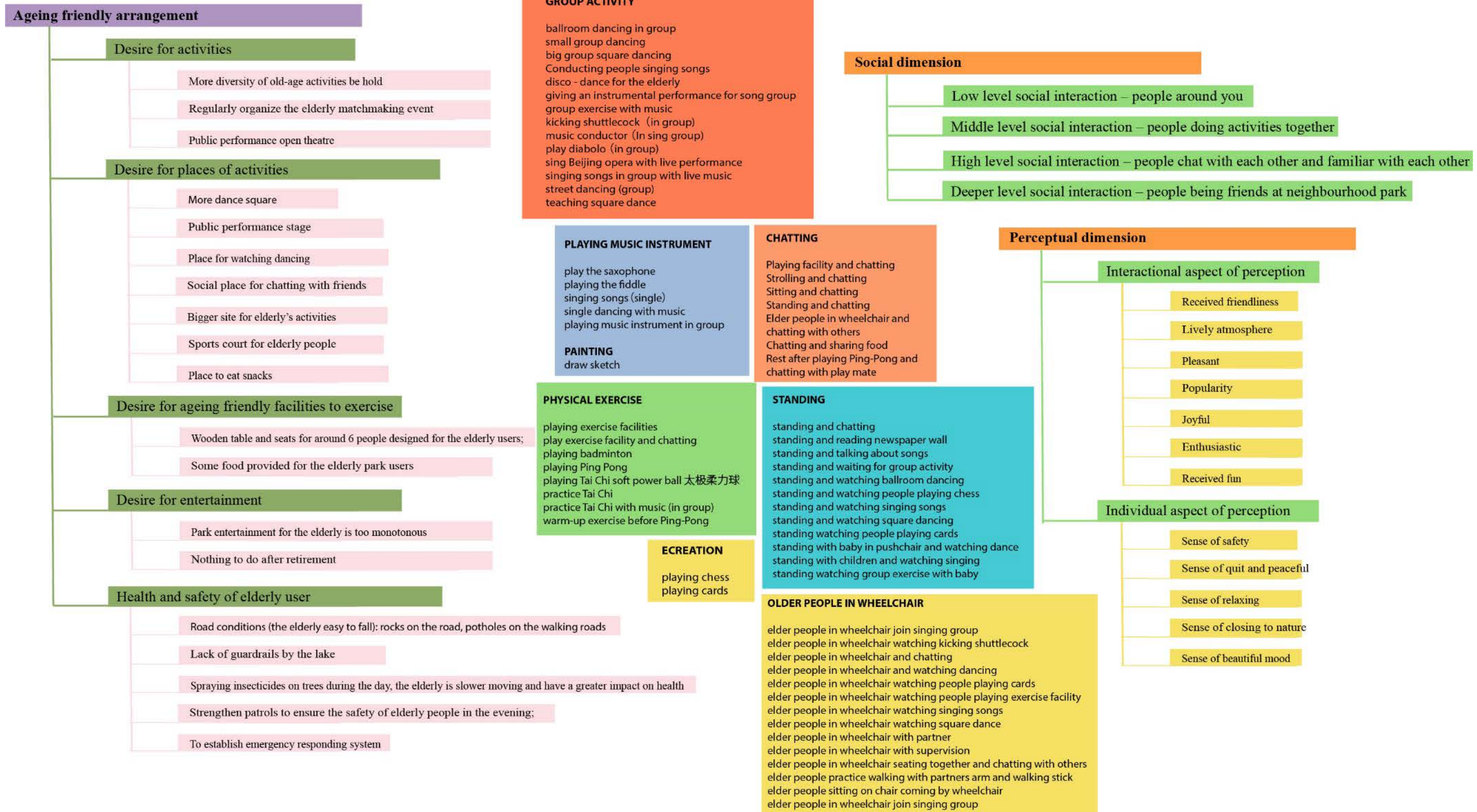
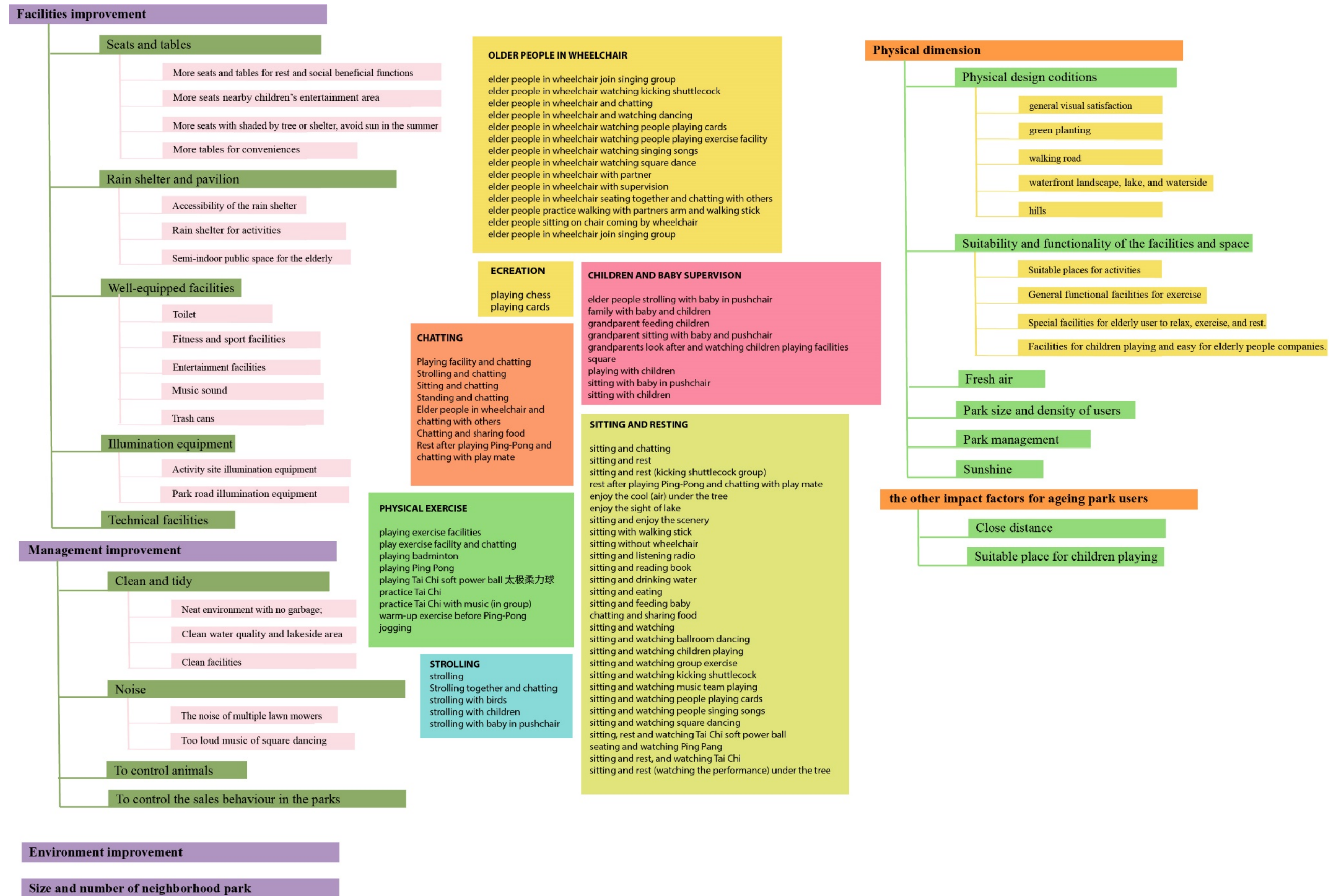


Figure 10-2 the comparison among the desires, usage behaviour and attractiveness of the ageing people in physical environment



10.3 The structured important points emerge from data analysis

The section summarizes the key points emerging in the findings of four chapters of data analysis. These key points have been integrated and organized into seven themes, including behavioural, social, physical, perceptual and personal dimensions, co-improvement of emotional bonding and psychological benefit, and a new analysis approach. This evidence for a new understanding will contribute to the current theoretical foundation for urban open space design in a gerontological context.

10.3.1 Behavioural dimension: features and benefit

The key points around the behavioural dimension separate into two parts, the common features of usage and the features of positive association with psychological benefit. Every sentence is based on the findings of the data analysis. The common features of behaviour include dependence, common activity and the preferences of the elderly. The second part addresses the benefits on psychological state and emotional bonding associated with behaviour, covering group, frequency, duration, patterns.

10.3.1.1 The common features of behaviours of ageing people

For the elderly, dependence on neighbourhood parks is common, and 92% of the elderly have specific parks to go for activities. (Chapter 9) The activities distribution shows similar trends in general in different groups, but there are some differences, detailed in table 10.1 and table 10.2. Walking is the most popular activity for ageing people. (Chapter 6) The number of older people who choose park activities with social possibilities is higher than the number of older people who prefer individual activities. (Chapter 7)

The number of older participants engaging in various activities are, from high to low: group activity, strolling, resting and seating, physical exercise, chatting with others, children supervision, entertainment. (Chapter 9)

10.3.1.2 Evidenced association between behaviour and psychological benefit and emotional bonding

Joining group activity in a neighbourhood park contributes to improving health, social networking, and belonging of the elderly, and helps them to obtain psychological benefits from parks. (Chapter 8) Group activity bring lots of opportunities for older people to have social interaction, including at a low level of social interaction, for example staying with people and watching them join a group activity, to a higher level of social opportunity like chatting with others. (Chapter 9)

The extent of the emotional bonding of elderly park users is impacted by the patterns, groupmate, duration and the frequency of activities they share. Those who were using the park for over 30 minutes each time and more than once a week showed a more positive state of emotional bonding with other older people. (Chapter 6) Using the park for over 30 minutes each time and using it more than once every week have a considerable benefit on improving quality of life of ageing people and gives essential support to maintain mental health, the reduction of loneliness and the sense of uselessness. (Chapter 6)

The five activities with the most highly weighted scores in emotional bonding include: activities playing with children; enjoying scenery; dancing; sitting in the sun; playing chess or poker and walking. (Chapter 6)

Some activities emerging from the analysis show a more positive impact than others, and a closer link with the psychological state. They are: playing with children; walking; sitting in the sun; dancing; enjoy scenery; chatting; playing poker and chess; playing Tai Chi; playing softball or kicking one around. (Chapter 6)

10.3.2 Social dimension: desire and benefit

There are five key points around the social dimension including: a common desire for social interaction; the current state of the neighbourhood parks; activity with high social interaction; the social psychological desire of the older female; and the benefits which accrue from these other elements. The findings in the other chapters have built a story from motivation to performance of the psychological achievement of the older female park users which provides an overview and deeper understanding of the preferences of older women.

10.3.2.1 The common desire of social interaction

The majority of elderly users (72%) desire to communicate and to build positive social relationships with others in daily life. (chapter 7) The ageing park users who came alone are the majority. Because of this, the needs of social interaction and social psychological satisfaction from the park should be paid more attention. (Chapter 9)

10.3.2.2 The statement of social interaction in current neighbourhood park

Most neighbourhood-park users (70%) had deeper social interaction relationships. (chapter 7) The number of older people who choose park activities with social possibilities is higher than the number of who preferred individual activities. (Chapter 9)

10.3.2.3 Activity with social interaction

High sociability is present in large group activities (such as dancing and singing), entertainment activities (such as poker and chess), and the exercise process (such as walking a route). (Chapter 7)

10.3.2.4 The social psychological desire of older women compared with older men

Older women prefer to participate in group activities or activities with the social potential to seed social psychological satisfaction and to relieve their loneliness; (Chapter 6) while the elderly female shows a stronger interest in social and self-expression activities than the elderly male. (Chapter 7) The older man and older woman show different attitudes to joining groups, the attractiveness of a group, the attractiveness of the neighbourhood parks, to frequent use of areas in the neighbourhood parks, which are places where the elderly relieve loneliness. (Chapter 7) The potential motivation is that women are more likely to be affected by psychological loneliness and fearfulness. (Chapter 6) The differences show that older women need a higher level of social interaction in neighbourhood parks to achieve maintenance of their mental health and well-being, compared with older men. (Chapter 7)

10.3.2.5 Benefit of social interaction in the neighbourhood park

Social interaction in a neighbourhood park contributes to relieving loneliness for the elderly, even the lower level social interaction like staying with people in the park plays an important role in this process. (Chapter 7)

The impact of a deeper level of social interaction in the neighbourhood parks and the attitude towards

that depth is very strong for the emotional bonding. (Chapter 8) Creating opportunities for social communication is a very effective way to enhance the emotional bonding in a neighbourhood park improves the quality than mental health of the users. The social interaction, especially deeper social interaction, plays a significant role in improve the well-being and mental health. (Chapter 8)

Social interaction and attitudes toward social interaction have a significant positive impact on the experienced relief of loneliness for the elderly in neighbourhood parks. (Chapter 8) Social interactions and attitude to social interaction makes a contribution towards psychological benefit for the ageing park users, especially for social networking. (Chapter 8).

10.3.3 Physical dimension: demand and design

There are three key points about the physical dimension: the increasing demand for quality and a greater number of neighbourhood parks in the future; their benefit on psychological health; and the target place for ageing-friendly design. The fully evidenced arguments predict the trend of growth in demand from the elderly with development of society and the direction of ageing friendly design.

10.3.3.1 The increasing demand in quality and numbers of the neighbourhood parks in the future

Those older people who have a high level of education also have a high demand for environmental satisfaction, especially with the development of society and globalization. (Chapter 6) The conflict between the growing demand of higher quality park experience and the current state of the neighbourhood parks will be more serious, which will reduce the satisfaction of the elderly with the environment, which will be unable to meet their psychological needs, especially for the retired people. (Chapter 6)

The current neighbourhood park is insufficient to meet the size of the social psychological desire of those older people who come many times every week to seek psychological satisfaction. (Chapter 9) Only 66% of ageing people can go to the neighbourhood park by walking for less than 20 minutes, and the current number of neighbourhood parks is insufficient. (Chapter 9) The demand shows the neighbourhood park is very attractive for ageing people. 92% of the elderly have a specific neighbourhood park to go for activities, and dependence on neighbourhood parks is common among the elderly. (Chapter 9) Neighbourhood parks are strongly tied to an elderly's daily life.

10.3.3.2 Evidenced benefit on psychological health

Using neighbourhood parks gives a significantly positive impact on improving self-reported quality of life, health, bright mental health, and reducing the sense of uselessness. (Chapter 6) More than half of the older participants can feel the psychological benefits of neighbourhood park activity, (Chapter 8) confirming the experienced psychological benefits are confirmed. This finding is echoed by Scannell and Gifford (2017). (Chapter 8)

Target place of ageing friendly design

Most ageing park users prefer using a flat and open park with good light, a bright place with some facilities providing shade or shelter. (Chapter 9) Places where the elderly have a high spatial density include the main/big square, an area for tables and seats for chess and poker, an area for exercise facilities and an area for children facilities. (Chapter 9) The characteristic places which provide the

experience of relief from loneliness are described in Figure 7-35. (Chapter 7) These places should be given more attention in the future design.

10.3.4 Perceptual dimension: benefit from ageing friendly perception

There are three key points about the perceptual dimension: the current state of the parks; their attractiveness in perceptual dimension (detailed in Figure 7-37 and Figure 7-36) and their evidenced benefit. The attractiveness of the neighbourhood park and group activity in perceptual dimension have been identified in this research, and to promote this attractiveness is an effective approach to engage ageing people to improve quality of life and health.

10.3.4.1 Current state

In different neighbourhood parks, the perceived friendliness of the social environment varies. (Chapter 7) A current social environment for group activities is relatively friendly (64% feel local residents' support and agree with them), and the local residents give understanding, tolerance and support to the activities of other older people, but not enough. (Chapter 7)

10.3.4.2 Benefit from a neighbourhood park with good perceptual dimension

A good healthy, friendly social environment will be more conducive to enhancing the psychological experience and psychological benefits of elderly users. (Chapter 8) A healthy, inclusive perceptual dimension built by the friendly residents around a neighbourhood park has a positive influence on improving health, social network, and the sense of belonging of the park users. (Chapter 8) There is a higher performance in a friendly and accessible social environment, which ties the ageing users in a group and engages new ageing people to join park groups. (Chapter 7)

10.3.5 The impacts of personal dimension of the elderly

The finding that the demographic characteristics of a person affects their emotional bonding and psychological state is echoed by adaptation level theory and triple relationship system of place attachment described by Scannell and Gifford (2010). The previous experience of the person will influence the recognition and reflection of the environment. This research supports our understanding of the way the demographic of the elderly affects their emotional bonding and psychological statement. We must ask, what demographic has influence on which aspects of emotional bonding, on which issues of psychological state and what is the extent of these influences?

The demographics of elderly individuals (retirement or not, Native or not, educational level, living arrangement) has a considerably significant influence on the social, group, cognitive and behavioural levels of their emotional bonding. (Chapter 6) These conditions, such as their retired (or not) state, little education, living in their own home, create potential isolation around older people, who desire and seek social psychological satisfaction from their neighbourhood park, and build deeper emotional bonding with the park than those people who still work and have more social communication in their working or home life. (Chapter 6)

Educational level, difficulty in seeing and living arrangements had a significant affect on the self-rated quality of life, fearful, loneliness, and uselessness. (Chapter 8) The elderly who experienced relief of loneliness have a better self-rated quality of life. (Chapter 8)

The needs and desires of older people change with the passage of time. (Chapter 7) There are differences

which emerge between different age groups. When people get older, their need for a high level of social interaction changes to a need for a lower level of social interaction in the neighbourhood parks. (Chapter 7) At the same time, the awareness of personal health is rising with ageing become the most attractive element in park users aged 66-76. (Chapter 7)

10.3.6 The co-improvement of emotional bonding, psychological benefit, and quality of life

The integration of the evidenced associations in each pair of emotional bonding, psychological benefit, and quality of life shows they co-operate with each other. They are dynamic associated with each other, giving a positive impact on each other.

For the perceptual dimension, a harmonious, inclusive and understanding social environment is critical to the perceptual dimension of neighbourhood parks for the elderly. The data demonstrates that the perceived friendliness of the park users and residents around the park has an impact on the extent of emotional bonding of the elderly people using the park. (Chapter 8) The friendliness of neighbourhood parks influence psychological health and quality of life, because the perceptual dimension influences emotional bonding, which influences psychological-health, and quality of life.

All dimensions of emotional bonding have a statistically significant correlation with between psychological benefit, self-rated quality of life, and the experience of relief from loneliness. (Chapter 8) Increased emotional bonding contributes to improved psychological benefit for ageing people. The experienced psychological benefits (confidence, health, social network, and belonging) contribute to maintaining psychological health and well-being. (Chapter 8) The psycho-social benefits of confidence and belonging make a considerable contribution to improving the quality of life of ageing park users. (Chapter 8) The emotional bonding is positively associated with quality of life and psychological health of older park users. (Chapter 6) The different dimensions of emotional bonding have kinds of psychological benefit. (Chapter 8) For relief of loneliness, the effective aspects of emotional bonding include: emotional bonding; psychological process dimension–behaviour level, the emotional bonding–place dimension–social level, emotional bonding–psychological process dimension–emotional level (the order is arranged by accounting influence). (Chapter 8)

10.3.7 New test approach in research interdisciplinary area between landscape and psychology.

This section provides a new approach to landscape, urban studies using Goodman and Kruskal's gamma test, which has a more effective, and predictable performance compared with traditional correlation analysis like Spearman's for ordinal data analysis on relatively small sample sizes in social science. (Chapter 6)

These evidence a new understanding of the seven themes and contribute to the current theoretical foundation for urban open space design and gerontology. These developments are discussed in the next chapter to describe their contribution and application.

10.3.8 The consistency and discrepancy of the interview data observation data in mixed methods

Using different types of procedures for collecting data and obtaining that information through different sources can augment the validity and reliability of the data and their interpretation. (Zohrabi, 2013) This

research applied a mixed method by combining questionnaire, semi-structure interview and observation, they give supports and interpretation for each other. This section set out the consistency of the interview data and observation data and discuss the reasons for the discrepancy.

The observation data and the interview data in general presented a unified and fully correlated result, and the elements presented in the data results were also verified and validated against each other. Each of the three themes is described below:

First, for the high-frequency use of sites by seniors in community parks, the results of the analysis obtained from the interview (see section 7.2.6) and the observation (see section 9.3.1.1) are consistent with the findings that the most frequent use by seniors is in the park square. And observing the features of the common squares at the five sites excavated yielded more specific spatial details than the interviews. Behavioural analyses based on questionnaire data (see section 9.2) yielded more specific comparisons between human characteristics and spatial behaviour than observational data, which provided a more in-depth interpretation of the phenomenological data.

Secondly, with regard to the diversity of activities, the observational data give a more specific record of the type of activity and the duration of the number of people who participated in the activity, as opposed to the analysis of the options for specific answers to questions Q1-1 on activity behaviour in the questionnaire, the observational data present a real phenomenon and a comprehensive interpretation. However, the options in the questionnaire allow for statistical analysis of correlations with other psychological indicators, demonstrating the advantages of quantitative analysis. This is because bias can be minimized as much as possible when supported by observational data. Also, the data can be weighed down by observing the representations of the questionnaire data sample to present invisible data that are closer to the real ones. A possible reason for this variability is that the questionnaire method's own BIAS, as opposed to reducing the nature of things, is better suited to mining the data for correlations, i.e. targeted analysis by controlling for variables. The results of the observational data can also be used as a basis for the pre-content design of the questionnaire.

Third, for the interpretation of the social dimension, the questionnaire and observation data were analysed in a targeted manner, presenting the very important finding of multi-level social interaction. The analysis of the interview data regarding social interactions was mainly derived from 7.2.2 and 7.2.5 and divided into four dimensions, three of which are visible dimensions, which are also corroborated and analysed in the observational data (9.3.2.3) from low to high. This presents the consistency of the analysis results from both data sources. This is accompanied by differences in the details of the data results, which are manifested in three ways:

- The first is the inconsistency in the visibility of factors, which the interviews embodied in four dimensions, namely low-level social interaction, intermediate social interaction, advanced social interaction, and deeper social interaction. The first three can be obtained through observational analysis, but the deeper social interaction of the fourth level is the friendship relationship, the conscious emotional bond. This creates an asymmetry in the results of the inquiry.
- The second aspect is the difference in the number of coded dimensions in the sample, with the number of interviews mentioning different social dimensions of attraction in order: low level social interaction > middle level social interaction > deeper level social interaction > high. The reason for this difference in number may be that activities that last for a long time, such as exercise and square dancing, are more likely to be recorded and judged by the observer than activities that are transiently and serendipitously motivated, such as watching, which results in a weak degree of data distortion due to a combination of individual judgment bias and recording style errors.
- Third, there is the more intrinsic difference between the ontogeny of the observation data and the interview data, i.e. the observation is to inquire into the consciousness exhibited by the

group through the recording of individual behaviour, whereas the interview is to inquire into the motivation of the behaviour from the analysis of consciousness and thus decipher the behaviour.

In summary, after the above analysis and discussion, it can be found that integrated research methods support each other and help each other to reduce the inherent bias of the methods, can be multifaceted to tap and decipher the inherent of conscious behaviour and spatial relations, the concluding viewpoints corroborate each other, there is an inherent unity of coherence, and due to the ontogenetic variability and data differences also form a small difference. And this variability can help the study to understand the conclusions in more depth.

10.4 The approaches to promoting quality of life and well-being of ageing people

The research question ‘how to promote the quality of life and well-being of ageing people through improving the environment’ is answered by the six tree-maps of relationship with mental health (see figures 10.3, 10.4, 10.5, 10.6, 10.7, 10.8), which clarify the associated components benefiting the psychological state including: quality of life, self-rated health, self-rated positive mental health, self-rated fearful, self-rated loneliness, self-rated uselessness. These tree maps are based on the findings from data analysis as below:

- The integrated conceptual framework of the frequency of usage, emotional bonding with park, self-rated psychological issues and characters of ageing people (Table 6-17)
- The integrated conceptual framework of the duration of usage, emotional bonding with park, self-rated psychological issues and characters of ageing people. (Table 6-18)
- The integrated conceptual framework of the associations between social and perceptual attributes and the indicators among emotional bonding, experienced psychological benefit, and self-rated psychological status. (Table 8-10)
- The integrated conceptual framework of associations among psychological statement, emotional bonding, social interaction, experienced psychological benefit, and usage behaviour of the elderly neighbourhood park users. (Table 10-3)

These conceptual frameworks rely on the findings of the effective associations between behaviours, emotional bonding, psychological benefit, psychological statement, and the attributes of the social and perpetual dimensions. These findings provide solid theoretical foundations for application and future studies. By tracking the evidenced trails, the approaches can effectively improve quality of life and other mental health indicators regarding to well-being, as outlined in the tree-maps below:

- The components and progress process of associated promotion on self-rated quality of life. (Figure 10-3)
- The components and progress process of associated promotion on self-rated health. (Figure 10-4)
- The components and progress process of associated promotion on self-rated positive mental health. (Figure 10-5)
- The components and progress process of associated promotion on self-rated fearful. (Figure 10-6)
- The components and progress process of associated promotion on self-rated loneliness. (Figure 10-7)
- The components and progress process of associated promotion on self-rated useless. (Figure 10-8)

Figure 10-3 the components and progress process of associated promotion on self-rated quality of life

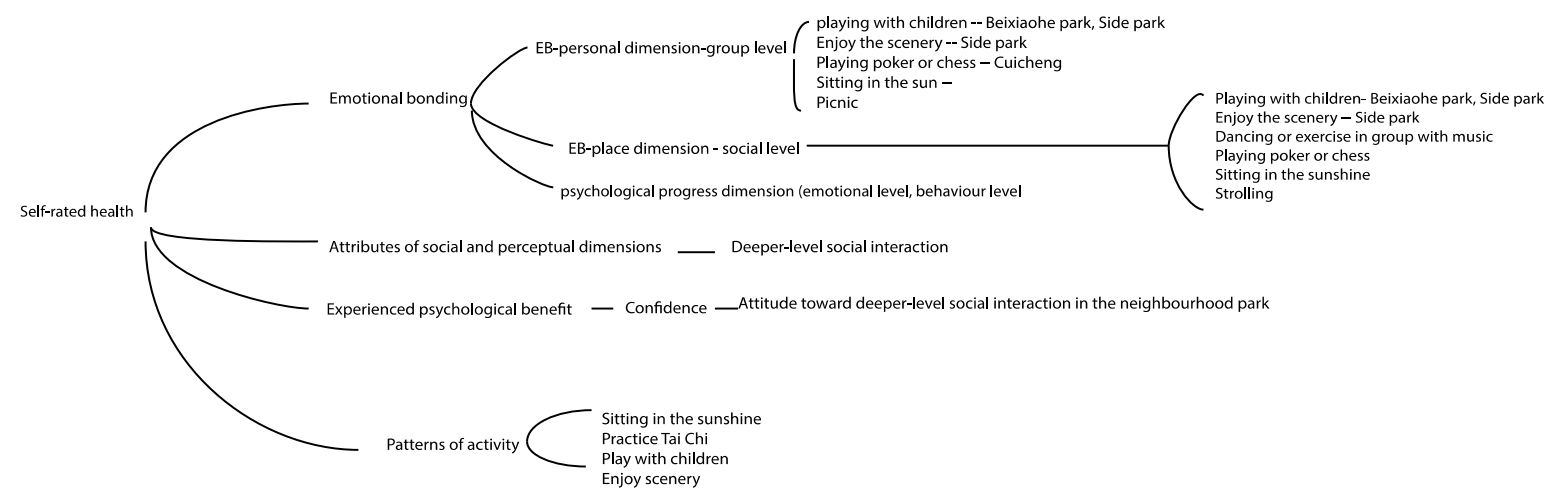
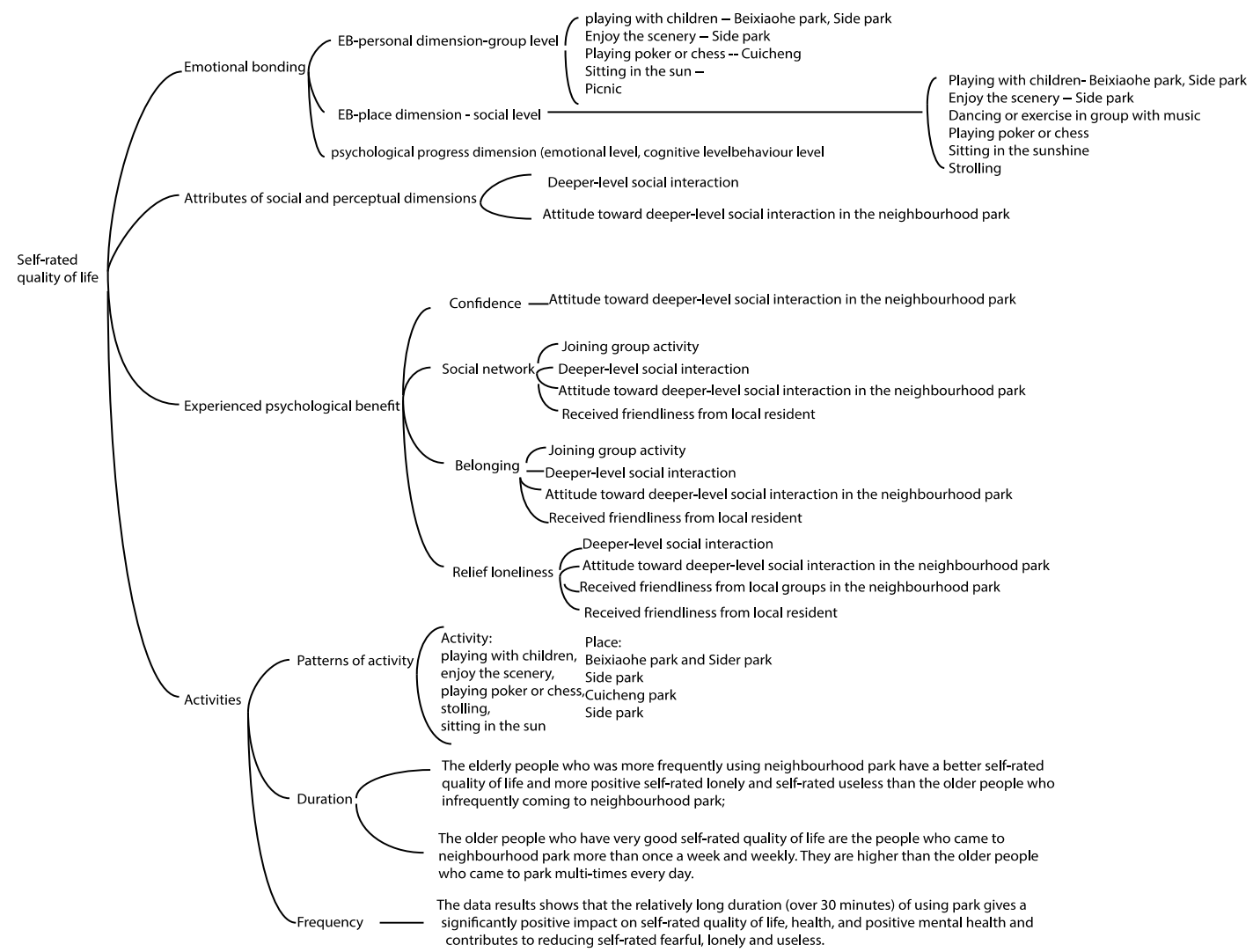


Figure 10-4 the components and progress process of associated promotion on self-rated quality of life

Figure 10-5 the components and progress process of associated promotion on self-rated positive mental health.

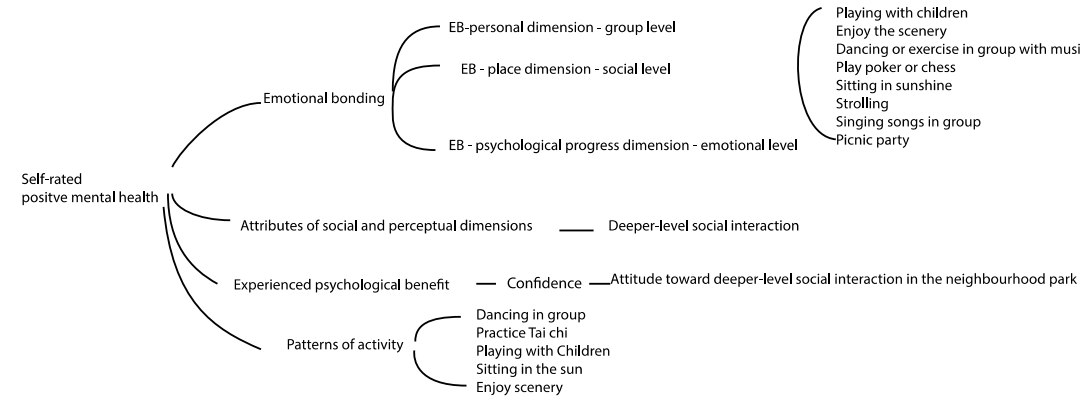


Figure 10-6 the components and progress process of associated promotion on self-rated fearful.

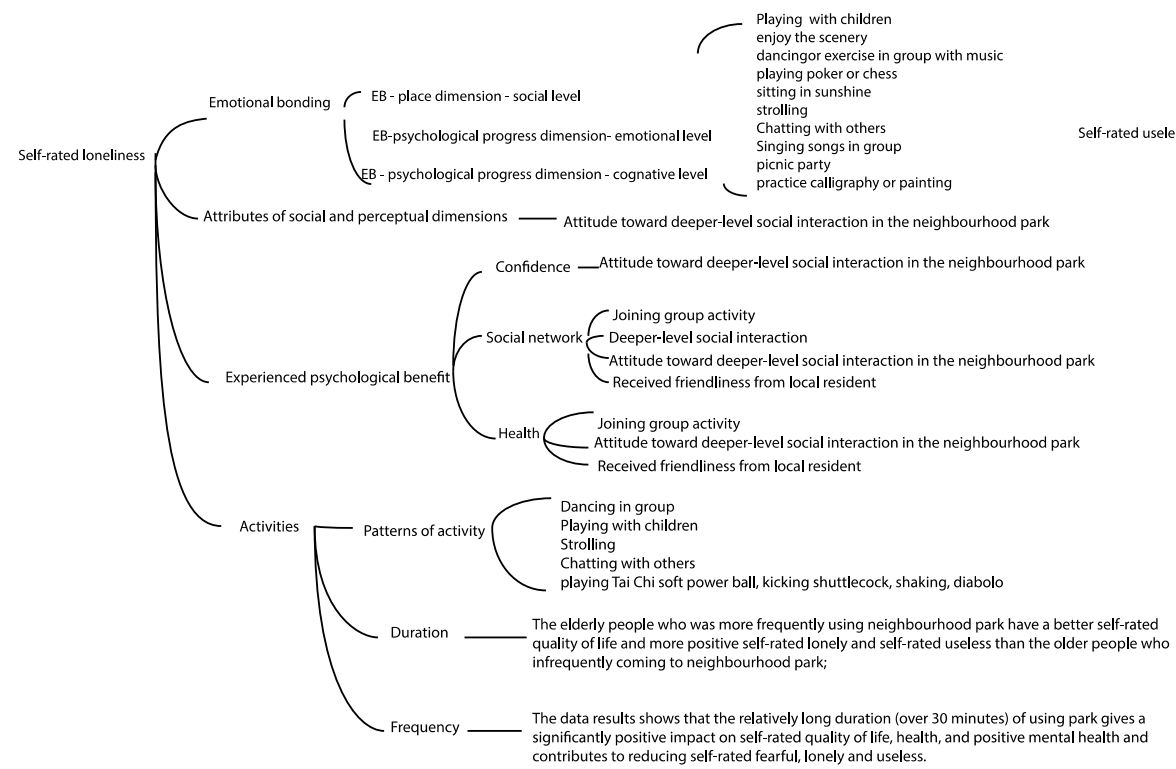
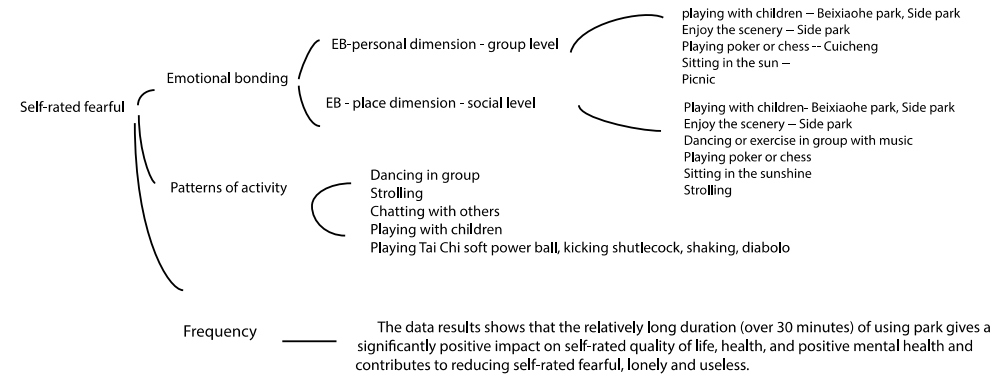


Figure 10-7 the components and progress process of associated promotion on self-rated loneliness

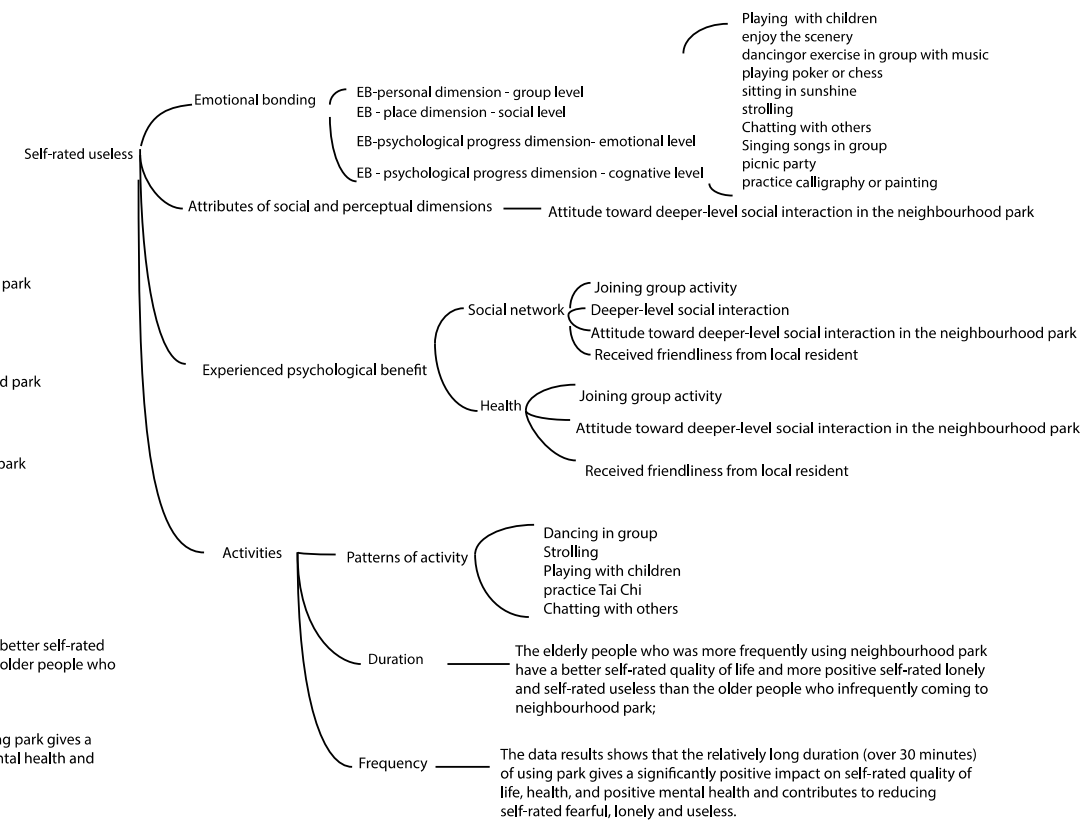


Figure 10-8 the components and progress process of associated promotion on self-rated useless

10.5 The integrated comparison of characters in the physical, social and perceptual dimensions of the five neighbourhood parks

A comparison of place-oriented features is shown in Table 10-4. It summarises a range of features of activities of older people, the physical attributes of neighbourhood parks, emotional bonding and social and perceptual attributes. Comparison is made of the best performance of an indicator used to investigate the influence of physical attributes of environment. The similar condition of first three has been identified as positive condition, the different condition of the best two and worst two has identified as negative condition. The indicators with top 3 performance have been highlighted with red circles.

In **emotional bonding**, the first three are Qingfeng, Side and Beixiaohe parks.

Positive condition (similar condition)

- Landscape water system (lake, river), but unoccupied large area.
- Separated quiet and active zone in the neighbourhood park
- Strolling path > 1km
- Park area >0.1 km²
- Large square, exercise facilities

Negative condition (different condition)

- The park's activity area is relatively small
- Populated density

In **received friendliness** in park, the first three are Tuanjiehu, Cuicheng and Qingfeng parks.

Positive condition (similar)

- Diversity of activities of the elderly
- More older people engaged in activities
- Popularly social interaction.
- Close to residential area

In **perceived friendliness of local residents**, the first three are Side, Tuanjiehu and Qingfeng parks.

Positive condition:

- Side park and Qingfeng park keep a certain distance from residential buildings.
- The active area designed inner zone of the neighbourhood park.

In the influence **on relief of loneliness**, the first three are Qingfeng, Tuanjiehu and Side park.

Positive condition:

- Large area of water (lake, river)
- More seats along the water area.
- Pavilion and waterfront design beside the water area.

Depending on the comparison of the indicators of the five neighbourhood parks, some positive and negative conditions have been identified as above. Some indicators did not show any obvious difference in positive or negative condition comparison, so they are not mentioned here.

10.6 Summary

This chapter integrated the findings from chapter 6, 7, 8, and 9, which consist of the analysed data results from questionnaire, semi-structured interview, observation and mapping. This chapter listed a range of conceptual framework based on the analysis results, identified the gap between the current state of neighbourhood parks and the needs of ageing people in an ageing-friendly arrangement and physical dimension, and structured the important arguments which emerged from the data analysis. This reflects theoretical development, identifies the effective approaches in promoting quality of life and well-being of ageing people and identifies the physical attributes with their positive and negative influence on ageing park users in the perceptual and social dimensions. The next chapter will discuss how these findings answer the research aim, describe their unique significance, and discuss the application of these findings.

Table 10-4 Comparison of indicator performance of five parks and their physical environment design condition

		Side park	Tuanjihu park	Cuicheng park	Beixiaohe park	Qingfeng park	
Sum of ageing park users in one day		418	501	431	268	73	
	Mean of emotional bonding	2	4	5	3	1	
	Sum	28	31	36	24	16	
Information	Attitudes from semi-structured interview	Received friendliness in park	4	1	2	5	3
		Received friendliness of local resident	1	2	5	4	3
		Relief loneliness in the neighbourhood park	3	2	4	5	1
		Sum	13	9	17	20	9
The physical conditions of the neighbourhood park	Park area	0.1244km ²	0.1151km ²	0.0358km ²	0.176km ²	0.0972 km ²	
	Footpath design	Main footpath +multi-sub footpaths	Main footpath +multi-sub footpaths	Only main footpath	Main footpath +multi-sub footpaths	Main footpath +multi-sub footpaths	
	Footpath long	0.975km	1.24 km	0.666km (close to the wall)	1.4 km	2.05km	
	Waterfront, lake, water area design	Lake + lakeside pavilion	Lake + lakeside pavilion +lake long corridors + bridges	No water area design	Lake + lakeside bridge + lake pavilion	Park designed along a river +bridge + landscape water pool on entrance area	
	Square	Entrance square, 2 big square, 2 small square	Entrance square, 2 big squares, 2 small square	Entrance empty place, 1 main square, 3 big flat and open places	Entrance square, one big main square, one small square	3 big square, and some small flat and open space.	
	Seats design	Seats around square with sun shade, seats on main footpath	Seats on the main footpath around the lake	10 sets of stone seats and table under trees, seats in a long corridor, no space for seats for the walking route.	Seats on the main footpath, seat and table with chess, mains seats on the entrance square	Seats along the riverside and a few seats around square.	
	Facility	One big exercise facilities area and 6 table tennis set in a square, 2 toilets, one children playing facilities area	Two areas with exercise facilities, two toilets, no children playing facility area	One area of exercise facilities, one toilet, one children playing facilities area	Big good quality of children playing area, one area of exercise facilities. Two toilet	One good children playing facility area, no area of exercise facility	
	Building, shelter	3 pavilions, and one rain shelter around main square	No special rain shelter, one big set of long corridor and pavilions	One long corridor	One pavilion, no special rain shelter	One pavilion, no special rain shelter	
	Planting design	Good planting design, high green coverage rate, modern design	Good planting design, Chinese traditional design	Green land coverage is low, vegetation is relatively simple	Good planting rate, very high green coverage rate	Good planting, relatively high green coverage rate	
	Distance with residential area	The park is separated from the residential area by traffic road	Very close, This park is connected with residential buildings.	Very close, This park is connected with residential buildings.	The park is separated from the residential area by traffic road	This park is not closely with residential area.	

PART IV TO APPLY

Chapter 11 Discussion

This chapter addresses four questions: how do the findings of this research reflect its aim, objectives, and sub-objectives; how the outcomes reflected to the initial conceptual framework and revise it in light of academic literature; how do the findings reflect the theoretical development of human-place relationship; what is the unique contribution of this study; and how can the findings be applied to open space design recommendations focused on social and perceptual dimensions in Chinese cities.

11.1 Reflection on the research sub-objectives in procedure, objectives, and research aim

This research addressed the research aim through four objectives, each of those by two or three sub-objectives. Table 11-1 states the sequence of objective – sub-objective – chapter – outcomes. It shows which outcomes from which chapter achieved which sub-objectives and contributed to which objective.

Table 11-1 the reflection to research objectives and sub-objectives.

Objective	Sub-ob.	Chapter	Outcomes
Objective 1	1-1	3	<ul style="list-style-type: none"> • Direction, special area, detailed direction of promoting ageing health and ageing friendly environment in policies. • The insufficient area of ageing friendly environment in theoretical development • The gaps between the theoretical development and policies.
	1-2	4	<ul style="list-style-type: none"> • Choose neighbourhood park as focusing on type of urban open space in this research. • Selected 5 neighbourhood parks in Chaoyang District in Beijing for this research.
	1-3	5	<ul style="list-style-type: none"> • Identified 6 key gaps depending on the critical review on human-space relationship • Produced an initial conceptual framework. • Obtained inspiration on methods
Objective 2	2-1	9	<ul style="list-style-type: none"> • The summary of behaviour map of the ageing people in neighbourhood park. (see Table 9-6) • The summary of behaviour-oriented features of using neighbourhood park of ageing people. (see Table 9-1) • Some key points
	2-2	7 & 9	<ul style="list-style-type: none"> • Thought and needs: • The frameworks for the attractiveness of joining the group activities for the elderly; (Figure 7-37) • The frameworks for the attractiveness of neighbourhood parks for the elderly; (Figure 7-36) • The frameworks for a place where the elderly feel relief loneliness; (Figure 7-35) • The frameworks for the limitations of current neighbourhood parks and desires of ageing users; (Figure 7-38) • Usage features: • The summary of features of behaviour analysis of older man and

			<p>older woman in different ageing stage. (Table 9-2)</p> <ul style="list-style-type: none"> • The behaviour list of the older people in neighbourhood park. (错误!未找到引用源。) • The summary of the difference between elderly male and elderly female in thoughts, usage feature and desire in the neighbourhood park. (Table 7-1) • The summary of key characters and changing trend emerging in the comparison among age groups toward desire, usage, inside thought of ageing people for the neighbourhood park. (Table 7-2)
	2-3	6 & 8	<ul style="list-style-type: none"> • The integrated conceptual framework of self-rated psychological statement benefited by emotional bonding and behaviours (Table 6-19) • The integrated conceptual framework of features of usage, emotional bonding with park, self-rated psychological issues and characters of ageing people (Table 6-16) • The integrated conceptual framework of the frequency of usage, emotional bonding with park, self-rated psychological issues and characters of ageing people (Table 6-17) • The integrated conceptual framework of the duration of usage, emotional bonding with park, self-rated psychological issues and characters of ageing people. (Table 6-18) • The conceptual framework of behaviour—emotional bonding—place (Figure 6-73) • The conceptual framework of behaviour—psychological issues—emotional bonding. (Figure 6-74) • The comparison of the older male and older female of performance in the psychological status engaging in various activities in the neighbourhood park. (Table 6-15) • The integrated conceptual framework of features of usage, emotional bonding with park, self-rated psychological issues and characters of ageing people (Table 6-16) • The integrated conceptual framework of the associations between social and perceptual attributes and the indicators among emotional bonding, experienced psychological benefit, and self-rated psychological status. (Table 8-10)
Objective 3	3-1	10	<ul style="list-style-type: none"> • Identified the gap between current statement of the neighbourhood park and desire of ageing people in ageing friendly arrangement and physical dimension.
	3-2	10	<ul style="list-style-type: none"> • A summary of the gender differences in the psychological, perceptual, social, and behavioural dimensions of elderly neighbourhood park uses. (Table 10-1) • A summary of the differences in ageing steps in social, perceptual, and behavioural dimensions in a neighbourhood park. (Table 10-2) • The integrated conceptual framework of associations among psychological statement, emotional bonding, social interaction, experienced psychological benefit, and usage behaviour of the elderly neighbourhood park users. (Table 10-3)
Objective 4	4-1	10 & 11	<ul style="list-style-type: none"> • The components and progress process of associated promotion on self-rated quality of life. (Figure 10-3)

			<ul style="list-style-type: none"> • The components and progress process of associated promotion on self-rated health. (Figure 10-4) • The components and progress process of associated promotion on self-rated positive mental health. (Figure 10-5) • The components and progress process of associated promotion on self-rated fearful. (Figure 10-6) • The components and progress process of associated promotion on self-rated loneliness. (Figure 10-7) • The components and progress process of associated promotion on self-rated useless. (Figure 10-8) • Suggestions based on the outline of promotion process.
	4-2	11	<ul style="list-style-type: none"> • Neighbourhood design suggestion and intervention suggestion based on outline of well-being promotion of elderly, gaps, conceptual frameworks.

11.2 Reflection to the initial conceptual framework

The initial conceptual framework (Figure 3-9) obtained in chapter 5 based on the reconstructed conceptual framework of understanding on the interactional relationship. Through the whole process (Figure 4-1) with logical and systematic test and analysis, the findings has been integrated in Chapter 10 expressed as the main outcomes of this research. This section set out to explain what is the real conceptual framework of interaction relationship between ageing people and urban open space produce in this research and reflection it to the initial framework.

In this research, the final conceptual framework of interaction relationship is constructed by 12 single conceptual frameworks, which are listed in 10.1.4. they expressed the findings from the different section in a relatively comprehensive view to provide a solid and logical understanding of the relationship existing behind the phenomenon in the daily life of the ageing people. There are five main components in this relationship, as people, place, behaviour, emotional bonding, wellbeing and loneliness. The de-constructed and reconstructed process in critical review provide a micro-view to understanding this dynamic relationship and delivered into this initial conceptual framework with five main component, which has a range of aspects and different dimensions. As we know each of them is link together, but how it works and which aspects or dimensions influencing this relationship is limited understanding. This research is aimed to discover it and provide the evidenced understanding for applying in the real design.

Figure 11-1 shows an overview of the final conceptual framework and how it reflects to the initial conceptual framework. the final conceptual framework is constructed by 8 tables (Table 6-16, Table 6-17, Table 6-18, Table 8-10, Table 10-1, Table 10-2, Table 10-3 and Table 9-6) and 4 figures (Figure 7-37, Figure 7-36, Figure 7-35 and Figure 7-38) Figure 11-1 shows how the tables reflected to the initial conceptual framework in different view. In theoretical level, the indicators in these tables linking with each other as a whole system, but in the paper it is difficult to express them together. Thus, the relationship expressed into the 8 tables, which expressed three to four dimensions together. The advantage of this approach is the each table can be applied in single or multiple view to direct the design application or provide the solid fundamental basis to support future research.

The application of the final conceptual framework in this research is 3 ways in academic development and 1 way in practical development. The three ways of academic development are

1, using them to identified the gaps between current situations of neighbourhood park and the desires of ageing people (see section 10.2);

2, using it as a system to produce the outline of the approaches for improving the quality of life and other psychological health indicators (see section 10.4), which means the links of the indicators are linking with each other in this system, if pick one indicator of it, it will shows the all links following it;

3, using them to reflection to the academic literatures to contribute to the insufficient field in theoretical development. (see section 10.3)

The final conceptual framework also can directly used into practical development, which shows in section 11.4 (page 291-295).

Figure 11-1 an overview of the final conceptual framework

Conceptual framework	Wellbeing and loneliness		Emotional bonding	Behaviour	Place	People
	Psychological benefit	Psychological status				
Table 6-14		●	●			●
Table 6-15		●	●		●	●
Table 6-16		●	●		●	●
Table 8-9	●					●
Table 9-5					●	●
Table 10-1		●		●	●	●
Table 10-2				●	●	●
Table 10-3	●	●			●	●

11.3 Reflection on theoretical development

The outcomes of this study are integrated and summarised in chapter 10. This section sets out for discussion how these outcomes contribute to filling the gaps in current theoretical development regarding older people and urban open space, and the significance of the outcomes compared with other research. The gaps shown in Table 11-2 were identified in Chapters 3, 4, and 5 based on critical review. The gaps identified in the Chinese theoretical review (section 3.4 in Chapter 3) are compared with the gaps identified in critical review on interaction relationships (section 5.2.3 in Chapter 5) to show which are consistent and which vary. The second gap dealt with gender and age differences, and has been separated into two. So there are eight sections in this discussion one by one.

Table 11-2 the comparison of gaps in theoretical review of Chinese older people research regarding to urban open space and critical review on the interaction relationship.

Number of gap in chapter 3.4	Number of gap in chapter 5.2.3	Gap identified in literature review
7	1	There are limited studies investigating the two-way of the interactional people-place relationship in a holistic view, especially the elderly people.
3	2	The differences in need, preference of ageing people in urban open space is underexplored, especially in detailed terms of gender and age groups.

	3	There is limited research investigating which part of experience affecting by what kind of characters of people with what extent of influencing, especially for the ageing people in detailed.
2	4	The impacts of perceptual dimension and social dimension of the place on behaviours of ageing park users are underexplored.
1-2-6	5	There are limited studies tested behaviour with social context and emotional bonding on the experienced psychological benefit in the neighbourhood park.
5	6	There are limited research investigating how the ageing people engaged in urban open space and how to attract them to use it to improve both general and mental health.
4		The trend of the changes of new generation of the older people in China has not identified by current studies.

11.3.1 The two-way interactional people-place relationship in a holistic way for older people

The outcomes listed below contribute to filling this gap in a holistic view covering psychological, perceptual, social, behavioural dimensions.

- The integrated conceptual framework of the associations between social and perceptual attributes and the indicators among emotional bonding, experienced psychological benefit, and self-rated psychological status. (Table 8-10)
- The integrated conceptual framework of associations among psychological statement, emotional bonding, social interaction, experienced psychological benefit, and usage behaviour of the elderly neighbourhood park users. (Table 10-3)
- The integrated conceptual framework of features of usage, emotional bonding with park, self-rated psychological issues and characters of ageing people (Table 6-16)
- The integrated conceptual framework of the frequency of usage, emotional bonding with park, self-rated psychological issues and characters of ageing people (Table 6-17)
- The integrated conceptual framework of the duration of usage, emotional bonding with park, self-rated psychological issues and characters of ageing people. (Table 6-18)

This research used descriptive statistic and inferential statistic approaches to investigate how the interaction relationship worked and how it associated with psychological status of the older park users, through questionnaires and semi-structured interviews. The conceptual frameworks of the associations illustrates the complex and cooperatively dynamic system of the interaction relationship between ageing people and the neighbourhood park, shows how they are linked and influence different aspects of the psychological health of the elderly. They provide a comprehensive and holistic understanding of the two-way interactional people-place relationship for the elderly. The detailed indicators in the relationship are discussed now.

This research continues and echoes Scannell and Gifford (2017), who identified a range of experienced psychological benefits of place attachment based on context analysis, and predicted future research on measurement through a quantitative approach. The contribution of the research is that it tested the associations between place attachment and a part of experienced psychological benefit, as did Scannell and Gifford (2017), as belonging, confidence, and other psychological benefit, like social network, health, relief loneliness. The measurement of place attachment continues to use the triple-dimension model from Scannell and Gifford (2010) with justification depending on the pilot in China. The results

(table 8.4) show five experienced psychological benefits associated with aspects of place attachment, some of which show more significant influence (value>0.3). The indicators with significantly mediated level of effect on each experienced psychological benefit have been highlighted in tables 8.4 and table 8.3.

This research is partly consisted with Marcheschi et al. (2015), who noted that perceived physical and social environment qualities predicted quality of life, and that place attachment mediated this relationship. The results of this research show that the perceived social environment has a significant impact on some dimensions of place attachment (table 8.5) but did not show an impact on the psychological status of older people (table 8.9). This result shows the association between the quality of life and the social level – place dimension – place attachment, which influences through the perceived social environment in neighbourhood parks and local residence. The role of place attachment is intermediate: the impact of perceived physical and social environment does not directly affect psychology of the elderly, but rather through place attachment.

The contribution of this research indicates that a stronger influence on the psychological health of older people is social interaction and the attitudes of older people to social interaction, which are strongly influenced by the dimensions of place attachment, experienced psychological benefit, and psychological status (quality of life, health, positive mental health, loneliness, useless). To build a social sustainable environment and encourage social interaction of older people is a critically effective approach to co-improving their place attachment, quality of life and well-being.

The results of this research are mostly consistent with those studies (Casakin & Kreitler, 2008; Manzo & Perkins, 2016; Moulay et al., 2018) which note that attachment to particular place is an important motivation for people to spend more time outdoors and that the people who have spent more time in place have a stronger place attachment (B. Brown, Perkins, & Brown, 2003). This research shows that the most dimensions of place attachment increased with the time people stayed in a neighbourhood park. Another contribution of this research is that it shows a peak of place attachment for older people who came to the neighbourhood park more than once a week. It is higher than for older people who came many times every day.

There is a similar trend in the association between frequency of going and duration of staying and self-rated psychological status. The older people who used the parks more frequently had a better self-rated quality of life and more positive scores for self-rated loneliness and uselessness than those older people who visited parks infrequently, but it also shows a peak performance for the older people who came to the parks more than once a week. They score higher than those who came many times every day. This result shows that the role of the neighbourhood park is limited, impacting on place attachment, quality of life and other psychological indicators. A rich and diverse balanced lifestyle may be more conducive to improving the quality of life and mental health of the elderly. It is also consistent with the gap between the elderly's desire for spatial functional diversity and the single function of places in current neighbourhood parks identified in 10.2.1.2.

This research provides a holistic understanding of the interactional relationship between ageing people and neighbourhood parks, integrating the perceptual, social, psychological, behavioural and emotional dimensions through a logical and systemic analysis. The links between each dimension have been tested and analysed in a solid statistical approach which shows the extent of influence of different indicators and dimensions.

11.3.2 Gender and older people: different preferences and needs in urban open space

The outcome below contributes to filling this gap by focusing on neighbourhood parks.

- A summary of the gender differences in the psychological, perceptual, social, and behavioural dimensions of elderly neighbourhood park uses. (Table 10-1)

This research used questionnaires and semi-structured interviews to reveal the characteristics of the performance, preferences and needs of older people in psychological, social, perceptual, and behavioural dimensions of their interactions with neighbourhood parks, and then assessed the differences and common characteristics patterns amongst older males and females. This provides a comprehensive understanding of the differences between male and female attitudes in a holistic way, differentiating their potential motivation and behaviour by gender. There are limited studies assessing the differences between older men and women in relation to their psychological health, using neighbourhood parks and covering social, perceptual, behavioural dimensions.

This outcome is consistent with the findings of Pinqart and Sorensen (2000) that women prefer social integration linking with life satisfaction and happiness compared with men. The particular contribution of this research is to specify the gender differences between the older people. This research also found that women preferred activities with higher quality of life and positive mental health and more social interaction than older men. This echoes H. K. Park et al. (2015), who pointed out that the association between the quality of life and social activities participants of the older women is greater than with men. This research identifies the differences in attitude to the attractiveness of the parks, that older women are more attracted by the presence of people in the parks than men. On group activities, the older women were more frequently 'happy', saying that they enjoy the group activities like 'square dancing' and 'singing'. The results show that group activities like square dancing have a significantly positive impact on the psychological health of women, leading them to looking at the brighter side of things, and reducing their sense of uselessness. It also has an important impact on older males, but less than for the older women. This research also found that older women feel loneliness and fearful more readily than the older men, which may explain the motivation of the older women to participate in group activities to achieve greater psychological satisfaction.

This outcome is partly contrary to that of Noon and Ayalon (2018) who found there were no gender differences between the older adults who were alone in urban open space. This research found that older women showed more interest in resting in places with aesthetic value than the older men. This is consistent with Ode Sang et al. (2016) who found that women saw greater aesthetic value in green space than men. The contribution of this research is a deeper understanding of the preferences of older women in terms of the usage, spatial, social and psychological dimensions. There are several common characteristics of preferences for using places. Older men and women all like flat and open places and the waterside, but the men tend to have individual activities at the waterside, like enjoying the scenery, while the women like to socialize there, chatting with others. The possible explanation for this might be that the women seek opportunities to meet their social psychological needs in the parks, which is consistent with the finding of this research that older women feel loneliness more than older men. This echoes another finding of this research about a place where they feel relief of loneliness. The difference is that the older women admit to a higher and deeper level of social interaction in a place to feel relief from loneliness than the older males. For example, the women talked more about places with 'friends' in the neighbourhood park helping them to relieve their loneliness. The sociability of activities differs for older men women. The older men always got their deeper level of social interaction by making friends, from 'chatting', 'playing chess or cards'. The older women most got it from 'dancing', 'playing cards' and 'walking'.

This outcome partly echoes Wang (2018), who found that the physical activities of older men were affected by the extent of greening of the outside space of the neighbourhood, while older women were affected by the whole environment. This research found that older men desire improvements to facilities in the parks, while the older women focused on their management, focusing on the whole environment of the neighbourhood park.

There were several common characteristics shared by older women men, which should be highlighted. Playing with children (grandchildren) plays a key role in maintaining a better self-rated positive mental health for both men and women in China. Chatting with others in the parks plays an essential role in helping the elderly relieve their fears and anxieties. Social interaction helps them relieve their loneliness,

even at the lower levels of social interaction, by simply staying with people. There are a certain percentage of them who feel a sense of uselessness. For the older men chatting with others and playing with children helps them to relieve this feeling. The older women prefer to join dancing groups and play with children. The accessibility of the social environment of the neighbourhood parks is the same for older men and women, and most of them had friends in there. They confirmed the parks' social function. For the parks' physical attributes, the older women and men generally preferred using a place with facilities and buildings like pavilions, shelter, tables and seats, when they attend entertainment activities.

This research provides a holistic understanding of the differences and common characteristics of the older men and women in psychological, social, behavioural, perceptual and spatial dimension of their interactions with their neighbourhood park. The summary of the performance, preferences and needs helps the designer to capture the special features of the older people and to meet their need to improve their quality of life and maintain psychological health.

11.3.3 Different age groups: different preferences and needs in urban open space

This outcome contributes to filling the gap relating to the different characteristics of the elderly at different stages in their lives, in respect of their performance and needs in urban open spaces and especially neighbourhood parks.

- A summary of the differences in ageing steps in social, perceptual, and behavioural dimensions in a neighbourhood park. (Table 10-2)

There are some studies which have identified the different usage and psychological changes of the elderly (Pleson et al., 2014; Shankar et al., 2011; Stenner, McFarquhar, & Bowling, 2011; Van Cauwenberg et al., 2011; D. Wang et al., 2017), but are few which focus on the different ageing stages of older people in using urban open space. The ageing process is one of physical functional degradation, even cognitive decline in advanced age. (Clarke, Weuve, Barnes, Evans, & Mendes de Leon, 2015; Wilson et al., 2013) This decline conditions preferences and usage which change with ageing stage. Different ageing stages have different kinds of interaction with the neighbourhood parks. This section mainly addresses two dimensions, social and behavioural, both of relating to psychological health.

This research found that the people aged 56-65 and 66-75 described a higher level of interest in joining group activities, showing that there is a greater diversity of sociable activities for the younger age group. People aged 45-55, those who are just retired or just after retirement expressed the most positive interest in social life in the parks. The attributes of social life shows a considerably increasing trend amongst the new generation, showing that an awareness of the need to address social psychological needs has increased in new generation, who are more focusing on the social function of neighbourhood parks.

This research found that there are some considerable differences in attractiveness and usage for people at different ageing stages. People aged 45-55 were attracted by perceptions of the neighbourhood park as having a lively atmosphere, good for entertainment and personal health. People aged 56-65 are attracted by the same 'lively' quality, but then friendship (deeper social interaction) and people (at a lower level of social interaction). For people aged 66-75, whose awareness of health had become their primary reason for using their neighbourhood park, the preferences were 'lively' and 'people'. Those aged 76-85 were mostly attracted by 'people'. It shows a change in the needs for social interaction in the parks. It is possible that there is a decline in social psychological need with the ageing process, but older people still need the lower level of social interaction. This finding is consistent with result relating to places which help them to relieve loneliness. The people aged 76-85 and older had significantly different comments compared with younger ageing groups. They expressed a strong preference for staying with people, for a lower level of social interaction. For the younger older people aged 45-65, looking after children and group activities play an important role helping them to relieve loneliness. This is consistent with younger ageing people of 45-55 and 56-65, who said that they got deeper social interaction in more vigorous activities, in contrast to older people who preferred more

static activities.

The differences found is also in the physical dimension. Older people of 76-85 and above expressed concern about the facilities for protecting them from danger and about the ease of use of facilities when their physical condition worsens. The decline in physical condition is closely linked to their well-being and quality of life, and self-acceptance is a key factor in moderating the association. (Wilson et al., 2013) A barrier-free environment can help them reduce the negative impact of physical and cognitive decline and to improve self-acceptance. Younger ageing people of 45-55 expressed more concern about the children's play facilities, because they have to look after their grandchildren more often. This phenomenon is very common in China. Design for an ageing friendly environment needs to consider the features of usage and need, of groups. For people aged 76-85, the design should also consider groups, because most come with a family member and some in a wheelchair needing a helper.

This research is the first comprehensive assessment of the different preferences for activities, attributes of social interaction, perception, place benefiting of relief of loneliness, preferences and physical attributes of using places for ageing people of all the groups, 45-55, 56-65, 66-75, and 76-85. It provides a deeper understanding of the different needs and characteristics of the different groups of older people which can help a designer to consider park design in detail, for example in locating a target place for the installation of more helpful ageing friendly facilities.

11.3.4 The influence of the demographic of ageing people on the behavioural, emotional and psychological dimensions of their interaction with the neighbourhood park

The outcomes below contribute to assessing the influence of the demographic of the ageing people on their behavioural, emotional and psychological performance in their interaction with neighbourhood parks.

- The integrated conceptual framework of features of usage, emotional bonding with park, self-rated psychological issues and characters of ageing people (Table 6-16)
- The integrated conceptual framework of the frequency of usage, emotional bonding with park, self-rated psychological issues and characters of ageing people (Table 6-17)
- The integrated conceptual framework of the duration of usage, emotional bonding with park, self-rated psychological issues and characters of ageing people. (Table 6-18)

Only limited research has investigated the relationship between characteristics of older people and their performance in the neighbourhood park. This research analysed the demographic characteristics including gender, age, retired or not, native or not, educational level, living alone or not, living arrangement, difficulty in seeing, moving, and hearing to identify changing trends and differences in usage, perception, and psychological status relating to neighbourhood parks. This research found that retirement, native or not, living alone, difficulty in body function are the key factors influencing the usage and performance of the elderly, echoing the current pattern of Chinese society.

The one-child policy in China has left a particular generation as a unique phenomenon of China's ageing pattern compared with many other societies in developed countries. (J. Yu & Rosenberg, 2017) For older people, the neighbourhoods and their homes play a more important role in their daily life. (Tine Buffel, Phillipson, & Scharf, 2013) In China, many older people moved to their children's home after retirement to help them to look after a grandchild. This research found that the ageing people who are not native show more interest in entertainment and staying longer time in the neighbourhood park. In the interviews, some participants said that they came to Beijing to help their child, that they were not familiar with the environment, and that the most time they like to stay in a park because they could look after their grandchild there and sometimes talk to the other grandparents in the park. They had lost their original social network and the familiar social environment in their own home to come to a relatively

strange place to build new social relationships. The park played an important role in this process, relieving loneliness and providing social interaction. By contrast, other ageing people faced, living alone. This research found that those who were living alone preferred to walk and showed a high awareness of health protection, compared with those who lived with a child, who preferred entertainment activities. The older people who lived alone expressed a statistically higher extent of emotional bonding regarding to social issues affecting their mental health and found it easier to feel lonely. These barriers around ageing people impact on their quality of life and well-being. The neighbourhood parks have the potential mediating role and can relieve the negative impact of these barriers.

The empirical findings in this study provide a new understanding of the Chinese ageing population regarding the impact of demographic factors on their usage and performance of interaction with their neighbourhood and the understanding of ageing in China.

11.3.5 Comparing influence and associations among perceptual, social, and behavioural dimensions of ageing park users

A range of findings emerged in this research as evidence for arguments which provide a deeper insight on the interaction relationship reflecting the development of urban design theory. It has extended our knowledge of the relationship between emotional bonding (place attachment), psychological benefit and quality of life. The reflection is based on solid and systematic statistical test and logically qualitative analysis by quantitative coding process. The insights gained from this study can be of assistance to our understanding of the statement, desire, features, and influence of Chinese ageing people in each dimension by a holistic view.

Figure 11-2 the reflection on development of urban design theory focusing on Chinese ageing people

Behavioural dimension

- The common features of behaviours of the ageing people
- Evidenced association between behaviour and psychological benefit and emotional bonding

Social dimension

- The common desire of social interaction
- The statement of social interaction in current neighbourhood park
- Activity with social interaction
- The social psychological desire of older women compared with older men
- Benefit of social interaction in the neighbourhood park

Physical dimension

- The increasing demand in quality and numbers of the neighbourhood parks in the future
- Evidenced benefit on psychological health

Perceptual dimension

- Current statement
- Benefit from a neighbourhood park with good perceptual dimension

personal dimension

- The impacts of **personal dimension** of the elderly

The **co-improvement** of emotional bonding, psychological benefit, and quality of life

11.3.6 The influence of social behaviour and social interaction on the emotional bonding and experienced psychological benefits of a neighbourhood park.

The outcome below contributes to extending our understanding of the influence of social behaviour and

social interaction on emotional bonding and psychological benefits experienced.

- Table 8-10 the integrated conceptual framework of the associations between social and perceptual attributes and the indicators of emotional bonding, experienced psychological benefit, and self-rated psychological status.

This finding is consistent with that of Pinqart and Sorensen (2000) who showed that the quality of social life has a strong influence on subjective well-being in later life. The influence of the middle level of social interaction, joint group activity in a park, is evident on the psychological state and experienced psychological benefit. By statistical test, a deeper level of social interaction has a significant positive impact on self-rated quality of life, self-rated quality of life, and self-rated positive mental health. Social interaction has an impact on belonging, an important fulfilment of human affiliation needs. These results corroborate the findings of the previous work in exploring the contribution of social interaction in local parks on the development of social ties in inner-city neighbourhoods. This contribution is an investigation of the social interaction of social interaction in neighbourhood park for older people who face more psychological and physical barriers than other ages.

The impact of social interaction on emotional bonding is discussed above at 11.2.1.

This research found that the role of social interaction is on not only well-being and quality of life, but also on the relief of loneliness, engaging ageing people to use urban green space. The preference for and attractiveness of social interaction was expressed by the older participants in semi-structured interviews.

- The frameworks for the attractiveness of neighbourhood parks for the elderly; (Figure 7-36)
- The frameworks for a place where the elderly feel relief loneliness; (Figure 7-35)

These findings are in agreement with Noon and Ayalon (2018) who argue that the outdoor environment is a good venue for the social activities of older people; they remark on the high level of aloneness experienced by them. This research confirms the strong social psychological needs of older park users, for whom social interaction is a significant engagement for them. All four levels of social interaction identified in this research works are effective in relief of loneliness. This research provides a holistic view of what elements relieve loneliness for the elderly, and how to promote it.

11.3.7 11.2.7 How ageing people are engaged in urban open space and how to attract them to use it.

The outcome below contributes to extending our understanding of the attractiveness of neighbourhood parks for older park users

- The conceptual framework of the experienced attractiveness of the neighbourhood parks for the ageing people. (Figure 7-36)

This finding seems consistent with Gibson (2018) who asserts the importance of need fulfilment and psychological need for park visitation of the older people, and describes the need for autonomy, which has a significant impact on revisiting behaviour. The contribution of this research is to extend the current understanding of the attractiveness of neighbourhood park for older people, in four dimensions, social, physical and, perceptual dimension, and other factors.

This finding is in agreement with Kemperman and Timmermans (2014) and Li (2018) who said that the greening of the living environment, for example with trees, is affecting the social contacts of ageing people. This research provides a deeper understanding of the physical environment attracting ageing people, including physical design conditions (general visual satisfaction, green planting, walking roads, waterfront, hills), sustainable and functional facilities and space (suitable places for activities, exercise facilities, special facilities for older user to relax, exercise and rest, facilities for children playing and

easy for older people to company), fresh air, park management, and sunshine. It provides the key elements of the physical environment of neighbourhood park to engage the older people. The importance of the paths and chairs in parks is also conformed by other studies of Chinese older people. (Bai, Wang and Zhu, 2017, Chen and Huang, 2018, Chen and Huang, 2019)

This research extends our perception of the value of neighbourhood parks for ageing people. There are few studies which investigate the perceptual dimension for the elderly. This research found there are two aspects of perception attracting them: interactional aspects of perception (perceived friendliness, lively atmosphere, pleasant, popularity, joyful, enthusiastic and received fun) and individual aspects of perception (sense of safety, sense of quiet and peaceful, sense of relaxing, sense of being close to nature, sense of beautiful mood). The power of being close to nature is confirmed by Beery and Wolf-Watz (2014) and the sense of safety is echoed with the human needs. The interactional aspects of perception is based on the space people made, extending our understanding of the relationship between human behaviour and space, which builds the perceptual dimension of the neighbourhood park. There is a positive impact by an ageing friendly perceptual dimension on psychological benefit (confidence, health, social network, belonging and loneliness), self-rated quality of life, self-rated health, reducing self-rated loneliness and uselessness. The needs of interactional aspects of perceptual dimension is echoed with the affiliation needs like belonging and acceptance by Maslow (1968).

This research contributes to our knowledge of social interaction in urban open space. Social connection and social behaviour have been identified as chatting behaviour and social activities in previous urban studies ((Każmierczak, 2013; H. K. Park et al., 2015; Pleson et al., 2014) and in Chinese older people research (Liu, 2018, Gu and Sun, 2019). The contribution of this research redefines the social interaction of ageing people in neighbourhood parks using qualitative analysis, at four levels of social interaction, a lower level of social interaction (staying with people), a middle level of social interaction (do the same activity with others), a high level of social interaction (chatting with others) and a deeper level of social interaction (making friendship). The distinct contribution extends our understanding of the social interaction of older people and the different levels of their social psychological needs and social satisfaction. This research found that group activity with high social possibilities shows a positive impact on psychological benefit, and investigated the attractiveness of group activities. Social interaction plays an essential role in engaging people in group activities. What needs to be highlighted is the personal achievement in the attractiveness of group activities, which is echoed with self-actualisation needs as expression. The older people who engaged in square dancing want to express themselves and seek spiritual fulfilment, which they could not do when they were working.

This research provides a deep and systemic understanding of the attractiveness of the neighbourhood park for elderly Chinese people and gives an insight into how to engage them in using it to promote their quality of life, health and well-being.

11.3.8 The trend of the changes in a new generation of older people in China has not identified by current studies.

A distinct contribution of this research is that the younger ageing people with a higher educational level have a lower extent of environmental satisfaction. With the development of society and internet technology, the educational level and knowledge level of ageing people is increasing. The results predict a trend of increasing demands in the environment of the new ageing generation.

The gap between the current state of the neighbourhood park and the preferences of the elderly has been identified based on comparison of the findings from semi-structured interviews and observation, showing gaps in two main areas, ageing friendly arrangement and the physical dimension.

The gaps in the physical dimension are issues of accessibility (Nie, 2003, Zhang, 2009, Qu, 2015), comfort (Zhou, Liang and Li, 2003, Qiang, 2004, Zhang, 2004, Bai, Wang and Zhu, 2017, Liu, 2018) focusing on seating area and number of chairs (Chen and Huang, 2019). This research has identified a

gap in social accessibility, safety, and flexibility. Social accessibility emphasizes the socially beneficial function of resting areas, including long benches, seating groups around the square and rest areas near the children's entertainment facilities. The parks are an important social venue for older people (Noon & Ayalon, 2018), and should provide a social accessible physical environment for them to achieve social interaction and meet their social psychological needs. The gaps in safety in both physical design and management need to be addressed to ensure an environment which can meet the basis needs of older people. There need to be flexible facilities, equipment and space designed which can meet as many as possible of the activities of the elderly in the limited space of the parks.

These two gaps (10.2.1 and 10.2.1.4) identified in this research echoed Gu and Sun (2019) and Wang et al. (2019), who say that there is an increasing demand for inspiration and ageing friendly service (Bai, Wang and Zhu, 2017). They say there is a need for drinking water to be provided for the elderly, and that cultural and spiritual improvement must be addressed. The contribution of this research is providing a deeper understanding in detail (see 10.2) of the gaps in the ageing friendly environment:

- The gap between the elderly's desire for diversity of activities and the current simple fixed activities in the neighbourhood parks.
- The gap between the elderly's desire for spatial functional diversity and the single function of places in current neighbourhood parks.
- The gap between the needs of the elderly for comfortable spatial capital and current crowded space in the neighbourhood parks
- The gap between the elderly's desire for ageing friendly services and currently the design of the neighbourhood parks just concerned on exercise facilities in physical dimension.

This research predicts a change with the new ageing generation, and describes the direction of improvement of the ageing friendly environment to meet increasing demands on the environment and the gaps between current neighbourhood parks and the demands of ageing people.

11.4 Application of the integrated findings in decision-making recommendations

The recommendation on decision-making of design neighbourhood park are based on the findings as below. The application of these finding contributes to filling the gap in political development in China identified in section 5 in chapter 3.

- The conceptual framework of the experienced attractiveness of the neighbourhood parks for the ageing people. (Figure 7-36)
- The conceptual framework of a place relieve loneliness for ageing people. (Figure 7-35)
- The conceptual framework of limitation of current neighbourhood park for ageing people and their desires. (Figure 7-38)
- The summary of behaviour map of the ageing people in neighbourhood parks in the social dimension and spatial dimension. (Table 9-6)
- The components and progress process of associated promotion on self-rated quality of life. (Table 10-3)
- The components and progress process of associated promotion on self-rated health. (Figure 10-4)
- The components and progress process of associated promotion on self-rated positive mental health. (Figure 10-5)
- The components and progress process of associated promotion on self-rated fearful. (Figure 10-6)

- The components and progress process of associated promotion on self-rated loneliness. (Figure 10-7)
- The components and progress process of associated promotion on self-rated useless. (Figure 10-8)
- The findings in 10.5 the integrated comparison of characters in physical dimension, social dimension, perceptual dimension of the five neighbourhood parks

This research makes recommendations for ageing friendly neighbourhood park design and interventions. These cover four processes, design, management, promotion and intervention and planning. The key points and references of using outcomes has been listed in Table 11-3. The aims of the recommendations are promotion quality of life and psychological well-being of ageing people by improving the environment and social and perceptual dimensions. The overall recommendation is for an ageing friendly neighbourhood park design standard to fill the gap and to offer development of the ageing policies in China.

Table 11-3 the recommendations on ageing friendly neighbourhood park design and interventions.

<i>PROCESS</i>	<i>ASPECT</i>	<i>KEY POINT / COMPONENTS</i>	<i>REFERENCE</i>
DESIGN	Structure	<ul style="list-style-type: none"> • Structured quiet zone and active zone. • Quiet zone: waterfront, lake with rest area, waterside pavilion, hills, grave trees. • Active zone: two square, and one children playing ground with rest area nearby. • Keep certain distance between active zone and residential area. To arrange the quiet zone beside the residential area, or greening and planting arranged beside the residential area. 	10.5 7.2.5 figure 7.36 7.2.8 figure 7.37
	Space	<ul style="list-style-type: none"> • The space construction design should concern the all four social interactions from lower level to deeper level and concern on the accessibility of perceptual dimension attracting older people and relieving loneliness of them. • The space form could reference the spatial behaviour map. 	Table 9.14 7.2.5 figure 7.36 7.2.8 figure 7.37
	Element	<ul style="list-style-type: none"> • The main strolling road recommended ≥ 1km. • Raining friendly pavement and covering for the strolling road to avoid the slip. To concern the colour and drawing on the covering to encourage the older people strolling exercise. • Replace some septate seat with long bench and seats set to promote the possibility of high level of social interaction. Moreover, to concern about 	7.2.9 figure 7.38 Table 9.14 7.2.5 figure 7.36

		<p>the convenient of the bench design, such as materials, size, height, handle position, the use of older people in wheelchair with keeper accompanying. To concern the trees shadow or shelter from</p> <ul style="list-style-type: none"> • Benches design should cover these places: nearby children play ground, shaded by trees or shelter, around the square. • Tables and seats set with trees shadow and corridors with seats for some entertainment activities of the older people. • Rain shelter and pavilion: the accessibility of the rain shelter (ramp + steps), handles for older people in wheelchair, and the week height difference prevents rainwater from flowing backwards or accumulating under the shelter to affect the elderly. • Greening environment and planting design: flower, trees, grass. Changing on the strolling road. • The quiet zone should concern some relative enclosed space design with trees help the older people who like to individual psychological control for the loneliness and balance. It also help to access the individual aspect of perceptions. 	<p>7.2.8 Figure 7.37</p> <p>Figure 10.3 to figure 10.5</p> <p>10.5</p>
	Facilities	<ul style="list-style-type: none"> • Illumination equipment: strolling road, square, corridor, pavilion, steps, and other activity sites. • Exercise facilities: exercise facility for older people (suitable size and easy to control with safety concern), sports facilities as Ping Pong tables. • Hidden electric power charger. • Blue touch or Wi-Fi music sound the group activities with passwords. • Trash bins around the facilities • Disable toilet with ramp and handles in room. • Emergency aid and emergency call in toilet and some main places. 	<p>7.2.9 figure 7.38</p> <p>Table 9.14</p> <p>7.2.5 figure 7.36</p> <p>7.2.8 Figure 7.37</p>
MANAGEMENT	Manage	<ul style="list-style-type: none"> • To clean and keep tidy and clean the water quality of lake and waterfront. Clean and fix the facilities and equipment. • To control noise. • To control animals. To strictly forbidden to walk the dog without the rope in the neighbourhood park, and to control the stray cat and tray dog to recent accidental injury. 	<p>7.2.9 figure 7.38</p>

		<ul style="list-style-type: none"> To control the stalling behaviour in the parks. 	
	Ageing friendly service	<ul style="list-style-type: none"> Some food and water provided for the older people in the neighbourhood park. To establish emergency responding system. 	Gap 10.2.1.4 7.2.9 figure 7.38
	Updating system	<ul style="list-style-type: none"> To establish an updating system to ensure the flexible function of the space in the neighbourhood park and to update with the changing of the demands of the older people. The updating review could designed for two to three years to get the feedback from the park users and to update the functions. 	Gap 10.2.1.1. Gap 10.2.1.2.
INTERVENTION / PROMOTION	Promotion on ageing friendly activity	<ul style="list-style-type: none"> Older services and local communities are encouraged to organize weekly activities in the park. time of activities should controlled from 30 minutes to 1 hour To encourage the diversity of activities and rich context. Encourage the elderly to organize exercise or communication activities spontaneously. The content of the event can be referred to figure7.38. 	Figure 10.3 to figure 10.5 figure7.38 table 6.22 table 6.23
	Publicity activities for local residents.	<ul style="list-style-type: none"> Increase awareness campaigns for local residents, increase the inclusion and understanding of the elderly in society and the surrounding population, and provide a friendly and perceived environment for the elderly. Promote family-based care for the elderly, support, encourage and exchange. 	Figure 10.3 to figure 10.5
	Publicity activities for the ageing people	<ul style="list-style-type: none"> Increase publicity activities for the elderly, improve their own attitudes towards the elderly, improve their own positive attitude and participation in park activities and encourage positive communicate and exchanges among the elderly. To encourage the hobbies of the ageing people and develop new skills or new tech-skill to promote the diversity of the daily life of them. 	Figure 10.3 to figure 10.5 7.2.5 figure 7.36 7.2.8 figure 7.37
PLANNING		<ul style="list-style-type: none"> The size of neighbourhood park recommended as $\geq 0.1 \text{ km}^2$. Recommend the servicing area of a neighbourhood park should within 15 minutes walking. For local parks with large-scale event functions, satellite service-linked design is recommended 	Gap 10.2.1.3 7.2.9 figure 7.38 10.5

		to coordinate planning with small neighbourhood parks.	
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11.5 Summary

This chapter set out to discuss and answer the questions in four issues.

First section discussed and answered how the outcomes from this research reflected and achieved the research aim, objectives, and sub-objectives. Table 11-1 shows the details of the hierarchy of the achievement of outcomes to the aim.

Second section set out to directly answer and emphasis what is the final conceptual framework produced by this research and how do it reflect the initial conceptual framework. It also explain the significance of it in theoretical and practical development and the other potential contribution of it. In this research, the final conceptual framework constructed by 8 tables and 4 figures to express the whole dynamic system in different view, however, the combination of them provide a special and holistic understanding of the interaction and expressed the all evidenced links existing in this relationship.

Third section discussed and answered how the outcomes reflected and contributed to the 8 insufficient field of theoretical development identified in chapter 3 and chapter 5 based on literature review, and it also illustrated the unique contribution of this research.

The forth section applied the outcomes from this research to the insufficient field of practical development identified in chapter 4 based on the political review and give a systematic and evidenced recommendations on four aspects including design, management, promotion, and planning, to effectively improve the quality of life and well-being of Chinese ageing people.

Chapter 12 Conclusion

The functions of this chapter are to provide a summary of the research as a whole, and to consider ways in which its findings can be taken forward. It begins with an overview of current research, and moves to a summary of this research, a summary of its methodology and outcomes. Then it identifies the limitations of this thesis and describes the scope for future work.

12.1 An overview of this research

12.1.1 The summary of current research

The aim of this research is to present a comprehensive and effective conceptual framework to guide the design of urban open spaces in Chinese cities, in order to improve the quality of life of ageing people.

The comprehensive and effective conceptual framework is constructed of four core components. First are the eight conceptual frameworks which illustrate and explore the interaction relationship between ageing people and neighbourhood parks. These deal with behavioural, social, personal, perceptual, emotional, psychological and spatial dimensions in a holistic view, and two conceptual frameworks uncovered the differences in performance in the psychological, social, perceptual and behavioural dimension of ageing people in terms of gender and ageing steps. Then gaps are identified between the current state of neighbourhood parks and the desire of the elderly for an ageing friendly arrangement and in relation to the physical dimension. There follows an extended discussion of the current state and features of the behavioural, social, physical, and perceptual dimensions in neighbourhood parks and the evidenced psychological benefits on ageing park users. Finally there is a conceptual framework for understanding the qualities of attractiveness in neighbourhood parks and group activities offered to elderly people there, helping designers to engage with the elderly.

In terms of the practical application of this research, the theoretical outcomes are used as a means to give recommendations covering four processes, design, management, intervention, and planning, which can help with the design of ageing friendly neighbourhood park and management standards or criteria, and there is some reflection on the continuing deeper development of ageing friendly environment policies in China.

To achieve the main research aim specified above, four research objectives were set as below:

1. To develop an understanding of the nature of the physical and psychological dimensions relevant to the relationship ageing people have with open space, and to bring this understanding into a conceptual framework.
2. To test the initial conceptual framework and to analyse the way it works in relation to people in Beijing.
3. To reflect on the use of the initial conceptual framework, and revise it in light of the academic literature.
4. Ultimately to use this as a means to make open space recommendations focused on social and perceptual dimensions of open space in Chinese cities.

To achieve the four research objectives, this research adopted a four-stage research model as below:

Stage 1: to explore

The author reviewed the empirical findings in three respects: ageing people, urban open space, and the relationship between ageing people and urban open space, with the process and sub-objectives illustrated in Figure 2.1. These three parts are placed in parallel and each acts on the next. The outcome

of the discussion of ageing people in chapter 3 is the clarified direction of policies and the area-needed improvement in China and the insufficient area of theoretical development. The recommendation based on the findings of this research is a reflection on the policy direction and insufficient area identified here. The insufficient area identified in Chinese ageing studies regarding with urban open space is combined with that identified in critical review of interaction, reflected in the findings of this research in the discussion chapter. The review of the regulations and documents of urban open space in China determines the type of neighbourhood park focused upon, and the criteria for site selection in Beijing, which informs the methodology. The critical review of the interaction relationship produces the initial conceptual framework by deconstructing and reconstructing current understandings. The initial conceptual framework is tested and analysed in stage 2. It also contributes to informing methodology to show what data and methods are required. The methodology of this research is mixed-method, designed in the four stages of this research. It guides the literature review, and the results of the literature review also inform the methods.

Stage 2: to test and analysis

Following stage 1, stage two collects the data required by observation and mapping, semi-structured interview, and questionnaire. The data from the questionnaires and semi-structured interviews are used to test the initial conceptual framework and discover the inner structure and key features, which are then described. The usage features and desires of the ageing people are established by the combination of questionnaire, semi-structured interview and observation. The links between physical attributes and behaviours is discovered by observation in the behaviour maps. So at this stage, many findings emerge from the different data analysis.

Stage 3: to develop

This section integrates the findings from stage 2 to develop a logical and systemic understanding of the interaction relationship between ageing people and neighbourhood parks. These findings has been organised in five themes. The conceptual frameworks are refined, integrated and listed to give a comprehensive understanding of how the interaction works by viewing in different dimensions. The gap between the current situation and the desires of the ageing people is identified by comparison of the findings of the users' preferences, usage, and attractiveness of the parks. The findings are restructured according to logical and systemic themes reflecting the theoretical development. Approaches to the promotion of five psychological health indicators emerge from the relationship integrated in the first theme. Then there is place-oriented comparison of the five sites to identify the potential positive physical attributes for ageing people.

Stage 4: to apply

The stage is to apply the findings to both theoretical and practical issues. For theoretical development, the author discusses which outcomes contribute to the eight insufficiencies identified in stage 1, and how they extend understanding in that field. For practical improvement, the recommendations are given in terms of the solid findings of this research, is reflected in the direction of policies and implementation area following the Chinese policies identified in stage 1.

12.1.2 The summary of the main research methods

This research used a mixed method combining literature review, questionnaire, semi-structured interview, and observation and mapping to reveal the interaction relationship in a holistic view. For an overview of the methodology designed see figure 2.1. In this, the results and methods in each stage are logically and closely linked with each other. The details are outlined as following:

Firstly, the literature review and document analysis is one method of working in stage 1 and contributes to building the foundation of this research and its results, informing the methodology and forming the

indicators in the questionnaire. They produce three results:

1. To clarify the direction of development on policies and implement field following policies concerning ageing people in China;
2. To determine the type of urban open space, design criteria and select sites in Beijing for this research;
3. To produce the initial conceptual framework by exploring the understanding of interaction relationship.

The initial conceptual framework is used to inform the data required in this research and contribute to the structure and indicators designed for the questionnaire. Result 2 refers to the site selection for questionnaire, semi-structured interview, and observation.

Secondly, the questionnaire, semi-structured interview and observation were designed for stage two, combining to achieve three sub-objectives at this stage.

Questionnaire & semi-structured interview:

- To discover the inner structure and key features of the dynamic system of the interaction relationship and express them.

The participants in the study finished the questionnaire and then moved on to the semi-structured interview. The information and attitudes of these individuals are linked and can be cross-analysed. The associations of the conceptual framework are tested in chapter 6 by questionnaire data. Chapter 8 investigated the cross-analysis for the indicators in the questionnaire and social and perceptual attributes from the semi-structured interviews. The sample size, reliability and validity are calculated as satisfactory and reliable. This section achieved the objective by using a quantitative approach including descriptive statistics and inferential statistics.

Observation, semi-structured interview and questionnaire:

- To discover the usage features, desires, and thought of the ageing people.

The usage features of ageing people are uncovered by both observation and questionnaire, which, used together, can reduce the limitations of each method. Observation can record the reality of the usage of the all older park users, reducing the participant's subjective bias and limitations in the enrolment of participants. The questionnaire contributes to clarifying the detailed usage features and links between demographic characteristics and usage which cannot be obtained from observation and providing a comprehensive understanding of the parks' usage.

The desires and thoughts of ageing people are obtained from semi-structured interview. The outcomes are a deeper understanding of the attractiveness of the neighbourhood parks and of groups in helping, for example, to relieve loneliness. This is investigated by qualitatively coding the context.

Observation and mapping:

- To produce a map of people's behaviour.

Non-participant observation was designed and used to investigate the usage and attributes of spatial behaviours of ageing people. The outcome is the behaviour list and behaviour map focusing on social interaction, which discovered the links between spatial attributes and different levels of social interaction in neighbourhood parks.

In summary, the findings from the questionnaires, semi-structured interviews and observation are integrated in stage 3 and discussed and applied in stage 4, transferred to the results in stage 1 of the literature review. The advantage of this design process is a more direct focus on the research aim and more comprehensive and solid results to extend current understanding.

12.1.3 Summary of the main outcomes

This research has produced five main significant contributions to the field of urban neighbourhood park design, addressing its social and perceptual dimensions regarding ageing people, and including both theoretical development and practical application.

12.1.3.1 Theoretical contribution

The first contribution is the illustration of the associations between physical, social, and perceptual dimensions of neighbourhood park and psychological, behavioural, personal dimensions of the elderly which can fill the gap that exists within existing research into the people-place relationship in social and perceptual dimension. It composed of a range of conceptual framework expressed through the evidenced interaction relationship viewed from different perspectives to provide a deeper and comprehensive understanding of how it works. The significance of this distinct contribution lies in both theoretical and practical aspects. In its theoretical aspects, it contributes to fill the under-researched field of the two-way interactional people-place relationship from a holistic view, our understanding of the state and impact of social interaction on the elderly, and our understanding of the associations and impact of social and perceptual dimension of the neighbourhood park on the elderly. In its practical aspects, the research shows one way to use the conceptual framework as a means to give recommendations which track and outline the associations linking with psychological indicators, showing all the effective approaches to improving psychological health (for example see figure 10.3). The outline framework can be used to guide design and intervention in the policy making and design standard making. There are also many other potential ways to use this conceptual framework, which builds a solid fundamental base for future research and decision-making in designing and planning.

The second contribution is that the research has uncovered the differences in performance in psychological, social, perceptual and behavioural dimensions of ageing people, in terms of both gender and ageing steps, filling the gap in studies of older people using urban space. This can help designers to meet the various different desires of the target group.

There are only a few studies which have subdivided older populations to study the differences between older people with different characteristics. By contrasting these studies, which compared the characteristics of older men and of older women in public and green spaces, this research gives a more comprehensive and specific comparison, including a comparison of usage behaviour, and proposed gender – psychological health – activity in a three dimension comparison model, and describes some common and differential features in the perceptual dimension of interaction between older men and women.

There are many studies which have evidenced the differences between older people and younger adults, some of which have focused on the features of people in advanced age. The significant contribution of this research is to identify the differences of performance in different ageing stages of the older park users in groups aged 45-55, 56-65, 66-75, 76-85 and over. This research describes the common and differential performance of social and perceptual attributes at different ageing stages, and proposes a holistic view of these differences, helping designers and planners to target the arrangement for the different demands of older people, and providing a deeper understanding of ageing urban studies in the future.

The third contribution is that it exposes the gap between the desires of elderly people and the current environment of the neighbourhood parks in a way which may help designers and planners to find a

more effective direction for ageing friendly design. The gaps are identified and based on a comparison on the three findings of this research on the basis of the semi-structured interviews and the usage list obtained by observation. The significance of this outcome is to provide a solid and logical understanding of the current situation in neighbourhood parks, benefitting decision-making for policies and targetting objectives for an ageing friendly environment design in the future. This research shows one way for this outcome to build ageing friendly neighbourhood park design recommendations.

The fourth contribution is the proposal of a conceptual framework for understanding the qualities of attractiveness in neighbourhood parks and the group activities offered to elderly people there, helping designers to engage with the elderly, so that they can use neighbourhood parks to improve their quality of life and well-being.

12.1.3.2 Practical contribution

The fifth contribution is to provide a systemic and effective ageing friendly neighbourhood park design recommendation focusing on social and perceptual dimension improvement. It can help to provide an ageing friendly and social sustainable neighbourhood park design, following the direction of ageing policies in China and contributing to current theoretical developments and policies. The recommendations covering design, management, promotion, and planning build on the significant outcomes of this research.

12.1.3.3 The significance

The theoretical contributions of this study provide a systematic and in-depth understanding of the theoretical study of age-friendly cities in China, especially in terms of the overall multi-dimensionality of the interaction, and the different explorations of the refined needs of older groups, as well as the real spatial perceptions and social needs cravings of older groups and the characteristics of existing spatial behaviour. These theoretical contributions not only provide us with a better understanding of the elderly population, a better understanding of the changing needs of the elderly in the new era, and a reasonable forecast of the challenges and opportunities of future ageing, but also provide theoretical support for age-friendly cities in China, and even provide reference and reference for other developed and developing countries in the world that are also facing ageing. The theoretical contribution is not only to the care of the elderly, but also to the social care and urban inclusion of the vulnerable in urban design theory. In-depth research on older people is a banner for a more socially inclusive and inclusive city, planting the seeds for a future of vulnerable and inclusive cities, including for older people.

The significance of this study in terms of its application is also very significant. Specifically, in China's rapid urbanization process, the results of this study can provide targeted strategic interventions and design guidance for Lao Lin friendly cities, without detours, without the need for renovation, and directly applied to the planning of the areas to be built, especially applicable to the current situation of population movement and cultural conditions in China, to provide maximum help and support for the future elderly in China. Likewise, these results have practical implications for achieving age-friendly and socially inclusive urban goals in urban renewal. Overall, the combined application of multiple outcomes can maximize the contribution to China's goal of providing quality of life and well-being for the elderly. In general, and for other countries also facing the twin challenges of ageing and urbanization, it is a very positive reference. Strengthen the universally applicable results of the research methodology through an understanding of cultural and contextual characteristics, thereby helping to increase the sense of urban use and well-being of more disadvantaged groups through design applications.

12.1.4 Limitations of research

There are generally three types of limitations: limitations in time, limitation of research instruments, and the application of the research outcomes.

12.1.4.1 The limitation of the research time

Due to the limitation of research time, the on-site investigations were only set out in Chaoyang district in Beijing over a limited number of days. This may have limited the number of older people involved and created difficulty in involvement for the elderly of advanced age with difficulties in seeing and hearing. The research took advantage of the mixed-methods employed and abundant information was obtained from three methods, mitigating this concern.

The limited time for fieldwork meant that the data were collected in only one season in Beijing. The impact of seasonal weather for the older people was to limit assessment in this research. The pilot study shows the difficulty of carrying out a data survey in winter, due to the limitation of research instruments, which are impacted by the very cold weather and poor light.

12.1.4.2 The limitation of the research instruments

Due to the limitation of research instruments, a manual camera recorder, may have caused errors of observation. The time for one route recorded in a neighbourhood park was around 20 to 40 minutes, which will be the possible repeated account for some persons who is moving. The author wanted to mitigate the delay error by utilizing drone high-angle panoramic viewing techniques to obtain accurate information records and movement of the elderly, which can reduce the possibility of such errors. However, this plan was stopped because there is a decree in Beijing which bans drone flights in the city. The author settled the direction of observation path to the opposite direction of the elderly's strolling, reducing the repeated recording of the same person.

12.1.4.3 The limitation of the application of the research outcomes

The limitation of application of research outcomes may emerge in the northwest and southeast of China, because the data for this study was collected in Beijing. China's north and south land spans nearly 50 latitudes, with five zones from cold temperate to tropical. The large climate difference between the north and south may affect the living habits and usage of the elderly. But Beijing is the capital and the place where various policies are implemented, so it has the widest applicability for its research outcomes.

12.2 The scope of future research

The scope of future research has five elements: technological, cross-regional, demographic and rural development, and that of other types of urban open space.

12.2.1.1 Technological development

Utilizing drone high-angle panoramic viewing techniques is a key new way of observation which can reduce the time delay errors which arise in the current situation. It has the potential to obtain more reliable data from the real world, and can be used outside Beijing to improve the quality and efficiency of data collection process for future research.

Utilizing internet technique also has a big potential contribution for improving the efficiency of data collection with the development of technology and the popularity of internet technology by the elderly, especially for the new ageing generation who are familiar with the internet. It also has a potential impact on their social interaction in their daily life, even when they are using the urban open space, which will be worth future investigation.

12.2.1.2 Cross-regional development

This research designed and set out a mature and reliable research system of researching interaction relationship between the elderly and neighbourhood parks, applying the findings in recommendations

which can impact upon the direction of policies to establish ageing friendly design standards for the environment. The recommendation in this research focuses on the ageing population in Beijing; future research could build on the system to explore other cities in other areas of China or in other countries facing the the challenge of an ageing population.

12.2.1.3 Demographic development

Two significant outcomes of this research are the difference in performance of the older people in terms of gender and ageing steps. This research found a difference between the people living alone and those with empty-nest or who have moved from other places. These groups of older people are worth future investigation.

12.2.1.4 Rural development

The elderly in rural and urban-rural areas have relatively different habits and a more natural outdoor environment compared with the elderly living in cities. With the development of urbanization and globalization, more and more young people choose to leave their hometowns to find opportunities, causing the ageing of towns and villages to become more severe. How to improve their quality of life and wellbeing is worth investigation. The research system of this research could be applied to this situation.

12.2.1.5 Other types of urban open space

The application of the findings of this research should help to establish an ageing friendly neighbourhood park design and management standard and guidance for Beijing and other cities in China. The mature research system could be used to investigate the other types of urban open space to promote ageing friendly environment design.

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Appendix B Questionnaire and Semi-structured interview questions (English and Chinese)

Appendix C Approval letter of research survey

Appendix A. Tables And Figures In To Test And Analyse Part

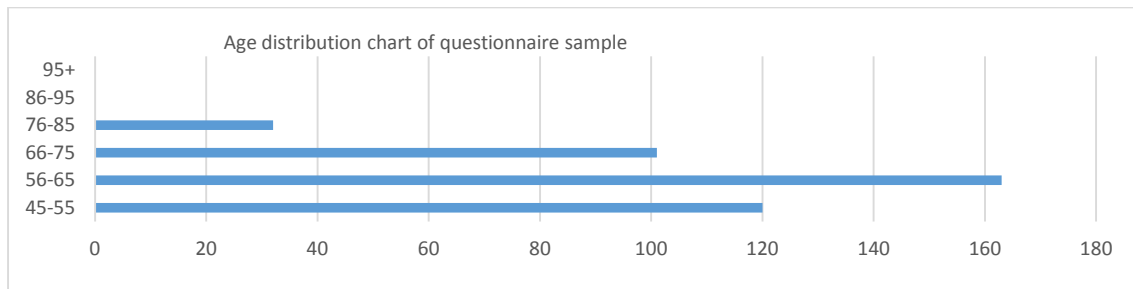


Figure A. 1 Age distribution chart of total participant

AGE * OCCUPATION CROSS-TABULATION					
			occupation		Total
			retirement	working	
age	45-55	Count	102	17	119
		% within age	85.7%	14.3%	100.0%
	56-65	Count	154	8	162
		% within age	95.1%	4.9%	100.0%
	66-75	Count	100	0	100
		% within age	100.0%	0.0%	100.0%
	76-85	Count	30	1	31
		% within age	96.8%	3.2%	100.0%
Total		Count	386	26	412
		% within age	93.7%	6.3%	100.0%

Table A. 1 cross-tabulation of age group and retirement

Difficulty in physical function	N ^a	Weighted % ^b
Difficulty in seeing		
Not difficult	330	78.9%
Difficult	79	19.1%
Very difficult	5	1.2%
Difficulty in moving		
Not difficult	345	82.5%
Difficult	68	16.3%
Very difficult	1	0.2%
Difficulty in hearing		
Not difficult	366	87.6%
Difficult	48	11.5%
Very difficult	1	0.2%

Table A. 2 statement of physical difficulty the respondents in case study sites

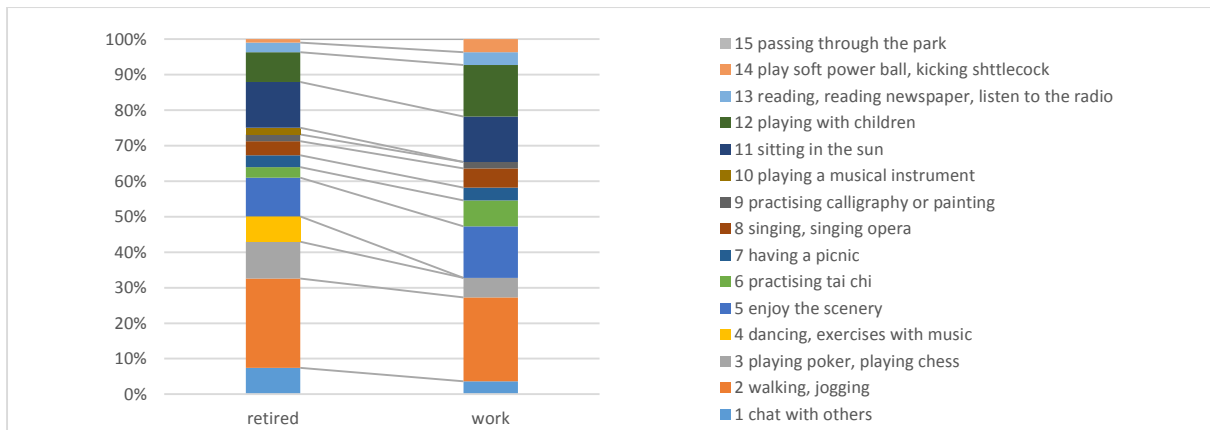


Figure A. 2 the comparison of activities chosen by retired ageing people and not retired ageing people

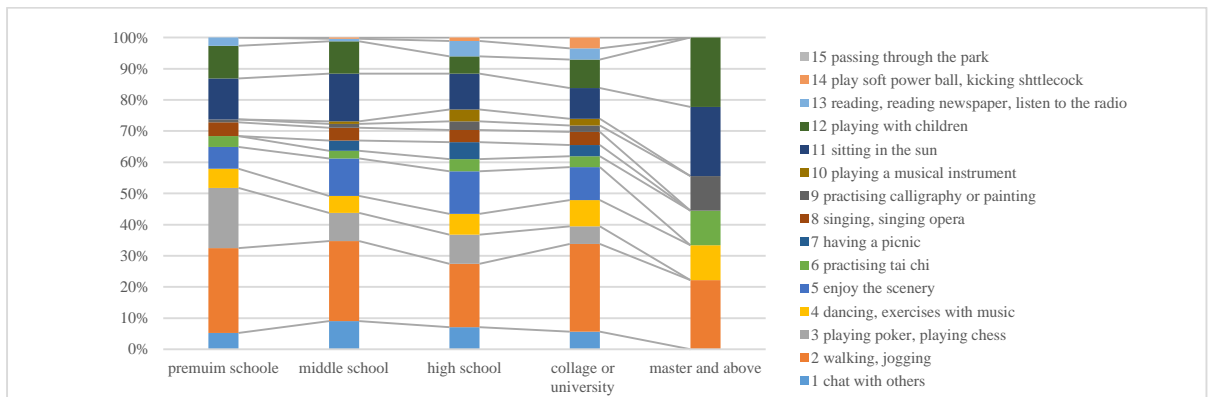


Figure A. 3 the comparison of activities chosen by different education level of ageing people

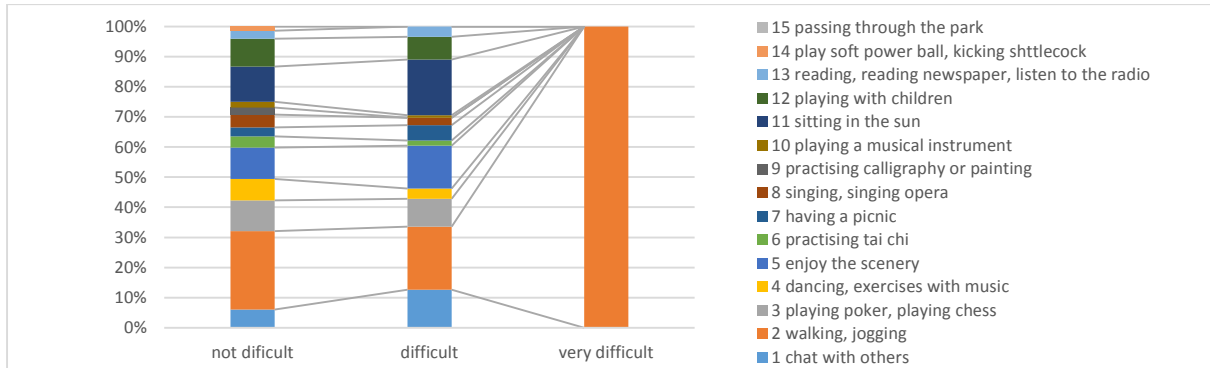


Figure A. 4 Activities selection and difficulty in moving

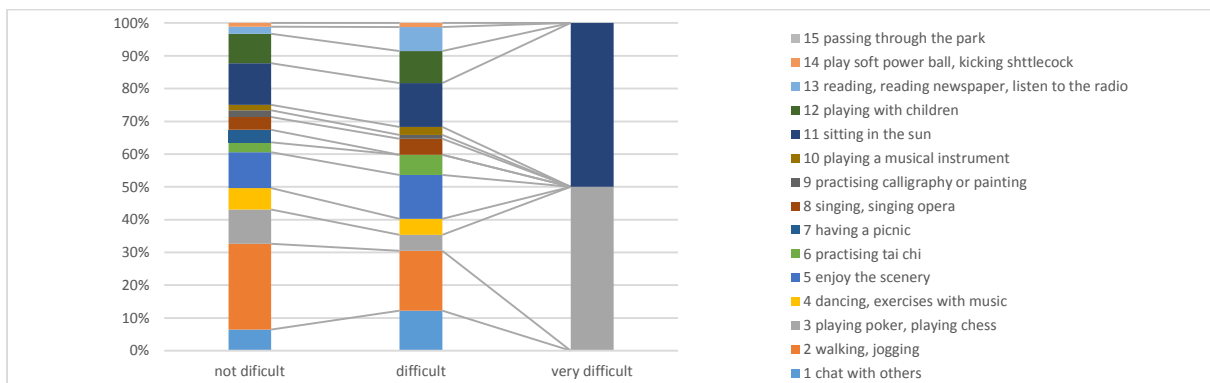


Figure A. 5 Activities selection and difficulty in hearing

			gender	age	marital	occupation	native or not	education	living arrangement	living alone
Spearman's rho	environmental satisfaction	Correlation Coefficient	0.080	-.185*	0.025	0.089	0.056	.290**	0.080	-0.048
		Sig. (2-tailed)	0.102	0.000	0.609	0.071	0.252	0.000	0.104	0.335
		N	415	414	413	411	414	413	413	405
	EB personal dimension	Correlation Coefficient	0.030	-.101*	0.080	.153**	0.092	.274**	0.081	-.135*
		Sig. (2-tailed)	0.538	0.039	0.104	0.002	0.062	0.000	0.099	0.007
		N	416	415	414	412	415	414	414	405
	EB place social level1	Correlation Coefficient	-0.026	-0.042	0.042	.148**	0.018	.177**	0.096	-.098*
		Sig. (2-tailed)	0.602	0.392	0.393	0.003	0.718	0.000	0.052	0.048
		N	414	413	412	410	413	412	412	403
	EB place social level2	Correlation Coefficient	0.012	0.051	0.077	0.093	-0.076	0.046	.119*	-.140*
		Sig. (2-tailed)	0.811	0.301	0.118	0.061	0.124	0.351	0.015	0.005
		N	415	414	413	411	414	413	413	404
	EB psychological emotional level	Correlation Coefficient	0.030	-0.060	0.082	.135**	-0.065	.215**	0.079	-0.083
		Sig. (2-tailed)	0.548	0.222	0.095	0.006	0.189	0.000	0.109	0.098
		N	414	413	412	410	413	412	412	403
	EB psychological cognitive level	Correlation Coefficient	-0.036	0.028	0.046	.116*	-0.069	0.077	.107*	0.000
		Sig. (2-tailed)	0.463	0.566	0.353	0.018	0.160	0.117	0.030	0.996
		N	417	416	415	413	416	415	415	406
	EB psychological behavior 1	Correlation Coefficient	-0.047	0.025	-0.006	0.056	-.179*	.108*	0.048	-0.043
		Sig. (2-tailed)	0.336	0.610	0.907	0.258	0.000	0.027	0.329	0.384
		N	417	416	415	413	416	415	415	406
	EB psychological behavior 2	Correlation Coefficient	-0.029	-0.052	-0.040	0.041	-0.060	.118*	0.008	-0.078
		Sig. (2-tailed)	0.560	0.288	0.417	0.406	0.223	0.016	0.872	0.115
		N	416	415	414	412	415	414	414	405

Table A. 3 Spearman's rho correlation test for demographic of participant on environmental satisfaction and Emotional bonding

^a EB means Emotional bonding

** means the association shows statistically significant. p -value < 0.05

*** means the association shows strongly statistically significant. p -value < 0.001

Activities Frequencies				
		Responses		Percent of Cases
		N	Percent	
Activities ^a	1.00	50	7.2%	12.1%
	2.00	175	25.2%	42.5%
	3.00	69	9.9%	16.7%
	4.00	45	6.5%	10.9%
	5.00	77	11.1%	18.7%
	6.00	24	3.5%	5.8%
	7.00	23	3.3%	5.6%
	8.00	28	4.0%	6.8%
	9.00	13	1.9%	3.2%
	10.00	12	1.7%	2.9%
	11.00	89	12.8%	21.6%
	12.00	62	8.9%	15.0%
	13.00	19	2.7%	4.6%
	14.00	9	1.3%	2.2%
Total		695	100.0%	168.7%
a. Group				

Table A. 4 the statement of Question A1.1 about patters of activities in questionnaire for 5 sites

SYMMETRIC MEASURES IN SPSS			VALUE	APPROXIMATE SIGNIFICANCE
EB PERSONAL DIMENSION	Ordinal by Ordinal	Gamma	.257	.000
	N of Valid Cases		413	
EB PLACE SOCIAL LEVEL1	Ordinal by Ordinal	Gamma	.281	.000
	N of Valid Cases		411	
EB PLACE SOCIAL LEVEL2	Ordinal by Ordinal	Gamma	.175	.010
	N of Valid Cases		412	
EB PSYCHOLOGICAL EMOTIONAL LEVEL	Ordinal by Ordinal	Gamma	.216	.000
	N of Valid Cases		411	
EB PSYCHOLOGICAL COGNITIVE LEVEL	Ordinal by Ordinal	Gamma	.039	.553
	N of Valid Cases		414	
EB PSYCHOLOGICAL BEHAVIOR 1	Ordinal by Ordinal	Gamma	.065	.328
	N of Valid Cases		414	
EB PSYCHOLOGICAL BEHAVIOR 2	Ordinal by Ordinal	Gamma	.092	.169
	N of Valid Cases		413	

Table A. 5 he result of Self-evaluation positive mental health with emotional bonding in Gamma test

SYMMETRIC MEASURES IN SPSS			VALUE	APPROXIMATE SIGNIFICANCE
EB PERSONAL DIMENSION	Ordinal by Ordinal	Gamma	.132	.036
	N of Valid Cases		379	
EB PLACE SOCIAL LEVEL1	Ordinal by Ordinal	Gamma	.157	.018
	N of Valid Cases		377	

EB PLACE SOCIAL LEVEL2	Ordinal by Ordinal	Gamma	-.001	.991
	N of Valid Cases		378	
EB-PSYCHOLOGICAL EMOTIONAL LEVEL	Ordinal by Ordinal	Gamma	-.043	.482
	N of Valid Cases		377	
EB-PSYCHOLOGICAL COGNITIVE LEVEL	Ordinal by Ordinal	Gamma	-.113	.103
	N of Valid Cases		380	
EB-PSYCHOLOGICAL BEHAVIOR 1	Ordinal by Ordinal	Gamma	-.052	.430
	N of Valid Cases		380	
EB PSYCHOLOGICAL BEHAVIOR 2	Ordinal by Ordinal	Gamma	-.031	.638
	N of Valid Cases		379	

Table A. 6 the result of self-evaluation fearful with emotional bonding in gamma test

SYMMETRIC MEASURES IN SPSS			VALUE	APPROXIMATE SIGNIFICANCE
EB PERSONAL DIMENSION	Ordinal by Ordinal	Gamma	-.021	.727
	N of Valid Cases		377	
EB PLACE SOCIAL LEVEL1	Ordinal by Ordinal	Gamma	-.039	.545
	N of Valid Cases		375	
EB PLACE SOCIAL LEVEL2	Ordinal by Ordinal	Gamma	-.239	.000
	N of Valid Cases		376	
EB-PSYCHOLOGICAL EMOTIONAL LEVEL	Ordinal by Ordinal	Gamma	-.193	.002
	N of Valid Cases		375	
EB-PSYCHOLOGICAL COGNITIVE LEVEL	Ordinal by Ordinal	Gamma	-.252	.000
	N of Valid Cases		378	
EB-PSYCHOLOGICAL BEHAVIOR 1	Ordinal by Ordinal	Gamma	-.081	.191
	N of Valid Cases		378	
EB-PSYCHOLOGICAL BEHAVIOR 2	Ordinal by Ordinal	Gamma	-.099	.134
	N of Valid Cases		377	

Table A. 7 the result of self-evaluation loneliness with emotional bonding in gamma test

SYMMETRIC MEASURES IN SPSS			VALUE	APPROXIMATE SIGNIFICANCE
EB PERSONAL DIMENSION	Ordinal by Ordinal	Gamma	-.146	.010
	N of Valid Cases		371	
EB PLACE SOCIAL LEVEL1	Ordinal by Ordinal	Gamma	-.076	.222
	N of Valid Cases		369	
EB PLACE SOCIAL LEVEL2	Ordinal by Ordinal	Gamma	-.139	.034
	N of Valid Cases		370	
EB-PSYCHOLOGICAL EMOTIONAL LEVEL	Ordinal by Ordinal	Gamma	-.193	.001
	N of Valid Cases		369	
EB-PSYCHOLOGICAL COGNITIVE LEVEL	Ordinal by Ordinal	Gamma	-.143	.026
	N of Valid Cases		372	
EB PSYCHOLOGICAL BEHAVIOR 1	Ordinal by Ordinal	Gamma	-.051	.435
	N of Valid Cases		372	
EB PSYCHOLOGICAL BEHAVIOR 2	Ordinal by Ordinal	Gamma	-.010	.874
	N of Valid Cases		371	

Table A. 8 the result of self-evaluation useless with emotional bonding in gamma test

Correlations													
Spearman's rho	EB personal dimension	EB place social level1	EB place social level2	EB psychological emotional level	EB psychological cognitive level	EB psychological behavioral 1	EB psychological behavioral 2	self-evaluation quality of life	self-evaluation health	self-evaluation personality	self-evaluation fearful	self-evaluation lonely	self-evaluation useless
	.500**	.330**	.189**	.295**	.102*	0.073	.171**	1.000	.537**	.205**	0.004	-.132*	-.188**
self-evaluation quality of life	0.000	0.000	0.000	0.000	0.037	0.136	0.000	0.000	0.000	0.000	0.937	0.010	0.000
Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.074	0.004	0.000	0.000	0.000	0.616	0.020	0.008
N	415	413	414	413	416	416	415	416	416	414	380	376	371
self-evaluation health	.492**	.271**	.138**	.134**	0.055	0.087	.141**	.537**	1.000	.285**	-0.026	-.119*	-.138**
Correlation Coefficient	.492**	.271**	.138**	.134**	0.055	0.087	.141**	.537**	1.000	.285**	-0.026	-.119*	-.138**
Sig. (2-tailed)	0.000	0.000	0.005	0.006	0.265	0.074	0.004	0.000	0.000	0.000	0.616	0.020	0.008
N	417	415	416	415	418	418	417	416	418	414	380	378	372
self-evaluation personality	.206**	.220**	.130**	.172**	0.029	0.049	0.069	.205**	.285**	1.000	-.171**	-.264**	-.247**
Correlation Coefficient	.206**	.220**	.130**	.172**	0.029	0.049	0.069	.205**	.285**	1.000	-.171**	-.264**	-.247**
Sig. (2-tailed)	0.000	0.000	0.008	0.000	0.552	0.322	0.164	0.000	0.000	0.001	0.001	0.000	0.000
N	413	411	412	411	414	414	413	412	414	414	379	376	370
self-evaluation fearful	.108*	.122*	-0.003	-0.038	-0.087	-0.043	-0.025	0.004	-0.026	-.171**	1.000	.633**	.466**
Correlation Coefficient	.108*	.122*	-0.003	-0.038	-0.087	-0.043	-0.025	0.004	-0.026	-.171**	1.000	.633**	.466**
Sig. (2-tailed)	0.035	0.018	0.961	0.463	0.092	0.400	0.623	0.937	0.616	0.001	0.000	0.000	0.000
N	379	377	378	377	380	380	379	378	380	379	380	371	363
self-evaluation lonely	-0.018	-0.034	-.193**	-.164**	-.203**	-0.068	-0.079	-.132*	-.119*	-.264**	.633**	1.000	.707**
Correlation Coefficient	-0.018	-0.034	-.193**	-.164**	-.203**	-0.068	-0.079	-.132*	-.119*	-.264**	.633**	1.000	.707**
Sig. (2-tailed)	0.725	0.507	0.000	0.001	0.000	0.188	0.124	0.010	0.020	0.000	0.000	0.000	0.000
N	377	375	376	375	378	378	377	376	378	376	371	378	367
self-evaluation useless	-.127*	-0.064	-.112*	-.167**	-.116*	-0.041	-0.009	-.188**	-.138**	-.247**	.466**	.707**	1.000
Correlation Coefficient	-.127*	-0.064	-.112*	-.167**	-.116*	-0.041	-0.009	-.188**	-.138**	-.247**	.466**	.707**	1.000
Sig. (2-tailed)	0.015	0.221	0.031	0.001	0.025	0.431	0.865	0.000	0.008	0.000	0.000	0.000	0.000
N	371	369	370	369	372	372	371	371	372	370	363	367	372

Table A. 9 the total Spearman's correlation of the indicators of emotional bonding and psychological statement

Independent Samples Test of gender in psychological issues										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
self-evaluation quality of life	Equal variances assumed	2.761	0.097	-0.744	414	0.457	-0.05280	0.07094	-0.19225	0.08665
	Equal variances not assumed			-0.750	413.831	0.454	-0.05280	0.07040	-0.19118	0.08558
self-evaluation health	Equal variances assumed	0.227	0.634	-1.723	415	0.086	-0.13576	0.07880	-0.29066	0.01914
	Equal variances not assumed			-1.731	413.562	0.084	-0.13576	0.07844	-0.28995	0.01843
self-evaluation personality	Equal variances assumed	1.017	0.314	-1.368	415	0.172	-0.13098	0.09578	-0.31924	0.05729
	Equal variances not assumed			-1.398	396.863	0.163	-0.13098	0.09370	-0.31519	0.05324
self-evaluation fearful	Equal variances assumed	7.714	0.006	-1.338	414	0.182	-0.20020	0.14963	-0.49432	0.09393
	Equal variances not assumed			-1.356	412.195	0.176	-0.20020	0.14763	-0.49040	0.09001
self-evaluation lonely	Equal variances assumed	6.410	0.012	0.085	414	0.932	0.01263	0.14893	-0.28011	0.30537
	Equal variances not assumed			0.086	410.392	0.931	0.01263	0.14667	-0.27569	0.30095
self-evaluation useless	Equal variances assumed	2.014	0.157	-0.216	412	0.829	-0.03301	0.15297	-0.33370	0.26768
	Equal variances not assumed			-0.217	411.715	0.828	-0.03301	0.15184	-0.33149	0.26547

Table A. 10 the result of T-test for psychological indicator of gender

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
self-evaluation quality of life	Between Groups	13.491	3	4.497	9.230	.000
	Within Groups	200.258	411	.487		
	Total	213.749	414			
self-evaluation health	Between Groups	27.965	3	9.322	16.010	.000
	Within Groups	239.881	412	.582		
	Total	267.846	415			
self-evaluation personality	Between Groups	5.951	3	1.984	2.095	.100
	Within Groups	390.040	412	.947		
	Total	395.990	415			
self-evaluation fearful	Between Groups	.315	3	.105	.045	.987
	Within Groups	962.298	411	2.341		
	Total	962.612	414			
self-evaluation lonely	Between Groups	.938	3	.313	.135	.939
	Within Groups	949.582	411	2.310		
	Total	950.520	414			
self-evaluation useless	Between Groups	5.277	3	1.759	.729	.535
	Within Groups	987.594	409	2.415		
	Total	992.872	412			

Table A. 11 the result of One-way ANOVA of age groups in psychological issues

Multiple Comparisons							
Tukey HSD							
Dependent Variable	(I) age	(J) age	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
self-evaluation quality of life	1.00	2.00	.38006*	.08416	.000	.1629	.5972
		3.00	.17572	.09444	.247	-.0679	.4193
		4.00	-.13183	.13900	.779	-.4904	.2267
	2.00	1.00	-.38006*	.08416	.000	-.5972	-.1629
		3.00	-.20434	.08839	.097	-.4324	.0237
		4.00	-.51189*	.13497	.001	-.8600	-.1637
	3.00	1.00	-.17572	.09444	.247	-.4193	.0679
		2.00	.20434	.08839	.097	-.0237	.4324
		4.00	-.30755	.14160	.133	-.6728	.0577
	4.00	1.00	.13183	.13900	.779	-.2267	.4904
		2.00	.51189*	.13497	.001	.1637	.8600
		3.00	.30755	.14160	.133	-.0577	.6728
self-evaluation health	1.00	2.00	.50261*	.09178	.000	.2659	.7394
		3.00	.29183*	.10304	.025	.0260	.5576
		4.00	-.30625	.15181	.183	-.6979	.0854
	2.00	1.00	-.50261*	.09178	.000	-.7394	-.2659
		3.00	-.21078	.09663	.130	-.4600	.0385
		4.00	-.80886*	.14754	.000	-1.1894	-.4283
	3.00	1.00	-.29183*	.10304	.025	-.5576	-.0260
		2.00	.21078	.09663	.130	-.0385	.4600
		4.00	-.59808*	.15479	.001	-.9974	-.1988
	4.00	1.00	.30625	.15181	.183	-.0854	.6979
		2.00	.80886*	.14754	.000	.4283	1.1894
		3.00	.59808*	.15479	.001	.1988	.9974

*. The mean difference is significant at the 0.05 level.

Table A. 12 Tukey HSD in One-way ANOVA of age groups in self-rated quality of life and self-rated health.

Table A. 13 the behaviour list of the older people in neighbourhood park

GROUP ACTIVITIES	BALLROOM DANCING IN GROUP small group dancing big group square dancing Conducting people singing songs disco - dance for the elderly giving an instrumental performance for song group group exercise with music kicking shuttlecock 踢毽子 (in group) music conductor (In sing group) play diabolo 抖空竹 (in group) sing Beijing opera with live performance singing songs in group with live music street dancing (group) teaching square dance
ELDER PEOPLE IN WHEELCHAIR	elder people in wheelchair join singing group elder people in wheelchair watching kicking shuttlecock elder people in wheelchair and chatting elder people in wheelchair and watching dancing elder people in wheelchair watching people playing cards elder people in wheelchair watching people playing exercise facility elder people in wheelchair watching singing songs elder people in wheelchair watching square dance elder people in wheelchair with partner elder people in wheelchair with supervision elder people in wheelchair seating together and chatting with others elder people practice walking with partners arm and walking stick elder people sitting on chair coming by wheelchair elder people in wheelchair join singing group
CHILDREN AND BABY SUPERVISION	elder people strolling with baby in pushchair family with baby and children grandparent feeding children grandparent sitting with baby and pushchair grandparents look after and watching children playing facilities square playing with children sitting with baby in pushchair sitting with children
RECREATION	playing chess playing cards
PHYSICAL EXERCISE	playing exercise facilities play exercise facility and chatting playing badminton playing Ping Pong playing Tai Chi soft power ball 太极柔力球 practice Tai Chi practice Tai Chi with music (in group) warm-up exercise before Ping-Pong jogging
STROLLING	strolling Strolling together and chatting strolling with birds strolling with children strolling with baby in pushchair
PLAYING MUSIC	play the saxophone (吹萨克斯)

	playing the fiddle	
	singing songs (single)	
	single dancing with music	
	playing music instrument in group	
PAINTING	draw sketch	
SITTING	sitting and chatting	
	sitting and rest	
	sitting and rest (kicking shuttlecock group)	
	rest after playing Ping-Pong and chatting with play mate	
	enjoy the cool (air) under the tree	
	enjoy the sight of lake	
	sitting and enjoy the scenery	
	sitting with walking stick	
	sitting without wheelchair	
	sitting and listening radio	
	sitting and reading book	
	sitting and drinking water	
	sitting and eating	
	sitting and feeding baby	
	chatting and sharing food	
	sitting and watching	
	sitting and watching ballroom dancing	
	sitting and watching children playing	
	sitting and watching group exercise	
	sitting and watching kicking shuttlecock 踢毽子	
	sitting and watching music team playing	
	sitting and watching people playing cards	
	sitting and watching people singing songs	
	sitting and watching square dancing	
	sitting, rest and watching Tai Chi soft power ball	
	seating and watching Ping Pang	
	sitting and rest, and watching Tai Chi	
	sitting and rest (watching the performance) under the tree	
STANDING	standing and chatting	
	standing and reading newspaper wall	
	standing and talking about songs	
	standing and waiting for group activity	
	standing and watching ballroom dancing	
	standing and watching people playing chess	
	standing and watching singing songs	
	standing and watching square dancing	
	standing watching people playing cards	
	standing with baby in pushchair and watching dance	
	standing with children and watching singing	
	standing watching group exercise with baby	
CHATTING	playing facility and chatting	
	strolling and chatting	
	sitting and chatting	
	standing and chatting	
	elder people in wheelchair and chatting with others	
	chatting and sharing food	
	rest after playing ping-pong and chatting with play mate	

Table A. 14
the

summary of the group activities of ageing people in 5 neighbourhood park

Number of activity	Patterns of activity	Sources	References	Number of participant	Participant Feature	Time feature
	Side park					
	Enjoying the group activities			155		
1	Ballroom dancing	1	1	12	Middle age and elder people	Evening
2	Square dancing	2	2	50	Elder women	Evening
3	Teaching square dance	1	1	8	Elder women	Afternoon
4	Group exercise with	4	4	75	Elder women are majority, elder men	Morning

	music				nearly 15	and evening
5	Playing a musical instrument (in group)	3	3	10	Elder people with same colour T-shirt in group, play music and discuss	Morning
Cuichen park						
	Enjoying the group activities			269		
1	Ballroom dancing in group	6	7	20	Elder people and middle age	Afternoon and evening
2	Square dancing in group	4	4	80	Elder women and middle age women	Afternoon and evening
3	Street dancing (group)	2	5	9	Middle age and elder people, men and women	Evening
4	Disco - dance for the elderly	1	1	5	Middle age and elder people, men and women	Evening
5	Singing songs (in group)	4	4	80	Elder people , men and women	Weekend morning
6	Conducting people singing songs	1	1	1	50+ woman with professional conductive skill	Weekend morning
7	Practicing Tai Chi (in group)	2	2	12	Elder women and men	Morning
8	Group exercise	3	4	50	Elder women	Morning
9	Kicking shuttlecock 踢毽子 (In group)	2	2	12	Family group, parents and children	Evening
Tuanjiehu park						
	Enjoying the group activities			211		
1	Ballroom dancing	2	2	18	Elder people	Daytime
2	Giving an instrumental performance for song group	1	1	9	The music team is combined by elder men. Drums, clarinet, Sachs, flute, Trombone	Saturday morning
3	Singing songs in group with live music	1	1	90	90-110 people in singing group, standing and hold the songs book, which shares with the others. Majority are elder people, some middle age people and a few young and children.	Morning
4	Group exercise with music	1	1	10	Elder women and middle age women	Daytime
5	Kicking shuttlecock 踢毽子 (in group)	1	1	10	Young people and middle age, and a few elder people	Daytime
6	Play diabolo 抖空竹 (in group)	1	1	12	4 children and 8 elder people	Morning
7	Practice Tai ji with music (in group)	4	4	10	10 elder people	Morning and daytime
8	Sitting and rest (kicking shuttlecock group)	1	1	7	Siting and drinking water, have a rest	Afternoon
9	Square dancing	6	6	45	4 groups in different place. One big group and three small groups 9+20+8+8=45	Daytime
Beixiaohe park						
	Enjoying the group activities			67		
1	Ballroom dancing	3	3	10	50+years old men and women	Evening, 2 hours
2	Big group square dancing	2	2	45	50+years old women as majority	Morning and evening, 1 hour
3	Small group dancing	1	1	12	All women, ageing people	Afternoon, 2 hours
Qingfeng park						
	Enjoying the group activities			32		
1	Playing Tai Chi in group	1	1	12	50+ old men and old women	Morning
2	Square dancing	1	1	20	50+ old women	Evening

Table A. 15 Ageing people playing and looking after grandchildren

Patterns of activity	Sources	References	Number of participant	Participant Feature	Time feature
Beixiaohe park			92		
Children and baby			46		
Elder people with baby pushchair	6	7	17	One baby with one to three people, grandpa or grandma or parents	Morning and afternoon, 1 hour
Strolling with baby in pushchair	6	7	10	Majority are grandparents with baby and pushchair	Daytime
Children playing recreation facility	1	1	7	Children	Morning
Strolling with children	3	3	12	Parents and grandparents with children	Daytime
Cuicheng park			10		
Children play recreation facility	3	3	9	2-10 years old children compared with parents or grandparents	Daytime
Grandparents with baby strolling	1	1	1	Grandpa hug 1 year old baby	Daytime
Tuanjiehu park			9		
Grandparent sitting with baby in pushchair	2	2	6	Grandparents look after baby, Take a cool ride under the tree, or sitting in the pavilion	Daytime
Grandparents with children and baby	1	1	3	Grandma with one child and one children in pushchair	Daytime
Side park			33		
Family with baby and children	2	2	8	2-4 people with one baby	Morning
Grandparent feeding children	1	1	3	Grandparents with one toddler	Morning
Grandparent sitting with baby and pushchair	1	1	2	Grandma with baby in pushchair	Morning
Grandparent with baby	3	3	7	Grandparents with one toddler	Morning
Sitting and watching children playing	1	1	3	Elder people and middle age	Morning
Sitting with children	4	4	8	Parents and grandparents with children	Morning
Standing with baby in pushchair and watching dance	1	1	2	Grandma with baby in pushchair	Morning
Qingfeng park			14		
Companying children rehearsal dancing activity	1	1	12	Grandparents and parents together with children	Daytime
Playing with children	2	2	2	Parents with children	Daytime

Table A. 16 Ageing people with entertainment activities

Beixiaohe park			17		
Chess	3	3	13	Elder men and children	Daytime 1-2 hours
Playing cards	1	1	4	60-75years old people, men and women	Afternoon, 2-3 hours
Cuicheng park			23		
Playing and watching people playing cards	2	2	21	Middle age and elder men	Daytime
Elder people in wheelchair watching people playing cards	1	2	2	85+ years old people with difficulty to walk (F&M)	Daytime
Tuanjiehu park			64		
Playing cards	4	4	34	Elder people sitting in pacilient or assembling under the tree, and play cards	Daytime
Playing chess	3	3	16	Elder men assemble to playing and watching playing chess	Daytime
Standing and watching people playing chess	3	3	14	Elder men	Daytime
Side park			12		
Playing cards	1	1	4	Elder people	Daytime
Playing chess	1	1	8	Elder man playing chess and someone standing	Daytime

				and watching	
Qingfeng park			3		
Chess	1	1	2	Elder man	Daytime
Standing and watching the other playing chess	1	1	1	Elder man	Daytime

Table A. 17 Ageing people doing physical exercise (exclude strolling) in neighbourhood park

Beixiaohe park			34		
playing exercise facilities	1	2	4	young adult and older people	morning, 1 hour
playing facility and chatting	1	1	2	middle age adult	afternoon
practice Tai ji	1	1	1	elder women	morning
strolling and chatting	5	6	10	elder people and middle age people	morning, evening, afternoon
strolling walking	12	13	17	elder people are majority, exclude 2 middle age adult	daytime and evening
Cuicheng park			11		
play exercise facility and chatting	2	4	7	middle age and elder women	morning, afternoon and evening
playing exercise facilities	1	1	4	elder men and women	morning, afternoon and evening
Tuanjiehu park			116		
jogging	1	1	1	elder people	afternoon
playing badminton	1	1	2	middle age men	daytime
playing exercise facility	5	5	16	average number of user in summer and winter, majority are elder people, and some middle age people	daytime
playing taijirouli ball 太极柔力球	1	1	8	8 elder women in a specific venue.	daytime
strolling	20	20	89	all age, elder people are majority,	daytime and evening
Side park			20		
playing exercise facilities	1	1	8	middle age and elder people	daytime
playing Ping Pang	2	2	12	elder and retired people (they ask for a rainshadow)	morning, afternoon
Qingfeng park			2		
practicing Taiji sword	1	1	1	elder man	daytime
playing taijirouli ball	1	1	1	elder women	daytime

Table A. 18 strolling in walking routes

Strolling and chatting	5	6	10	Elder people and middle age people	Morning, evening, afternoon
Strolling walking	12	13	17	Elder people are majority, exclude 2 middle age adult	Daytime and evening
Cuicheng park			29		
Strolling	6	11	26		Morning, afternoon and evening
Strolling and watching	1	1	2	Elder couple	
Walking with a trolley	1	1	1	Elder women	Morning
Tuanjiehu park			89		
Strolling	20	20	89	All age, elder people are majority,	Daytime and evening
Side park			110		

Strolling	33	40	102	All age, elder people are majority	Morning, afternoon, evening
Strolling and chatting	2	2	6	Elder people	Morning, afternoon, evening
Walking and pushing elder people in wheelchair	1	1	2	Elder people in wheelchair with keepers	Morning
Qingfeng park			7		
Strolling	6	6	6	All age	Daytime
Strolling with birds	1	1	1	Elder man	Daytime

Table A. 19 Ageing people chatting in the neighbourhood park

Beixiaohe park			27		
Playing facility and chatting	1	1	2	Middle age adult	Afternoon
Strolling and chatting	5	6	10	Elder people and middle age people	Morning, evening, afternoon
Sitting and chatting	2	4	8	Elder people	Daytime and evening
Stand and chat	3	3	7	Elder people, men and women	Daytime and evening
Cuichen park			31		
Sitting and chatting	4	4	28	Elder people , men and women	Daytime and evening
Elder people in wheelchairs and chatting with others	3	3	3	85+ years old people with difficulty to walk (F&M)	Daytime
Tuanjiehu park			78		
Sitting and chatting	14	18	41	Elder people	Daytime
Standing and chatting	1	1	2	Middle age	Daytime
Elder people in wheelchair and chatting	3	3	7	Elder women in wheelchair and chatting with the other elder women	Daytime
Sitting and chatting	4	4	28	Elder people , men and women	Daytime and evening
Side park			17		
Elder people in wheelchair and chatting	2	2	4	Elder people in wheelchair with keepers	Morning and afternoon
Strolling and chatting	2	2	6	Elder people	Morning, evening, afternoon
Chatting and sharing food	1	1	3	Elder people in dancing group, in the rest time, they shared their food and chatted	Morning
Rest after playing Pingpang and chatting with play mate	1	1	4	Retired people coming every day to play Ping-Pong, familiar with everyone in group and chatting	Morning and afternoon
Qingfeng park			7		
Sitting and chatting	2	2	4	Elder people	Daytime
Standing and chatting	1	1	3	Elder people	Daytime

Table A. 20 Ageing people resting and sitting in the neighbourhood park

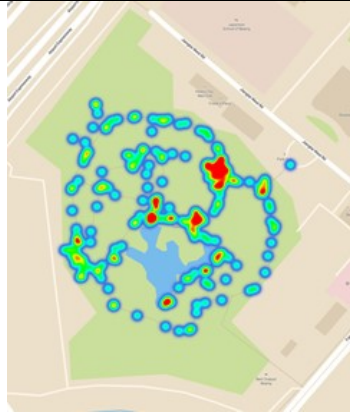
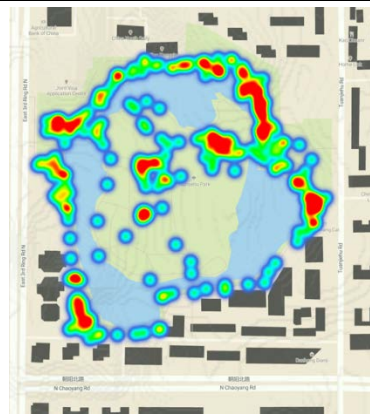
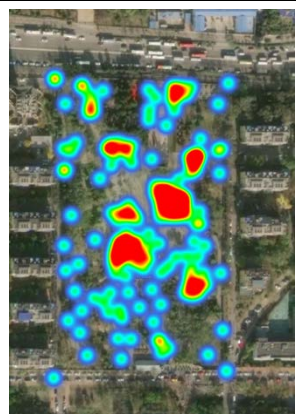
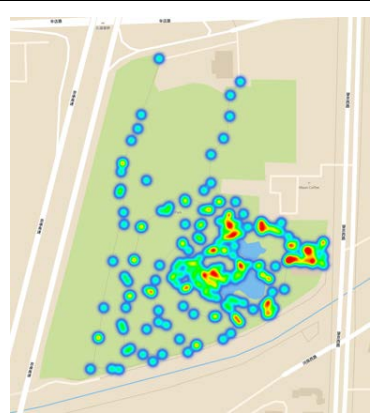

Beixiaohe park			38		
Sitting	5	6	26	Elder people, men and women	Daytime and evening
Sitting and reading	1	2	2	Elder men reading newspaper and young women read something on mobile phone	Afternoon
Sitting and chatting	2	4	8	Elder people	Daytime and evening
Sitting and feeding baby	1	1	2	A grandma bottle feed a baby	Morning
Cuicheng park			69		
Sitting	2	2	8	Elder people , men and women	Daytime and evening
Sitting and chatting	4	4	28	Elder people , men and women	Daytime and evening
Sitting and watching people practicing Tai ji	1	1	2	Elder men	Morning
Sitting and watching people	1	1	23	Elder people , men and women	Weekend

singing songs					morning
Sitting and watching square dancing	2	2	6	Elder men	Afternoon and evening
Sitting with baby in pushchair	1	1	1	Elder women	Daytime and evening
Sitting with walking stick	1	1	1	Elder men	Daytime and evening
Tuanjiehu park			50		
Sitting and rest (kicking shuttlecock group)	1	1	7	Siting and drinking water, have a rest	Afternoon
Sitting and rest, and watching Tai ji	1	1	7	All age, elder people are majority,	Morning
Sitting and watching kicking shuttlecock 踢毽子	1	1	6	Middle age and elder people	Afternoon
Sitting and watching singing songs	1	1	5	Some people sitting on stones and watching singsing songs	Morning
Sitting and watching square dancing	1	1	2	Elder women	Afternoon
Sitting without wheelchair	1	1	2	Elder people and keeper	Daytime
Enjoy the sight of lake	2	2	17	All age, elder people are majority, sitting and rest and enjoy the sight of lake. Sitting in the pavilions 亭子	Daytime
Sitting, rest and watching taijirouli ball	1	1	4	Middle age, elder women and children	Morning
Side park			91		
Chatting and sharing food	1	1	3	Elder people in dancing group, in the rest time, they shared their food and chated	Morning
Enjoy the cool (air) under the tree	1	1	15	All age	Morning
Lying on the chair to sleep	1	1	1	Middle age man	Daytime
Rest after playing Ping-Pong and chatting with play mate	1	1	4	Retired people coming every day to play Ping-Pong, familiar with everyone in group and chatting	Morning and afternoon
Rest and cool	1	1	6	Elder people	Morning and afternoon
Rest and waiting for playing partner	1	1	1	In Ping-Pong group	Morning and afternoon in summer
Seating and watching Ping-Pong	1	1	2	Elder people	Morning and afternoon
Sitting and listening radio	1	1	1	Elder people	Afternoon
Sitting and reading book	1	1	1	Elder women	Morning
Sitting and rest (watching the performance) under the tree	1	1	4	Elder people	Morning
Sitting and waiting to watch	1	1	7	Elder people	Morning
Sitting and watching scenery	2	2	7	Elder men	Morning and afternoon
Sitting and watching ballroom dancing	1	1	8	Elder people and middle age	Evening
Sitting and watching children playing	1	1	3	Elder people and middle age	Afternoon
Sitting and watching group exercise	1	1	4	Elder men	Morning, afternoon and evening
Sitting and watching music team playing	1	1	8	Elder people and child	Morning
Sitting and watching people playing cards	1	1	1	Elder people	Afternoon
Sitting and watching square dancing	2	2	6	Elder people and child	Evening
Sitting with children	4	4	8	Parents and grandparents with children	Morning and afternoon
Qingfeng park			10		
Sitting and chatting	2	2	4	Elder people	Daytiem
Sitting and rest	6	6	6	Elder people are majority	Daytiem

Table A. 21 Ageing people with behaviour of watching in 5 neighbourhood parks

Patterns of activity	Sources	References	Number of participant	Participant feature	Time feature
Sitting and watching children playing	1	1	3	Elder people and middle age	Morning
Standing with baby in pushchair and watching dance	1	1	2	Grandma with baby in pushchair	Morning
Playing and watching people playing cards	2	2	21	Middle age and elder men	Daytime
Elder people in wheelchair watching people playing cards	1	2	2	85+ years old people with difficulty to walk (female and male)	Daytime
Standing and watching people playing chess	3	3	14	Elder men	Daytime
Standing and watching the other playing chess	1	1	1	Elder man	Daytime
Strolling and watching	1	1	2	Elder couple	
Sitting and watching people practicing Tai ji	1	1	2	Elder men	Morning
Sitting and watching people singing songs	1	1	23	Elder people , men and women	Weekend morning
Sitting and watching square dancing	2	2	6	Elder men	Afternoon and evening
Sitting and rest, and watching Tai ji	1	1	7	All age, elder people are majority,	Morning
Sitting and watching kicking shuttlecock 踢毽子	1	1	6	Middle age and elder people	Afternoon
Sitting and watching singing songs	1	1	5	Some people sitting on stones and watching singing songs	Morning
Sitting and watching square dancing	1	1	2	Elder women	Afternoon
Sitting, rest and watching Tai Chi soft power ball	1	1	4	Middle age, elder women and children	Morning
Seating and watching Ping Pang	1	1	2	Elder people	Morning and afternoon
Sitting and rest (watching the performance) under the tree	1	1	4	Elder people	morning
Sitting and watching	2	2	7	Elder men	morning and afternoon
Sitting and watching ballroom dancing	1	1	8	Elder people and middle age	evening
Sitting and watching children playing	1	1	3	Elder people and middle age	afternoon
Sitting and watching group exercise	1	1	4	Elder men	morning, afternoon and evening
Sitting and watching music team playing	1	1	8	Eler people and child	morning
Sitting and watching people playing cards	1	1	1	Elder people	Afternoon
Sitting and watching square dancing	2	2	6	Eler people and child	evening
Strolling and watching people	1	1	2	Elder couple	Morning
Sum of ageing people joining through watching			145		

Table A. 22 Table A. 22 the comparison list of place-oriented features of usage of the older people, physical conditions of park, the emotional bonding, and attitude in perception of ageing park users in the 5 neighbourhood parks

	Side park	Tuanjiehu park	Cuicheng park	Beixiaohe park	Qingfeng park	
Data from observation						
Number of kinds of group activity	5	9	9	3	2	
Number of participants in group activity	155	211	269	67	32	
Ageing people playing and looking after grandchildren	33	9	10	92	14	
Ageing people with entertainment activities	12	64	23	17	3	
Strolling in walking routes	110	89	29	27	7	
Ageing people chatting in the neighbourhood park	17	78	31	27	7	
Ageing people resting and sitting in the neighbourhood park	91	50	69	38	10	
Sum of ageing park users in one day	418	501	431	268	73	
						
Ageing people mapping (details see Table 9-3)						
Place-oriented features of usage	The most using places	Flat, open, shade trees, beautiful landscape, sheltered sunny, quiet and not be disturbed;	Popular and lively, water area	There are facilities, popular and lively	Good light, bright	
	The resting places	Seats on a footpath, seats near trees, side of flowers, square or empty place;	Stone seats, the long corridor;	The long corridor;	Seats on a footpath, waterside pavilion	Grass
	Time range	Afternoon > morning > evening	Morning > afternoon > evening	Morning > afternoon > evening	Morning > afternoon > evening	Morning > afternoon > evening
	Who came with	Alone > with family > with friend > with group member > neighbourhood	With friends > alone > with groups > family > neighbourhood	Alone >>> the other four	Alone > with family > with friend > with group member > neighbourhood	Alone > with family > with friend > with group member > neighbourhood
	The best performance for activity (6.3.3)	Walking; singing songs; enjoy scenery; sitting in the sun; playing with children	Sitting in the sun	Playing poker or chess	Playing with children	Playing with children
The physical conditions of the neighbourhood park	Park area	0.1244km ²	0.1151km ²	0.0358km ²	0.176km ²	0.0972 km ²
	Footpath design	Main footpath + multi-sub footpaths	Main footpath + multi-sub footpaths	Only main footpath	Main footpath + multi-sub footpaths	Main footpath + multi-sub footpaths
	Footpath long	0.975km	1.24 km	0.666km (close to the wall)	1.4 km	2.05km
	Waterfront, lake, water area design	Lake + lakeside pavilion	Lake + lakeside pavilion + lake long corridors + bridges	No water area design	Lake + lakeside bridge + lake pavilion	Park designed along a river + bridge + landscape water pool on entrance area
	Square	Entrance square, 2 big square, 2 small square	Entrance square, 2 big squares, 2 small square	Entrance empty place, 1 main square, 3 big flat and open places	Entrance square, one big main square, one small square	3 big square, and some small flat and open space.
	Seats design	Seats around square with sun shade, seats on main footpath	Seats on the main footpath around the lake	10 sets of stone seats and table under trees, seats in a long corridor, no space for seats for the walking route.	Seats on the main footpath, seat and table with chess, mains seats on the entrance square	Seats along the riverside and a few seats around square.
	Facility	One big exercise facilities area and 6 table tennis set in a square, 2 toilets, one children playing facilities area	Two areas with exercise facilities, two toilets, no children playing facility area	One area of exercise facilities, one toilet, one children playing facilities area	Big good quality of children playing area, one area of exercise facilities. Two toilet	One good children playing facility area, no area of exercise facility
	Building, shelter	3 pavilions, and one rain shelter around main square	No special rain shelter, one big set of long corridor and pavilions	One long corridor	One pavilion, no special rain shelter	One pavilion, no special rain shelter
	Planting design	Good planting design, high green coverage rate, modern design	Good planting design, Chinese traditional design	Green land coverage is low, vegetation is relatively simple	Good planting rate, very high green coverage rate	Good planting, relatively high green coverage rate
	Distance with residential area	The park is separated from the residential area by traffic road	Very close. This park is connected with residential buildings.	Very close. This park is connected with residential buildings.	The park is separated from the residential area by traffic road	This park is not closely with residential area.
	Side park	Tuanjiehu park	Cuicheng park	Beixiaohe park	Qingfeng park	
Environmental satisfaction and emotional bonding of the older people for neighbourhood park	Environmental satisfaction (6.3.4)	2	4	5	3	1
	Personal dimension of group level of emotional bonding	3	4	5	2	1
	Social level 1 of place dimension of emotional bonding	4	3	5	2	1
	Social level 2 of place dimension of emotional bonding	4	3	5	2	1
	Emotional level of psychological progress dimension of EB	2	3	4	5	1
	Cognitive level of psychological progress dimension of EB	3	2	1	5	4
	Behaviour level 1 of psychological progress dimension of EB	5	3	2	1	4
	Behaviour level 2 of psychological progress dimension of EB	3	5	4	1	2
	Mean of emotional bonding	2	4	5	3	1
	Sum	28	31	36	24	16
Attitudes from semi-structured interview	Received friendliness in park	4	1	2	5	3
	Received friendliness of local resident	1	2	5	4	3
	Deeper level of social interaction (making friend) in neighbourhood park	2	2	3	2	1
	Attitude of deep level of social interaction in neighbourhood park	3	2	3	4	1
	Relief loneliness in the neighbourhood park	3	2	4	5	1
	Sum	13	9	17	20	9

Appendix B. Questionnaire and Semi-structure interview



The
University
Of
Sheffield.

Dear Sir or Madam:

I am a PhD student in Department of Landscape in University of Sheffield in the UK.

You are invited to take part in a questionnaire survey exploring **Research on The Interaction between Aging People and Urban Open Space in Chinese Cities – A Case Study of Beijing, China.**

The aim of the study is **to produce a design guidance for improving the quality of life of aging people.** Questions will be asked about the feeling and perspective of using urban open spaces in your daily life.

Participation in this study is totally voluntary, and you are under no obligation to take part. You are free to withdraw at any point prior to returning the questionnaire. All data collected will be anonymized and kept confidential and used for research purposes only. (PhD thesis, academic professional journals, conferences, presentations, seminars) The consent forms will be kept separate from the questionnaires. Please briefly examine the questionnaire before signing this consent form.

There are no trick questions in this survey. There are no right or wrong answers. Your name or any identifying characteristics will not be available to anyone, other than my supervisor and me, at any point.

If you have any questions you may contact me on (Tel:+44 7709604816; Tel: 18504317365; Email: yzhou54@sheffield.ac.uk)

Researcher: Youmei Zhou

Email: yzhou54@sheffield.ac.uk

Phone: +44 (0) 7709604816

Department of Landscape

University of Sheffield

Supervisor: Dr. Kevin Thwaites BA, DipLA(Dist), PhD

Email: k.thwaites@sheffield.ac.uk

Phone: +44 (0) 114 222 0620

Department of Landscape

University of Sheffield

Participant Signature:

Confirmation sheet

Title of Research Project: Research on The Interaction between Ageing People and Urban Open Space in Chinese Cities – A Case Study of Beijing, China

Name of Researcher: Zhou Youmei (周尤美)

Department of Landscape, University of Sheffield

Participant Identification Number for this project:

Please initial box

1. I confirm that I have read and understand the information sheet/letter (delete as applicable) dated [insert date] explaining the above research project and I have had the opportunity to ask questions about the project.

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without there being any negative consequences. In addition, should I not wish to answer any particular question or questions, I am free to decline.

3. I understand that my responses will be kept strictly confidential

I give permission for members of the research team to have access to my anonymised responses. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the report or reports that result from the research.

4. I agree for the data collected from me to be used in future research

5. I agree to take part in the above research project.

Name of Participant Date Signature

(or legal representative)

Name of person taking consent Date Signature

(if different from lead researcher)

To be signed and dated in presence of the participant

Lead Researcher Date Signature

To be signed and dated in presence of the participant

PART A

Directions: Please indicate your statements which reflect your using this park. Please, place a '√' **mark in the box of your answer.**

1.1. The **activities** you do most in this park (check one of your main activities; if you do more than one activity, please check your main three activities)

- | | |
|--|---|
| <input type="checkbox"/> Chat with others | <input type="checkbox"/> Walking, jogging |
| <input type="checkbox"/> Playing poker, playing mahjong, chess | <input type="checkbox"/> Dancing, exercises with music |
| <input type="checkbox"/> Enjoy the scenery | <input type="checkbox"/> Practising tai chi, qi |
| <input type="checkbox"/> Having a picnic party | <input type="checkbox"/> Singing, singing opera |
| <input type="checkbox"/> Practising calligraphy or painting | <input type="checkbox"/> Playing a musical instrument |
| <input type="checkbox"/> Sitting in the sun | <input type="checkbox"/> playing with children |
| <input type="checkbox"/> Reading, reading the newspaper, listen to the radio | <input type="checkbox"/> Playing soft power ball, kicking shuttlecock, mobility exercise, diabolo |
| <input type="checkbox"/> Passing through the park | <input type="checkbox"/> Other, if so please say what _____ |

1.2. Will you **normally** choose to spend time in **this park** ?

Yes, I would choose this park in most times

No, I prefer wandering in different parks

1.3. Do you have a **favourite rest place in the park**?

Yes No

1.4. If so, which is your **prefer place** (please check one box)?

- | | |
|---|--|
| <input type="checkbox"/> Seats on footpath | <input type="checkbox"/> Seats under trees |
| <input type="checkbox"/> Stone seats (石凳) | <input type="checkbox"/> Seats around raised flower beds (花坛边) |
| <input type="checkbox"/> The long corridor (长廊) | <input type="checkbox"/> Waterside pavilion (水榭) |
| <input type="checkbox"/> Square or empty place | <input type="checkbox"/> On the grass |
| <input type="checkbox"/> No where in particular | |

1.5. What are **descriptions** of place in the park you often use? (Multiple choice)

- | | |
|--|---|
| <input type="checkbox"/> Flat, open | <input type="checkbox"/> Facilities (shops) |
| <input type="checkbox"/> Water area | <input type="checkbox"/> Shade trees |
| <input type="checkbox"/> Buildings | <input type="checkbox"/> Good light, bright |
| <input type="checkbox"/> Beautiful landscape | <input type="checkbox"/> Sunny |



Emergency button					
Public access broadcasting equipment with limited volume					
Other					

PART C

Directions: Please indicate your level of agreement or disagreement with each of these statements regarding your feeling of this park and the psychological well-being. Please place a ‘√’ mark in the box of your answer.

Items		Code
C1. I feel comfortable with the whole environment of this park	1 agree strongly; 2 tend to agree; 3 Neither agree/disagree; 4 tend to disagree; 5 disagree strongly	
C2.1. Most of my friends are in some way connected with my use of the place	1 agree strongly; 2 tend to agree; 3 Neither agree/disagree; 4 tend to disagree; 5 disagree strongly	
C2.2.1. People I am attached to are mostly from this place.	1 agree strongly; 2 tend to agree; 3 Neither agree/disagree; 4 tend to disagree; 5 disagree strongly	
C2.2.2. I never feel alone here.	1 agree strongly; 2 tend to agree; 3 Neither agree/disagree; 4 tend to disagree; 5 disagree strongly	
C2.3. I miss this place when I am away.	1 agree strongly; 2 tend to agree; 3 Neither agree/disagree; 4 tend to disagree; 5 disagree strongly	
C2.4. This place is part of me.	1 agree strongly; 2 tend to agree; 3 Neither agree/disagree; 4 tend to disagree; 5 disagree strongly	
C2.5.1. This is my favourite place to go during my free time.	1 agree strongly; 2 tend to agree; 3 Neither agree/disagree; 4 tend to disagree; 5 disagree strongly	
C2.5.2. This is the best place for what I like to do	1 agree strongly; 2 tend to agree; 3 Neither agree/disagree; 4 tend to disagree; 5 disagree strongly	
C3.1. Through joining the activities in this park, I feel my confidence benefit.	1 agree strongly; 2 tend to agree; 3 Neither agree/disagree; 4 tend to disagree; 5 disagree strongly	
C3.2. Through joining the activities in this park, I feel my health benefit.	1 agree strongly; 2 tend to agree; 3 Neither agree/disagree; 4 tend to disagree; 5 disagree strongly	
C3.3. Through joining the activities in this park, I feel my social network benefit.	1 agree strongly; 2 tend to agree; 3 Neither agree/disagree; 4 tend to disagree; 5 disagree strongly	
C3.4. Through joining the activities in this	1 agree strongly; 2 tend to agree; 3	



park, I feel my feeling of belonging benefit.	Neither agree/disagree; 4 tend to disagree; 5 disagree strongly	
Self-evaluation and personality		Code
C4. How do you rate your life at present?	1 very good; 2 good; 3 so so; 4 bad; 5 very bad 8 not able to answer	
C5.1. Do you always look on the bright side of things?	1 always; 2 often; 3 sometimes; 4 seldom; 5 never; 8 not able to answer	
C5.2. Do you often feel fearful or anxious?	1 always; 2 often; 3 sometimes; 4 seldom; 5 never; 8 not able to answer	
C5.3. Do you often feel lonely and isolated?	1 always; 2 often; 3 sometimes; 4 seldom; 5 never; 8 not able to answer	
C5.4. Do you feel the older you get, the more useless you are?	1 always; 2 often; 3 sometimes; 4 seldom; 5 never; 8 not able to answer	

**PART D**

Demographic data

1. gender: Male Female
2. Age: 45-55 56 - 65 66-75 75-85 86-95 95+
3. Marital: Married / Cohabiting Not married / widowed
4. Retirement : Yes No, working at _____
5. Original/native place:
 Beijing the other province _____, how long you are being here _____
6. Education level
 Primary school middle school high school
 college or university master and above
7. Living arrangement
 Own home Own home with care support
 care-home accommodation
8. Living alone
 Alone With spouse With Children With someone
9. Do you feel any difficulty with seeing?
 Not difficult Difficult Very difficult
10. Do you feel any difficulty with moving?
 Not difficult Difficult Very difficult
11. Do you feel any difficulty with hearing?
 Not difficult Difficult Very difficult

PART E Short interview

Researcher will ask a few question about the statement of social life in your activities in this park. Please give your answers.

- 5.1 Do you like to join group activates in this parks?
 Yes No
- 5.2 If so, why are you enjoy the group activates?
- 5.3 You feel the other people (in the group) friendly when you join the activities?
 Yes No
- 5.4 What are the attitude of local residents to the group activities in this park?
 Happy to see and support agree with them no options
 reject them strongly reject
- 5.5 Did you make some friends in this process?
 Yes No
- 5.6 Do you think neighbourhood park is a good place for making friend?
 Yes No
- 5.7 What activities let you make friends with others?
- 5.8 Do you feel this park is attractive?
 Yes No
- 5.9 **Why** you feel the park is attractive?
- 5.10 Are the activities in the park attractive?
- 5.11 Which **area** you **prefer** and often use?
- 5.12 Where are you usually enjoy social life with friends? Seat somewhere and chatting?
Or in the activates?
- 5.13 Do you feel less loneliness, when you come to this park and stay with people?
 Yes No
- 5.14 when you feel loneliness, which area of this park help you feel less lonely?
If so, why?
- 5.15 Could you give some suggestions on the parks and active field in the future?



Downloaded: 18/05/2018
Approved: 21/02/2018

Youmei Zhou
Registration number: 140218587
Landscape
Programme: Research on the interaction between ageing people and urban open space in Chinese cities: a case study of Beijing, China

Dear Youmei

PROJECT TITLE: Research on the interaction between aging people and urban open space in Chinese cities: a case study of Beijing, China
APPLICATION: Reference Number 012040

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 21/02/2018 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 012040 (dated 16/02/2018).
- Participant information sheet 1039844 version 1 (15/02/2018).
- Participant information sheet 1025108 version 2 (17/11/2016).
- Participant consent form 1039845 version 1 (15/02/2018).
- Participant consent form 1025109 version 2 (17/11/2016).
- Participant consent form 1025111 version 1 (17/11/2016).

If during the course of the project you need to [deviate significantly from the above-approved documentation](#) please inform me since written approval will be required.

Yours sincerely

Denise Hall
Ethics Administrator
Landscape

Appendix C. Approval letter of research survey



Downloaded: 18/08/2015

Approved: 21/07/2015

Youmei Zhou

Registration number: 140218587

Landscape

Programme: Research on The Interaction between Ageing People and Urban Open Space in Chinese Cities
“ A Case Study of Beijing, China

Dear Youmei

PROJECT TITLE: Research on The Interaction between Aging People and Urban Open Space in Chinese Cities A Case Study of Beijing, China

APPLICATION: Reference Number 004370

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 21/07/2015 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 004370 (dated 24/06/2015).
- Participant information sheet 1009858 version 1 (24/06/2015).
- Participant consent form 1008681 version 1 (29/05/2015).

The following optional amendments were suggested:

See the comments from the reviewers. Jeff

If during the course of the project you need to [deviate significantly from the above-approved documentation](#) please inform me since written approval will be required.

Yours sincerely

Jeff Sorrill
Ethics Administrator
Landscape