

The Influence of Community Built Environment on social health: Review and Enlightenment

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Abstract

In the context of rapid urban renewal and human-place changes in China, changes in the built environment have led to a reconfiguration of community social space, alienation of neighborhoods, and increasing social health problems of residents. A wealth of research findings have demonstrated the value of active interventions in built environments on residents' physical and psychological health, while the relationship between the built environment and social health is still unclear. This study introduces the connotation and hierarchical characteristics of social health and compares the evaluation indicators and data sources of the built environment and residents' social health, clarifies the influence mechanism of "environment-social health" with objective behaviors and subjective perceptions as mediating variables, classifies and refines the research findings, analyzes the development and proposes future research in this field in China. This paper will provide a theoretical basis for proactive health interventions in human settlements.

Keywords

Built Environment, Social Health, Influencing Mechanism, Community, Urban Renewal

1. Introduction

Health is the most universal need of the people for a good life. In the process of urban transformation, the continuous population explosion and socio-spatial differentiation lead to a shift in modern health and disease patterns. ¹The influence of environmental factors on the health of the population has surpassed that of genetic factors.²It has been shown that the number of deaths attributed to social environmental factors such as low education, social isolation, and low social support are comparable to the number of deaths from the three major diseases myocardial infarction, cerebrovascular disease, and lung cancer, respectively.^{3,4}The influence of medicine on health is limited; personal behavior, life and social environment are the more critical determinants of health. Health includes not only physical and mental health, but also good social adaptation and moral health. At present, scholars at home and abroad have made great progress in the mechanism of influence between built environment and residents' physical and mental health, but the relationship between built environment and residents' social health needs more research findings.

Social health mostly refers to the ability of individuals to interact and form meaningful relationships with others. Social interaction and the physical space that hosts the activity are prerequisites for establishing



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social relationships.⁵ The study of how space shapes social relations has a long history, cutting across a variety of research fields including sociology, geography, network analysis, neighborhood studies, architectural design, and urban planning.⁶ The spatial scales of related studies cover a wide range, and urban and regional scale studies confirm that geographic variability, such as population distribution, can explain most of the large-scale social network structures^{7,8,9} At the micro level, there is a non-linear relationship between physical distance and neighborhood intimacy,^{10,11} colleague knowledge sharing¹² and friendship maintenance.^{13,14,15} The built environment can provide opportunities for social interaction between neighbors by increasing the likelihood of social interaction among residents. It has been shown that the built environment influences the formation of social relationships and thus the level of social health through at least three aspects: spatial propinquity^{11,16}, spatial composition¹⁷⁻²¹ and spatial configuration.^{6,22} In recent years, the research paradigm of the environment-society relationship has gradually shifted from the early empirical tests to path analysis and process excavation. The main body of research is dominated by European and American countries, while the relationship between environment and residents' social health is less discussed in China, and the research on the influence of material space elements on residents' social interactions and social relationships is still in the initial stage. However, along with China's urban renewal, social space has undergone a dramatic transformation, with neighborhood changes breaking up the "acquaintance society" of unit compounds and transforming into "living communities" under modern high-end commercial housing, gradually losing the original stable relationships based on geographic or business ties. Neighborhood alienation and increased distrust pose serious social health threats to individual residents and community groups. Improving neighborhood relations and addressing social health issues has become an important need to promote fine community governance nowadays.

To this end, this paper systematically reviews and summarizes the relevant literature in terms of connotation characteristics, main variables, research framework and main findings, to explore the path of active intervention in the healthy development of social space from various perspectives and provide suggestions and references for the construction and research of healthy cities in China.

2. Discrimination of concepts related to social health

2.1. Conceptual definition of social health

According to the definition of the World Health Organization, health is "a state of complete physical, mental and social well-being", including three dimensions of physical, mental, and social health, of which social health is defined as good social adjustment. Harmonious and healthy social relationships can facilitate smooth communication and cooperation among individuals, while poor social relationships can cause interpersonal tensions, which in turn can have an impact on physical and mental health. Social health at the individual level was first proposed by the American sociologist Parson in 1951 and refers to "the state of an individual in dealing or interacting with others and the individual's interaction with the social environment", which is interpreted by Chinese scholars as a social quality and social state determined by a healthy lifestyle.²³

The conceptual interpretation of social health as a vision of urban health development is presented from a multidimensional perspective. In recent years, researchers in social health are mainly involved in the fields of sociology, psychology, medicine, and behavioristics. Scholars in each field analyze the connotation of social health from their research perspectives. High-frequency terms related to social health include social identity, social support, social cohesion, social integration, social ties, social networks, meaningful social contact, availability of close friends, and social connection. The variability of the relevant concepts reflects, to some extent, the different understandings of their nature among

researchers. Community-level social health refers to the extent to which a person functions in his or her community and includes several measures such as employability, marital satisfaction, social skills, and community involvement, and is closely related to specific household income, race, area of residence, and other elements.²⁴ Social health at the individual level can be defined as our ability to interact and form meaningful relationships with others, and it is also related to our ability to adapt to social situations, which can manifest itself specifically in multiple signs of communication and socialization with friends and family. (Table 1) It has been established that the quality and quantity of social relationships have an impact on our mental health, physical health, and mortality risk.

Table 1. Signs of social health. Source: self-painted by the author

NO.	Sign
1	Balance your social and personal time
2	Always be your true self
3	Connect with people in your community
4	Respect for others
5	Maintain and build strong relationships with friends
6	Establish healthy boundaries to aid in communication, trust and conflict management
7	Seek support from friends and family
8	communicate effectively

2.2. Cross-level characteristics of social health

Many years of research results reflect the distinctive cross-level nature of social health, i.e., healthy social relationships at both the individual and group levels. This requires not only a healthy social network of support at the individual level but also a harmonious and inclusive community environment that provides a good space for individuals to develop. Social health at the individual level depends on individual-centered social networks and interaction behaviors, which are limited by opportunities for interaction and interaction environments. An individual's social network is made up of people who have a significant degree of closeness and trust, and the social interactions generated within the network provide various forms of social support that may influence an individual's social health by acting as a "buffer" for stress.²⁵ Social health is dynamic, and good social support among individuals provides more possibilities for forming group social health. Many scholars argue that at the group level, cohesion and integration are key aspects in forming group social health, depending on trust, social network attributes, and mutual support behaviors.

3. Main variable settings

3.1. Measurement of the community built environment

The built environment is of general interest to the disciplines of urban planning, architecture, geography, transport, public administration, and services. Its measurement emerged early in the field of travel behaviour research in transport and is divided into single and composite indicators. In terms of individual metrics, the 3D metric proposed by Cervero and Kockelman (1997) summarises the built environment metric in terms of density, diversity, and design.²⁶ It was originally developed to predict travel demand, but is now widely used in studies related to the relationship between built environment and health. Density is mainly reflected by the number of people living in a unit area, housing units, employment density or land development intensity; mix is a measure of the degree to which land is mixed with a

variety of land uses, and is often evaluated using the Entropy or Herfindahl-Hirschman Index. The design dimensions include road accessibility, microsite design, leisure facilities, vignette design and street quality. To this, Ewing and Cervero added two more indicators to form the 5D dimension (Table 2), destination accessibility, and distance to public transport. The former refers to the proximity of non-residential land uses (e.g. shops, parks, bus stops, etc.) and primarily measures the accessibility of one destination to another²⁹, mostly expressed in terms of distance to the CBD, accessibility of facilities, the latter can be reflected by distance to metro stations, bus stops or their density.² In addition, Handy et al. proposed six built environment characteristics such as density and intensity, land use mix, street connectivity, street scale, aesthetic qualities, and regional structure.²⁷ Pikora et al. explore the characteristics of built environment elements in terms of four aspects: functional, safety, aesthetics, and destination.²⁸ In terms of research scales, the built environment is a multidimensional concept and is measured from multiple scales when examining the relationship between the environment and resident behaviour. A macro-level focus on the impact of urban sprawl, the layout of public services, etc. on the activities of populations, focusing on the whole city or regional scale. The meso level is mostly block or neighborhood wide and focuses on the impact of density, intensity, land use mix, street network structure, etc. on residential activities. At a micro level, the focus is more on the building itself or its location, mainly in terms of the design of the place, the aesthetic character of the building or street, and the accessibility of public facilities.^{27,29}

Table 2 The 5D variables. Source: Ewing et al. 2015

D variable	Measurement
Density	Density is always measured as the variable of interest per unit of area. The area can be gross or net, and the variable of interest can be population, dwelling units, employment or building floor area. Population and employment are sometimes summed to compute an overall activity density per areal unit.
Diversity	Diversity measures pertain to the number of different land uses in a given area and the degree to which they are balanced in land area, floor area or employment. Entropy measures of diversity, wherein low values indicate single-use environments and higher values more varied land uses, are widely used in travel studies. Jobs-to-housing or jobs-to-population ratios are less frequently used.
Design	Design measures include average block size, proportion of four-way intersections and number of intersections per square mile. Design is also occasionally measured as sidewalk coverage (share of block faces with sidewalks); average building setbacks; average street widths; or numbers of pedestrian crossings, street trees or other physical variables that differentiate pedestrian-oriented environments from car-oriented ones.
Destination accessibility	Destination accessibility measures ease of access to trip attractions. It may be regional or local. In some studies, regional accessibility is simply distance to the central business district. In others, it is the number of jobs or other attractions reachable within a given travel time, which tends to be highest at central locations and lowest at peripheral ones. The gravity model of trip attraction measures destination accessibility. Local accessibility is a different animal, usually measured as distance to the nearest trip attraction of a given type.
Distance to transit	Distance to transit is usually measured as an average of the shortest street routes from the residences or workplaces to the nearest rail station or bus stop. Alternatively, it may be measured as transit route density, distance between transit stops or the number of stations per unit area. In this literature, frequency and quality of transit service are overlooked.

In addition, some scholars use a composite index to evaluate the built environment, such as the Walkability Index, which is obtained by summing the floor area ratio of commercial development, residential density, functional mix, and road intersection density,³⁰ and the Sprawl Index, Ewing et al. studied residential density, land mix, centrality and street accessibility as indicators of urban sprawl at the state level and metropolitan level by conducting principal component analysis on 22 variables.³¹

The built environment plays a role in achieving the vision of social health through at least three dimensions: spatial propinquity, spatial composition, and spatial configuration: spatial propinquity is the degree of physical proximity between actors; spatial composition is the presence of fixed places, such as parks, restaurants or lobbies, that makes interaction possible; and the division of space into sub-units with physical boundaries between them and roads as spatial configuration.⁶

Overall, indicators of the built environment can be divided into objective measures and subjective perceptions, but established studies lack attention to the role of subjective perceptions of the environment. Studies have found that the subjective 'cognitive map' formed by residents is less consistent with the actual objective attributes of the environment and that subjective perceptions do not match objective indicators in around a third of the population.³² Environmental perceptions have a potential mediating role between the built environment and resident behaviour.³³ For example, improvements in perceived destination accessibility and aesthetic features will somewhat increase the level of walking when objective indicators do not change.³⁴

3.2. Measurement of social health

Social health makes corresponding requirements for healthy social relationships for both individuals and groups, i.e., including healthy social network support at the micro individual level, as well as a harmonious and inclusive community environment for residents at the macro level, which can provide a good space for individuals to develop social health. Therefore, this study summarizes the social health system measures at the resident (individual) and community (group) levels, with the former being overall social support, usually consisting of objective support and subjective experiences, and the latter being social integration, mainly characterized by the reduction of differences, inequalities and social exclusion and the strengthening of social relationships, interactions, and connections.

3.2.1 Individual-level social health

Social health at the individual level is limited by various conditions such as opportunities for interaction and the environment of interaction, and how an individual interacts with others depends on the decisions of the participants, a process that is usually self-centered. Therefore, an individual's social network is composed of people with a fairly close relationship and a certain level of trust, and such a social network is an important social resource for individuals and also plays an important role in regulating their attitudes and behaviors. For example, individual community involvement not only provides individuals with the opportunity to learn new skills, but also gives them a sense of belonging to the community.³⁵ Berkman and Glass et al. suggest that participation in social networks provides people with various forms of social support, which may influence personal social health by acting as a "buffer" for stress.³⁶ Thus, at the individual level, social support reduces the stress of individuals' lives and positively affects the social health of residents. Based on this, social health from the individual level can be understood as individuals participating in social interactions and providing various forms of social support to others due to factors such as trust and reciprocity, and social support further promotes social health.

In the existing research, social support in a general sense refers to the various kinds of help that people receive from society and others, and financial support and moral support are two important aspects of social support for individuals. Social support in a broad sense refers to the mutual support between people.²⁵ Social support has an important impact on mental health³⁷, physical activity,³⁸ etc. Social support is a multidimensional concept derived from social psychology, which is divided into instrumental support, information support, and emotional support according to the object of social support. Instrumental support is expressed as tangible resources or material support to provide behaviors or services; information support refers to the provision of useful information such as advice, opinions, or knowledge to help others solve problems or make decisions.³⁹ With the development of information

technology, information support includes virtual information elements⁴⁰, emotional support is reflected in the emotional attention that individuals feel from others; according to the composition of social support, social support dimensions are divided into scale and quality, scale includes social activity and social capital, quality includes human-computer relationship and community identity.⁴¹

According to the specific characteristics of social support, the evaluation scales are Perceived Social Support Scale (PSSS)⁴², Social Support questionnaire, (SSQ)⁴³, Interview Schedule for Social Interaction (ISSI)⁴⁴, Social Support Rating Scale (SSRS)²⁵, Interpersonal Support-Evaluation List (ISEL)⁴⁵ etc. (Table3).

Table3 Summary of Social Support Scales Source: references 43-47

Scale name	Compiler	composition
Social Support questionnaire(SSQ)	Sarason et al.(1981)	The questionnaire has 27 items, divided into two dimensions: A. The amount of social support, i.e. the degree to which one is able to rely on others when needed, mainly involving objective support; B. Satisfaction with the support received, which assesses the subjective experience of the support.
Interview Schedule for Social Interaction(ISSI)	Henderson et al. (1981)	It is divided into two dimensions: availability of social support and self-perceived suitability of social relationships. It is one of the more influential social support questionnaires at present.
Perceived Social Support Scale(PSSS)	Zmie;	It is a social support scale that emphasizes individual self-understanding and self-feeling. It contains 12 items, which respectively measure the individual's perceived level of support from various social support sources, such as family, friends, and others, and reflect the individual's feelings as a total score. the overall level of social support received.
Social Support Rating Scale(SSRS)	Shuiyuan.X	It consists of ten items and includes three dimensions: objective support (3 items), subjective support (4 items), and utilization of social support (3 items). The scale has good reliability and validity, and is simple and easy to implement, and is widely used by domestic researchers.
Interpersonal Support-Evaluation List(ISEL)	Sheldon	There are 40 questions in total to measure the types of social support that college students receive. The questionnaire is divided into four sub-questions: information support, companionship support, material support, emotional support. A two-point scale of "yes" or "no" was used for the evaluation. When statistics, the scores were re-coded. The higher the score of the subjects, the more support they received.

3.2.2 Group-level social health

The norms and solidarity internalized by individual social support networks make people willing or obligated to participate in various social activities, and on this basis, collective trust and collective action are formed, which in turn promotes social integration and enhances the social health of the collective hierarchy.

At the collective level, social health is more dependent on network attributes, and built environments characterized by trust, participation, and mutual support are considered to constitute "health-promoting communities" because they are most likely to support health-promoting behaviors.⁴⁶ In terms of collective trust, in an environment where people trust each other, people are more willing to participate in community building and maintain neighborhoods due to high social interaction; in terms of collective action, community members strengthen control over their lives and the environment through collective action, and collective-level social health provides individuals with access to resources while increasing the ability of communities and individuals to change their behaviour. Finally, community-level norms of

reciprocity may lead to higher levels of public investment in communities, resulting in better access to urban services for individuals.

Thus, social health at the collective level can be indicated as the degree of social integration, which refers to the degree of individual participation and identification with the group, as well as the degree of interdependence and cooperation among group members, and can be divided into communicative integration, cultural integration, functional integration, and normative integration.⁴⁷ Measures of social integration vary. Among them, typical social integration measures are calculated based on different types of social roles, social participation patterns, and social network size, and most of the indicators such as marital status, employment status, community structure, and membership and participation in religious organizations are used in empirical studies.⁴⁸ Yanwei Lin et al. adopted the theoretical framework of social integration proposed by Yang (2010) to measure social integration in four dimensions-economic status, social interaction, cultural adaptation, and self-identity,⁴⁹ each of which is subdivided into multiple questions or indicators (Table 4).

Table4 Social Integration Evaluation Scale Source: Reference 50

dimension	evaluation index	
Economy	Employment	Yes/ No
	Labor contract	Unfixed term/ fixed term/one-time task or a probation period/unsigned labor contract/unknown/else
	Household income	
	Work time every day	
	Income, occupation position compared with the people of the whole society(1-10)	
	Income, occupation position compared with the relatives, friends and colleagues of the current residence(1-10)	
	Income, occupation position compared with friends and colleagues of their hometown(1-10)	
	Degree of respect compared with whole society(1-10)	
	Degree of respect compared with relatives, friends and colleagues of the current residence(1-10)	
Social communication	Number of organizations participated (0-8)	
	Number of activities attended(0-7)	
	Type of neighbors	Outsiders/The locals/outside and locals/Not sure
Acculturation	The consent of the views(8-40)	
	Familiarity with the local dialect	understand and speak/understand and speak some/understand some only/Don't understand
Self-identity	Integration will(13-52)	
	Think oneself native or not	Yes/ No
	Bring family members or not to the local in the next 1-3 years	All of family members at here / Yes/Yes, but some/ No/ Not sure

4. Research framework and main findings

4.1. Research Framework

Social-ecological theory is an important theoretical basis for constructing the relationship between the built environment and the social health of residents. The theory points out that individual development is nested in a series of environmental systems that interact with each other, and emphasizes the "situational effects" of the built environment on individual health.² Based on theories related to urban

ecology and health determinants, there is now a growing consensus that while individual-level economic and social attributes, genetic factors, and behavioral habits are critical in determining health, social capital, urban built environment, and natural ecology also have important effects on the health and well-being of residents.^{50,51} Community built environment is second only to personal characteristics in terms of its impact on residents' health, and proactive interventions in built environment can play a positive role in promoting physical, mental, and social health of the public.

The impact of community built environment on residents' social health at individual and group levels is mainly through two pathways: subjective perception or objective behavior. A favorable community environment enhances subjective well-being and satisfaction, promotes more active social activities, increases the frequency of community services, enhances neighborhood emotional exchanges, strengthens mutual trust and reciprocity among community residents, and improves community vitality and social cohesion. (Figure 1) .

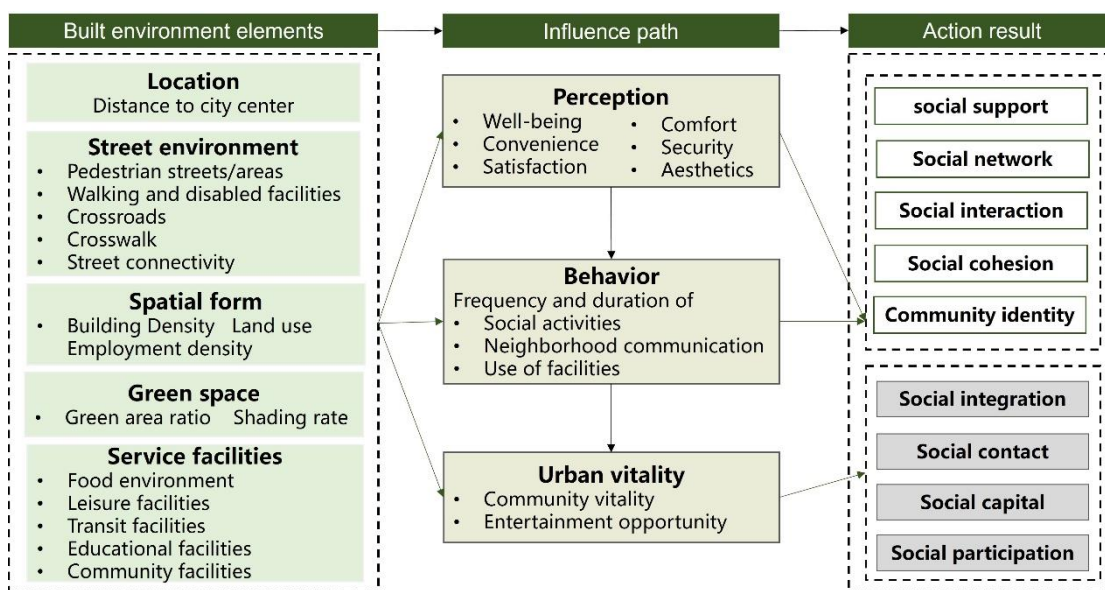


Figure 1 The influence path of environment on social health source: self-painted by the author

4.2. Effects of Built Environment on Individual Social Support

The built environment, as a physical-spatial carrier of residents' interaction activities, influences the level of individual social support. Yang et al. showed that the social support levels of older adults in residential areas were influenced by elements of the built environment, such as place diversity, place accessibility, landscape environment, and pedestrian facilities statistically significantly influenced the quality dimensions in social support 41, Chen et al. found that older adults' social interaction behaviors and satisfaction affected their social support levels greatly, and the spaces related to social interaction behaviors included stores, supermarkets, vegetable farms and roadside stalls, which were used by older people on a daily basis and were the main sites for their superficial social interaction behaviours and survival necessity behaviours.⁵² Venurs H.Y. Loh et al. found that the social support of the adolescent population was mainly derived from family and peers, and that the intensity of physical activity in this group was influenced by elements of the built environment and was significantly moderated by social support. 38

The built environment can influence residents' subjective perceptions, which in turn affects individual social support levels. Perceptual factors include three levels: individual intrinsic needs, environmental perception, and current situation evaluation. The social environment can influence social support

through individual perception as a non-material element, and behavior is a non-essential mediator in this path, while the social environment situation depends on the built environment quality. Zhang et al. demonstrated that for older age groups, the social environment influences the level of social support through the individual perception dimension, namely life satisfaction.⁵³ There is a complex interaction between social support and the built environment. The generation of social support relies on the spatial elements of the built environment, while social support, to a certain extent, reacts to the built environment and contributes to the social environment, thus forming a closed loop of sustainable development.

4.3. Effects of built environment on group social integration

A good built environment can provide a place for collective behavior and promote social cohesion. Collective action is defined as social cohesion among neighbors and the willingness to intervene on behalf of the common good, which is not dependent on specific neighborhood networks and individual social network relationships.⁵⁴ The built environment has a significant influence on collective behavior.⁵⁵ The presence of a library, school, or community center can promote collective behavior and enhance social integration in the community by enhancing connections among residents.⁵⁶ In contrast, hotels, and community disruptions inhibit collective activity. Cohen et al. showed a positive correlation between built environment factors such as community parks and collective action in the community, reflecting the fact that designed built environments do provide the necessary place for collective action and act as a facilitator for collective action and social integration.

The proper allocation of built environment resources can enhance equity and promote social integration. A review of the literature reveals that collective action cannot be generated without the function of place provided by the built environment and its contribution to collective action. An equitable distribution of environmental resources will therefore not only improve social equity in different regions, but also promote the development of social and cultural integration and other elements. The study by Fu Fan et al. found that only by making the built environment as equitable as possible and maximizing the distribution of the city as a public good can we achieve a truly "co-built, co-governed and shared" city,⁵⁷ and thus promote social integration. Therefore, a reasonable distribution of built environment resources can improve the quality of life and environmental equity among residents and promote social integration and development.

The built environment can be a vehicle for good norms and community solidarity, promoting social integration. Kawachi et al. found that trust, reciprocity, and good norms among individuals and social groups can facilitate collective action.⁵⁸ Studies on the role of built environment in promoting social norms also show that the environment has a binding effect on human behavior, which in turn generates social consensus norms and order. A well-built environment, an open and inclusive atmosphere, and the creation of a fair and harmonious environment contribute to the unity of the community and society at large. According to previous studies, social integration is influenced by factors such as psychological constructs and identity, and social solidarity and good norms promote people's sense of identity with each other and their sense of self. Therefore, good norms and a united community can promote social integration. In summary, the built environment serves as a vehicle for social cohesion in this process and promotes social integration.

5. Research Prospect and Enlightenment

Through a systematic review of the existing literature, this paper systematically explores the impact of community built environment on residents' individual and group social health, summarizes and summarizes the empirical findings and empirical laws in terms of connotation characteristics, main



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variables settings, research framework and major findings, and hopes to provide references and suggestions for future research.

Most of the existing studies on the relationship between built environment and residents' health have focused on the impact of built environment on physical and mental health. However, due to the complexity of social health measurement criteria, fewer studies have discussed the relationship between built environment and residents' social health, and research on the relationship between built environment elements and residents' social connections and social interactions is still in its infancy. Most of them stay in the analysis that open space and public green space play a certain role in the social interaction of people, and the research on the concept, measurement and influence mechanism of social health is still in the exploration stage and needs to be deepened. In terms of connotation, the definition and dimensional delineation of the concept of social health has not reached unity. In terms of research objects, there is insufficient attention to urban community subjects, inadequate grasp of the hierarchy of health subjects, and insufficient systematic research on individual social health centered on self-adaptation and collective social health centered on network cohesion; in terms of measurement standards, there is also a need to construct a local Chinese social health measurement index system.

With the need for urban governance in recent years, the social dimension of health has gradually become a hot research issue of concern for different disciplines. Along with rapid urbanization, urban spatial elements are continuously clustered, leading to many changes in the primary social relationships between all people and places. The first is the change in social relations. Along with the massive and high-intensity urban development and construction, population mobility has increased, the native social structure has disintegrated, and the original stable social network relations based on geography or industry have been rapidly broken. The second is the change in the way of interaction. As the scale of the city and the mode of construction gradually change, the physical environment of the city is also directly or indirectly changing the combination needed to realize the activities and has an impact on the spatio-temporal arrangement of other activities. The third is the change in the emotions of people and places, where the emotional ties, interaction patterns and identities established between people and specific places gradually dissolve in parallel with the rapid socio-economic growth. In addition, since the 21st century, the accelerated growth of population aging in China has posed more serious challenges to social services and economic development. Age-related aging health issues, such as physiological decline and psychological disease prevention, have become hot research topics, while social interaction and social participation, which are closely related to the elderly, have received less attention. These changes and trends are bound to have an important impact on the population health. Combining the actual needs and background of China, it is recommended that future research focus on the following areas.

In terms of built environment representation, adequate attention should be paid to the differences between subjective perceptions of the built environment and objective metrics. Most existing studies focus on objective measures of the built environment, often neglecting the impact of the perceiver's processing of information on his or her behavior and health. Currently, a series of well-established scales have been widely used for built environment perception measures related to mental health and physical activity. With the increasing level of digital technology, virtual reality and augmented reality technologies can fuse multiple sources of information to accommodate the physical movement of perceivers and enable the construction of 3D dynamic simulation systems, providing many opportunities to assist in the study of perceivers' environmental experiences.⁵⁹ Since there is a certain inconsistency in the subjective and objective evaluation of the environment, it is necessary to further explore how the patterns of subjective perceptions and objective indicators in various populations? 29 What are the specific mechanisms of influence of environmental perception on social health? What are the similarities and differences in the role of this influence and objective environmental indicators? How can the match between the two be improved through planning interventions, among other questions.

To fully grasp the hierarchical characteristics of social health and realize the local multi-scale quantitative exploration in China. Existing studies mostly focus on microscopic social interaction behaviors or macroscopic social networks in cities and regions, and the concepts, systems, and characteristics of social health need to be systematically sorted out and supplemented, and the cross-level scale characteristics of social health of residents and communities need to be further explored. Whether the effects of the built environment on social health hold true at the community, neighborhood, regional, and city or urban agglomeration scales and what the similarities and differences are also need to be answered in future research. In addition, due to the significant differences between domestic and foreign cities and communities in terms of the development stage, cultural background, and socio-economic aspects, the social health-related evaluation scales and indicators presented in foreign research results are not fully applicable to China, and there is a need to make locally appropriate quantitative exploration of social health in response to the problems of urban and community stock renewal, accelerated aging, and urban population loss in China.

To clarify the impact mechanisms of built environment and residents' social health, and to propose practice-oriented targeted strategies to respond to sustainable community health needs and community refinement governance. Examining healthy cities and communities from a social dimension is of great significance for the comprehensive implementation of the Healthy China initiative. Attention should be paid to the heterogeneity of the specific influence mechanism of environment-social health in different populations, with particular emphasis on the influence of urban built environment on the health status of key populations such as the elderly, women, children, and migrant workers. The possible mediating and moderating variables in the causal relationship of the mechanism can be explored to enhance the integrity and explanatory power of the social dimension of the spatial theory of healthy cities. To actively intervene in the healthy development of social space based on the discipline of urban planning and integrated multifaceted perspectives to promote social stability and sustainable development.

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