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Abstract

Neighbourhood parks are an essential activity venue for contemporary older adults and potentially impact their health. Most research has focused on the physical and visual dimensions of the park, with some studies demonstrating differences in the visual preferences of gender. Still, there is a lack of detailed research on the social and perceptual dimensions of male and female older people and a lack of research on psycho-emotional satisfaction and mechanisms to alleviate the psychological isolation of older people of different genders. In this study, a mixed research method was conducted to investigate the multi-dimensional interaction of older people using neighbourhood park, with a sample size of 418 participants from the Chaoyang district of Beijing, an integrated research method including questionnaires, semi-structured interviews and observation, Goodman and Kruskal's gamma analysis and Grounded theory qualitative method applied by using SPSS and NVivo to analyse the elements of neighbourhood parks related psychological outcomes. A conceptual framework of multi-layered social interactions and the influence of different social interactions on the perceptual and psychological dimensions has been conducted, as well as the gender differences. The study found that the social, physical space and perceptual dimensions of neighbourhood parks all contribute to alleviating loneliness among older people, that site-based self-regulation also plays an important role, and that low-level social interactions generally affect older people. In contrast, mid-level social interactions have a significant effect on perceptual and psychological benefits, with a synergistic increase in impact, and older women show a more vital need for social activities and self-expression than men. The findings of this study provide a theoretical basis for a multidimensional spatial mediation to enhance the well-being of older people and provide new ideas for comprehensive multidimensional and multi-level ageing optimisation research.

Keywords: social interaction, perceptual dimension, neighbourhood park, the ageing people, mental health, qualitative data by quantitative coding analysis

1. Introduction

The Ministry of Civil Affairs data show that as of August 2020, the state invested 5 billion yuan of central financial resources to support home care and community-based elderly services;

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the national community-based elderly services accounted for 83.6%, the community has an important role and potential in response to the national policy on ageing, the end of 2019, there are 254 million people over 60 years of age, is expected to exceed 300 million in 2025, 2033 exceed 400 million The community has an important role to play in responding to the national policy on ageing. There are many barriers around ageing people, such as a youth-oriented Society', 'Physical Isolation', 'Shifting Social Value', 'Sensory Loss', 'Diminished Power'; and 'Retirement'. (Oyer & Oyer, 1976, p. 10) All of these barriers hinder elderly people from feeling belonging and interacting and communicating with others, even though these barriers are still around older people. However, these barriers hinder this process; many elderly people feel isolated and anxious when ageing and feel lost. As a result, they feel less satisfied with life and less happy.

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

1.1. The role of neighbourhood parks is 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, Barbosa-Leiker, & Brooks, 2016) and quality of life (Camargo, Ramírez, & Fermino, 2017) are widely emphasised 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, and increasing social contact and cohesion. (Dadvand et al., 2016; Van Herzele & de Vries, 2011) In addition, green space has been shown to contribute to better health outcomes by improving self-esteem and mood. However, some aspects are still not adequately explored in current studies.

While most findings focus on the visual and physical function, the impact of these qualities on the user's psychological sense and well-being has not been adequately explored in the literature (Moulay, Ujang, Maulan, & Ismail, 2018), especially in systematic understanding perspective.

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

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

In addition, neighbourhood park, as a small urban open space, has been insufficiently investigated in delivering an age-friendly city. Some empirical studies indicate that urban green spaces of different sizes fulfil different functions and different relationships with users. (Wolfe, Groenewegen, Rijken, & de Vries, 2014) For example, district parks or national parks serve the whole urban area, and they show 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 is underestimated in developing an age-friendly city; the concern about the impact of the social and perceptual dimension of neighbourhood parks is insufficient in current studies. The barrier-free sense and accessibility of the social environment are also important as removing the physical barriers around the older users.

Furthermore, the importance of the 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 'the importance of assessing both physical and social environments of parks in relation to usage and physical activity patterns.' The impact of the social environment of the park on the psychological statement is rooted in two ways: one is from the benefit of increasing physical activities influenced by the social environment, and the second is the direct influence of the social environment. However, how the mechanism works is insufficiently explored in a systematic view.

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.

1.2. Gender Difference in Human-Space Relationship by Multi-Dimension View

The consideration of the human-space relationships starts with environmental determinism. By negating the role of human agency and social influence, the physical environment determines people's behaviour (Carmona, 2010, p. 133). It emphasises the one-way process from the physical environment. People generally show some everyday behavioural habits in a unique environment, such as parks. The different conditions of users in different ageing stages may lead to other performances in urban open spaces, especially in smaller spaces, such as the neighbourhood park. The benefit of physical activity and exercise for the elderly on both health is widely acknowledged; however, how they engaged in physical activity and their motivations for using the urban open space is limited research, especially in detail in terms of gender.

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 challenging to cover all dimensions at a deep level of research because it is a vast system. This research focuses directly on open space's perceptual and social dimensions and aims to contribute to its development and design for the elderly. The study of this social dimension is limited because of the different ages of people studied. But there is still a range of questions which are underexplored, such as 'Are the social interaction and social psychological needs of 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'?

1.3. The Elderly-Oriented Emotional Fulfilment

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-actualisation, and esteem needs are associated with 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 well-being (Milyavskaya, Philippe, & Koestner, 2013), especially the social psychological need satisfaction (Steuerink & Lindenberg, 2006). Field Steuerink and Lindenberg (2006) have shown that social psychological needs do not become less important with advancing age, so social psychological needs are a critical factor in examining the effects of the social dimension of the neighbourhood park for the elderly.

2. Methodology

This paper aims to explore the attractiveness of neighbourhood parks for the elderly, especially in social and perceptual dimensions, investigate the mechanism influencing psycho-emotional satisfaction, and track the different incentives in gender. Thus, a mixed method has been applied in this research, combining a qualitative approach and quantitative approach, including qualitative analysis based on Grounded theory, descriptive statistics and inferential statistics. Hypothesis testing based on quantitative research methods is usually based on known theoretical frameworks for data collection and computational verification, which has methodological limitations for theoretical innovation. In contrast, open-ended problem interviews based on grounded theory can correct this problem. It is a logical distillation of raw, real-life case data, leading to the outlining and abstraction of new concepts, mainly for theory development. Combined with the results of quantitative analysis, it provides an effective, comprehensive, and in-depth understanding of the interaction.

On the other hand, 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. The main approach for this research is nonparametric statistics in Goodman and Kruskal's gamma analysis. Its function is to generalise 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 and Spearman's rho are used to measure the associations between the variables of interactional relationships.

Pearson and Spearman's correlation coefficient analysis is typically used for ordinal data in human-environment research to investigate associations in the social-demographic and behaviour in urban open space (place attachment). (Allerhand, Gale, & Deary, 2014; Askari, Soltani, & Ahmad, 2014; Wang et al., 2017; Yu & Kang, 2008) This research applied gamma correlation coefficient as a primary 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) that Gamma coefficient is good when the table dimension is small for relatively small sample sizes and for square tables Gamma presents the best estimation of the actual degree of the association in average.

3. Data Results

This study adopts the data form of in-site interviews, taking Chaoyang District, which has the largest elderly population and is a mixed development, as the case study area, and selects five typical community parks in Chaoyang District as the research sites. 384 (confidence level 95%, confidence interval ≤ 5).

Open coding, focused coding and themes coding is the initial process based on the interpolation theory research, in which the qualitative data is treated in a flexible and highly authentic way, the interview recordings and notes are transformed into text and imported into NVivo, the key utterances are conceptualised and coded as a node, which is consolidated and collated through semantic analysis to finally obtain a non-emotional generalised compendium of 25 labels for primary concepts and 284 utterances for the number of tagged words lexical items. Through comparison and motivation, finally, the conceptual framework was conducted by four main dimensions from high to low percentage, including physical dimension, perceptual dimension,

social dimension and social and service dimension.

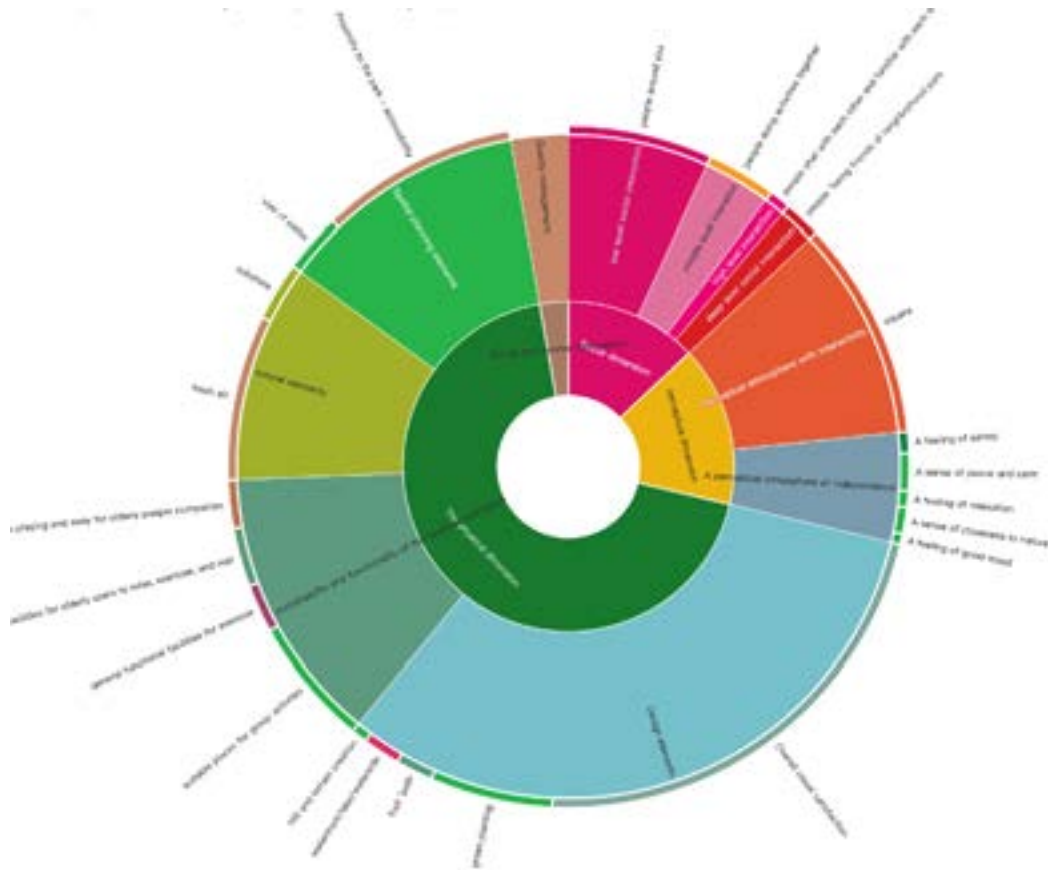


Figure 1. The hierarchy of attractiveness of neighbourhood parks by quantitative coding analysis for quantitative data

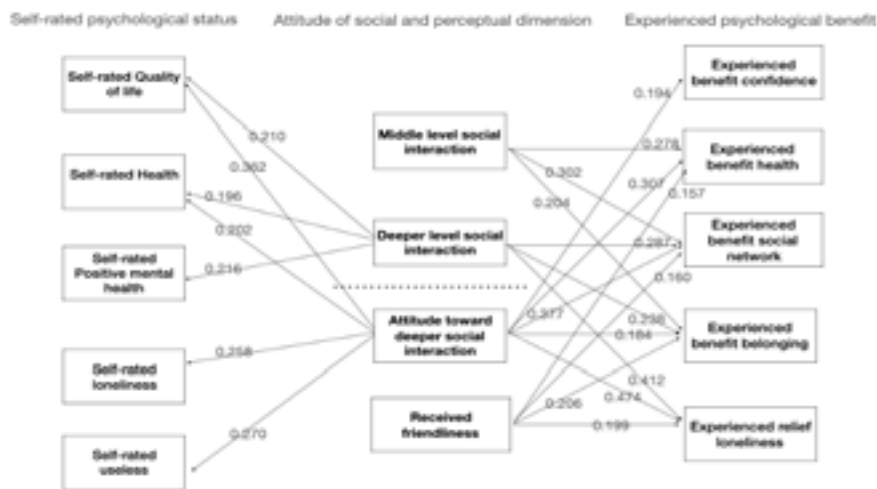


Figure 2. The test result of social dimensions and perceptual dimension on psycho-emotional influence
 To verify the impact of correlations between social gradients and indicators of psychological gain experience and self-assessment, a correlation analysis of Goodman and Kruskal's gamma was conducted based on the questionnaire data. The results of the analysis are shown in Figure 5 below, where links with significant correlations between elements are plotted ($p < 0.05$).

To explore the different incentives in gender, descriptive and inferential statistics have been applied. The T-test for psychological indicators of gender did not show statistical significance. The comparison of the bar chart of psychological indicators shows that the elderly males and elderly females 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. The comparison of duration and frequency in gender shows that the elderly men and women showed a similar trend, and most people chose to move 1-2 hours each time. Older women have a slightly more prolonged park activity than older men. Most people spend 1-2 hours per park activity, accounting 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.

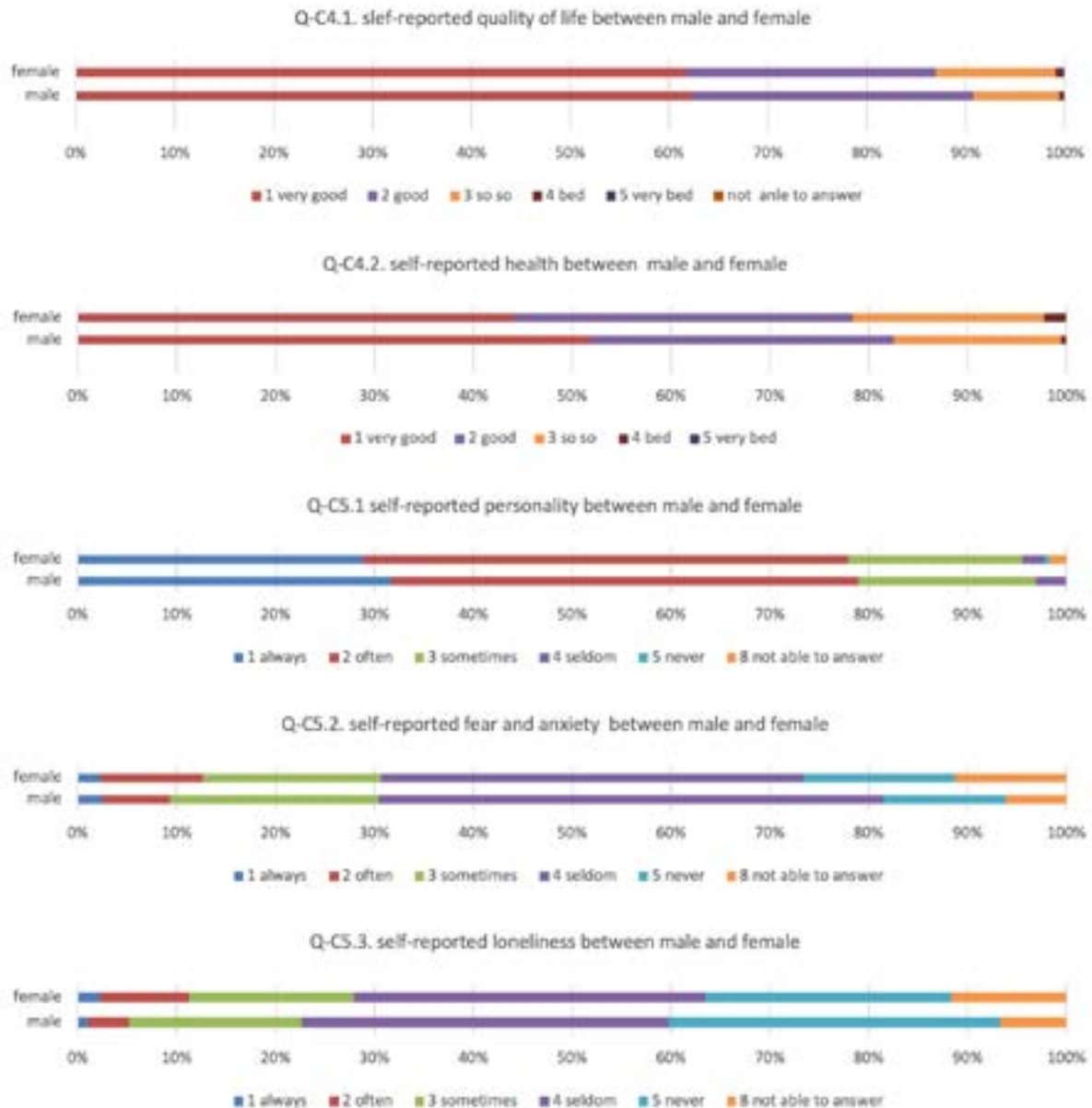


Figure 3. The comparison of the psychological status of older females and males



Figure 4. The comparison of duration and frequency of older female and male

4. Discussion

4.1. How Ageing People are Engaged in Urban Open Space

This research contributes to extending the current understanding of the attractiveness of neighbourhood parks for older people in four dimensions: social, physical, and perceptual dimensions, and other factors.

This finding agrees with Kemperman and Timmermans (2014) and Li (2018), who said that greening 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, sustainable and functional facilities and space fresh air, park management, and sunshine. It provides the key elements of the physical environment of neighbourhood parks to engage older people. The importance of the paths and chairs in parks is also confirmed by other studies of older Chinese people. (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 of 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 by human needs. The interactional aspect 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. An ageing-friendly perceptual dimension has a positive impact on psychological benefits, self-rated quality of life, self-rated health, and reducing self-rated loneliness and uselessness. The need for interactional aspects of perceptual dimension is echoed with the affiliation needs like belonging and acceptance by Maslow (1968).

4.2. Gender Difference in Psycho-Emotional Fulfilment

This outcome is consistent with Field Pinquart and Sorensen's (2000) findings that women prefer social integration linked with life satisfaction and happiness compared to men. The contribution of this research is to specify the gender differences between older people. This research also found that women preferred activities with a higher quality of life, positive mental health, and more social interaction than older men. This echoes Park et al. (2015), who pointed out that the association between the quality of life and social activities participants of older women is more significant 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. It also has an important impact on older males but less for older women. This research also found that older women feel loneliness and fear more readily than older men, which may explain the motivation of older women to participate in group activities to achieve greater psychological satisfaction.

5. Conclusion

This paper set out to investigate the role of social and perceptual dimensions in engaging ageing people, to illustrate the psycho-emotional satisfaction association with these two dimensions, and to track the different incentives in older females and males. One of the more significant findings from this study is that the social gradient model has been explored and identified and presents a comprehensive conceptual framework. This investigation shows that social and perceptual dimensions play an important role in engaging people and influencing machines to experience psychological benefits. Low-level social interactions have a general effect on older people, while mid-level social interactions have a significant impact on perceptual and psychological benefits, and older women show a stronger need for social activities and self-expression than men. The findings of this study provide a theoretical basis for a multidimensional spatial mediation to enhance the well-being of older people and provide new ideas for comprehensive

multidimensional and multi-level ageing optimisation research. Further studies need to be carried out on gender differences to give exemplary guidance on building an age-friendly city.

Conflict of Interests

The author declares no potential conflict of interest was reported by the author.

Endnotes

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