

The influence of green spaces on residents' subjective well-being in older neighborhoods

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ARTICLE INFO	ABSTRACT
<i>Article history:</i> Received March 26, 2026 Received in revised form April 20, 2026 Accepted July 02, 2026 Available online September 01, 2026 <i>Keywords:</i> Green space perception Grounded theory Older neighborhoods Place attachment Subjective well-being *Corresponding author: Azizan Marzuki School of Housing, Building and Planning, Universiti Sains Malaysia Email: chik72@usm.my ORCID: https://orcid.org/0000-0002-1035-4908	<i>Against the overlapping forces of rapid urban renewal and population aging, green spaces in older neighborhoods lack a mechanism-based explanation, grounded in situational experience, for how daily use translates these spaces into subjective well-being. This study examines older neighborhoods in Zhaoqing City, Guangdong Province. Using semi-structured in-depth interview data, it applies grounded theory through open, axial, and selective coding and conducts a theoretical saturation test. The analysis identifies the key elements and action logics by which neighborhood green spaces influence residents' subjective well-being. Finally, it constructs a process-mechanism model "perceptual support—practice embedding—recovery accumulation—attachment generation." The research findings are as follows: (i) Residents' core evaluation of green spaces is primarily guided by "daily availability" (ii) Use of green spaces is characterized by high frequency, fragmentation, and accumulateness within daily life; (iii) Subjective well-being does not arise directly from spatial attributes. Rather, through the cumulative accrual of micro-restorative experiences it gradually crystallizes into Subjective Well-Being. This study elucidates the dynamic mechanisms by which green spaces emerge in older neighborhoods, tracing pathways from spatial conditions to psychological benefits. It expands a process-based explanatory framework and offers both a theoretical foundation and practical guidance for well-being-oriented renewal strategies for older neighborhoods.</i>

Introduction

As China has deepened economic opening and advanced housing marketization, residents' expectations for living environment quality have risen correspondingly (Q. Li and Aalbers 2025). By contrast, older residential neighborhoods that emerged under the previous housing-supply system have steadily deteriorated (Liang et al. 2025). Most of these older neighborhoods, built primarily in the 1990s and developed under

government leadership, occupy central urban locations. They are typically composed of 4 to 6 story walk-up apartment buildings (Dai et al. 2023). Restricted by the spatial functional capacity, traffic organization, and limited land resources of the urban core, green spaces in older neighborhoods suffer from resource scarcity, aging facilities, and fragmented layouts. These deficiencies have decreased residents' participation in green-space activities and have substantially impeded the healthy development of



the living environment (Huang et al. 2024; S. Zhang et al. 2025).

Neighborhood green spaces denote publicly accessible vegetated areas within residential neighborhoods where residents gather. These spaces facilitate social interaction and outdoor recreation, thereby strengthening neighborhood cohesion while contributing importantly to urban ecological balance (Y. Xie et al. 2024). Green spaces also improve air quality, moderate the local microclimate, attenuate noise, and support urban biodiversity (Islam et al. 2024; Zhou et al. 2023; Azmeer, Tahir, and Al-Ghamdi 2024). In addition, they enhance the visual character and aesthetic value of the neighborhood environment (Rey-Gozalo et al. 2023; Chu et al. 2026). Green spaces foster social and recreational activities within neighborhoods (Wan, Shen, and Choi 2021; Jennings et al. 2024), encourage physical activity and active travel, alleviate psychological stress and mental tension, and strengthen residents' sense of belonging (Lopez-Haro et al. 2024). Consequently, the quality of neighborhood green spaces exerts a substantial influence on residents' quality of life and well-being (Xu et al. 2025).

Subjective well-being (SWB), introduced by American psychologist Diener in 1984, refers to individuals' subjective assessments of their life circumstances, encompassing both cognitive evaluations and affective experiences grounded in self-reflection (Diener 1984). SWB is typically conceptualized as comprising three primary dimensions: life satisfaction, positive affect, and negative affect (Diener 1994). Early research on subjective well-being concentrated mainly on individual-level microfactors and macroeconomic determinants (Blanchflower and Oswald 2004; Di Tella, MacCulloch, and Oswald 2001). At the same time, other scholars investigated cross-country and regional disparities in subjective well-being (Diener, Diener, and Diener 1995). Subjective well-being is also tightly linked to health. Individuals with robust immune function, regular healthy sleep patterns, and active engagement in health-promoting behaviors tend to face lower risks of heart disease, hypertension, and stroke (Pressman and Cohen 2005; Diener and Chan 2011; Steptoe, Deaton, and Stone 2015). These findings underscore the important role of subjective well-being in enhancing overall quality of life. Several scholars have examined spatial-scale variations in residents' subjective well-being and mapped its geographic

differentiation (Oswald and Wu 2010). Other researchers investigating the link between green space and subjective well-being have operationalized well-being in two dimensions affect and life satisfaction and demonstrated that neighborhood green space can influence residents' subjective well-being (Dong and Qin 2017; Liu, Xiao, and Wu 2022), offering useful precedents for the present study.

Empirical investigations of the association between neighborhood green space and subjective well-being date back to the late 1990s. Using survey data from residents aged 40-60 in various Glasgow neighborhoods, Ellaway and Macintyre (1998) identified a statistically significant relationship between the local outdoor environment and measures of subjective well-being, health, anxiety when assessing housing equity. Early research on the "green space well-being" relationship predominantly emphasized objective physical characteristics, frequently employing metrics such as neighborhood green-space proportion and vegetation cover to account for differences in well-being (Maas et al. 2006). With the advent of social capital theory, however, attention shifted toward social factors social networks, trust, and reciprocal assistance which, by reinforcing neighborhood cohesion and a sense of belonging, indirectly bolster residents' subjective well-being (Putnam 2000; Maas et al. 2009). The emergence of environmental psychology has offered a novel lens for examining the relationships between neighborhood green spaces and subjective well-being, highlighting how residents' interactions with local greenery shape mental health and perceived quality of life (Hartig et al. 2014; Nordh, Alalouch, and Hartig 2011). Recent work has broadened this inquiry, systematically integrating variables such as socioeconomic status, cultural background, and personal preferences, and has articulated clearer theoretical pathways and measurement frameworks for the mechanisms involved (Markevych et al. 2017; Twohig-Bennett and Jones 2018). Urban planners and policymakers have increasingly examined how neighborhood green spaces influence residents' subjective well-being, and they are pursuing policy levers to enhance that well-being. Initiatives such as expanding public green areas, creating pocket parks, and fostering neighborhood participation are being implemented to shape more harmonious green environments that support residents' subjective well-being (Wolch,

Byrne, and Newell 2014; Dennis and James 2016). Empirical studies typically employ structural equation modeling (SEM) or linear regression to interrogate the complex relationships among variables and to quantify the effects of neighborhood green spaces on perceived satisfaction, mental health, and well-being (Kothencz et al. 2017; Lai, Zhou, and Yuan 2021).

Most studies to date have examined comprehensive urban park green spaces when investigating how urban greenery affects sleep quality, reduces depression, and alleviates stress and other mental disorders (Yang et al. 2021; Shin et al. 2020). Far less attention has been given to the effects of green spaces within older neighborhoods on residents' subjective well-being. Most studies employ predominantly quantitative methods, using numerical data and statistical techniques to construct pathways and model relationships between green spaces and well-being (Collins et al. 2020). However, this hypothesis-driven, quantification-focused approach depends heavily on numeric measures, offers limited insight into the processes by which green spaces promote well-being, struggles to capture subjective and experiential dimensions, and can overlook contextual factors and individual differences among participants. This study examines green spaces in older neighborhoods in Zhaoqing City. Employing grounded theory and semi-structured in-depth interviews with neighborhood residents, it investigates the mechanisms by which these green spaces affect residents' subjective well-being. The research addresses several core questions and seeks to provide theoretical foundations and practical guidance for the renewal of urban older neighborhoods and the enhancement of local residents' quality of life.

1. How do residents of older neighborhoods perceive green spaces?
2. How do residents incorporate neighborhood green spaces into daily life, and what are the

principal characteristics of their usage patterns and experiences?

3. Through which key processes and causal pathways do green spaces in older neighborhoods influence residents' subjective well-being, and under what contextual conditions are these effects facilitated or impeded?

Methods

Introduction to the research area

Zhaoqing City lies in the western part of Guangdong Province within the Guangdong-Hong Kong-Macao Greater Bay Area. Combining deep historical and cultural heritage with rich ecological resources, it is also one of the cities of the Pearl River Delta. Zhaoqing benefits from distinctive natural conditions, a favorable ecological environment, and well-developed supporting infrastructure. In the 1980s, following completion and opening of cross-river links such as the Xijiang Bridge, the city undertook large-scale urban development focused on Duanzhou. As of 2025, Duanzhou District in Zhaoqing City comprises 63 neighborhoods. The government's most recent urban-rural integration development and improvement plan identifies 51 of these neighborhoods as requiring renovation encompassing building repairs and enhancements to the living environment which represents approximately 80.95% of all neighborhoods in the district. This study focuses on Duanzhou District and examines neighborhoods constructed between 1995 and 2005. Taking into account construction era, geographic location, spatial scale, population size, and physical form, and informed by on-site investigations, we selected two representative older neighborhoods in Duanzhou District: Songcheng Neighborhood and Baoyue Neighborhood (table 1).

Table 1. Green space conditions in older neighborhoods

Older neighborhoods	Green spaces in older neighborhoods		
Songcheng Neighborhood			
	Zhangqing Government Site Park	Zhangqing Ancient City Wall	Pocket Park
Baoyue Neighborhood			
	Baoyue Park	Baoyue Children's Park	Baoyue Pond

According to the Urban Green Space Planning Standard (GB/T 51346-2019) issued by the Ministry of Housing and Urban-Rural Development, and with reference to the Classification Standard for Urban Green Space (CJJ/T 85-2017) and the Guidelines for the Planning of 15-Minute Neighborhood Living Circles in Shanghai, the study defines older neighborhoods green spaces within the 15-minute neighborhood living circle as neighborhood parks, gardens, squares, and associated residential green areas. These public green spaces, intended for residents' daily leisure and recreation, comprise artificial or near-natural vegetation systems, primarily serve nearby neighborhood members, and provide basic recreational functions.

Research methods

This study employed the Grounded Theory method, a qualitative approach that derives theoretical explanations from empirical data. Grounded Theory emphasizes constructing explanatory models through systematic analysis of actions, interactions, and social processes observed in real-world contexts (Strauss and Corbin 1998). Through iterative procedures such as constant comparison, theoretical sampling, and hierarchical coding, grounded theory progressively abstracts concepts, categories, and their interrelationships during data analysis, ultimately generating a middle-range theory that explains social phenomena within specific contexts (Chun Tie, Birks, and Francis 2019).

The defining characteristic of grounded theory is that it does not posit theoretical hypotheses at the outset of research. Rather, it generates theory inductively from qualitative data through a rigorous, standardized analytic procedure grounded in empirical evidence. This approach addresses common limitations of conventional qualitative research such as the absence of standardized procedural guidance and the limited persuasiveness of conclusions and reduces subjective bias introduced by preconceived ideas. As a prototypical bottom-up method (Y. Zhang et al. 2025), grounded theory is therefore well suited to this study: it enables a systematic elucidation of how green spaces in older neighborhoods influence residents' subjective well-being, drawing directly on residents' everyday narratives and actual usage contexts.

Data acquisition and organization

Data were collected in Songcheng Neighborhood and Baoyue Neighborhood in Zhaoqing City between September and December 2025. Using semi-structured, in-depth interviews, we interviewed 25 permanent residents of the older neighborhoods, sampling across a range of social groups to maximize diversity and representativeness. The respondents differed markedly in age, gender, income, education level, and length of residence, enabling the capture of diverse perspectives on neighborhood green-space experiences and subjective well-being among residents from varied backgrounds (table 2).

Table 2. Demographic and involvement profile of interview participants (N = 25)

Attribute	Categories	n	%
Gender	Male / Female	11 / 14	44 / 56
Age group	18-30 / 31-45 / 46-60 / 60+	3 / 4 / 9 / 9	12 / 16 / 36 / 36
Education level	Primary or below / Secondary / Vocational-Tertiary	10 / 9 / 6	40 / 36 / 24
Household income (relative to neighborhood median)	Low / Middle / High	7 / 16 / 2	28 / 64 / 8
Length of residence	≤ 5 years / 6-10 years / 11-20 years / 20 years+	2 / 3 / 13 / 7	8 / 12 / 52 / 28

To account for the cultural background and linguistic habits of the interviewees, the interview guide was designed according to the principles of “easy to understand, easy to express, and open-ended,” while avoiding leading language so that participants could freely and honestly convey their views on neighborhood green spaces and well-being. The primary interview questions were as follows: (i) Which neighborhood green spaces do you use most frequently on a regular basis? (ii) What is your typical frequency of visits, duration of stay, and primary activities? (iii) How do you assess the overall environment and user experience of the neighborhood green spaces? (iv) What factors encourage or discourage you from visiting and lingering in these spaces? (v) Do you engage in neighborhood interactions or social exchanges while using the neighborhood green spaces? (vi) What effects do such interactions have on your daily life and emotional well-being? (vii) To what extent do the neighborhood green spaces influence your emotional experiences and overall life satisfaction? During interviews, the researcher probed and clarified participants' narratives, guiding them to expand on topics such as experiences of green space use, perceptual evaluations, neighborhood interaction processes, and the contextual mechanisms shaping well-being experiences.

With the interviewees' consent, audio recordings were made and used as raw material while research memos were written concurrently. After transcription and collation, the 25 interviews yielded approximately 60,000 words of text. Two-thirds of the samples (R1-R17) were randomly selected for analysis and for constructing open, axial, and selective codes. The remaining one-third (R18-R25) served to test theoretical saturation and thereby verify the

stability of the category system and its relational structure.

Results and discussion

Open coding

During open coding, the research team systematically examined the transcribed texts of 17 in-depth interviews from older neighborhoods, parsing them sentence by sentence and paragraph by paragraph. Emphasizing residents' usage experiences, emotional expressions, and subjective evaluations of neighborhood green spaces within the everyday context of these neighborhoods, the team probed the social meanings, cognitive orientations, and action logics embedded in their accounts. Coding was conducted using NVivo 11 (Version 11, QSR International, Australia). Guided by the principles of prioritizing residents' perspectives, privileging empirical evidence, and situating data within its social context, we excluded invalid corpus elements such as polite formulae, advertising catchphrases, and repetitive statements unrelated to the research topic to ensure that the retained material possessed clear socio-psychological relevance and analytical value. By clustering, comparing, and integrating recurring descriptions of experiences, leisure participation, and evaluative judgments in the texts, we identified 67 initial concept nodes. Through several rounds of merging and revision, these were refined into 14 representative subcategories: Accessibility, Connectivity, Sense of security, Cleanliness, Maintainability, Facility suitability, Visitation frequency, Length of stay, Activity types, Social interaction, Emotional soothing, Stress relief, Place dependence, and Place identity (table 3).

Table 3. Examples of open coding

Coding	Category	Conceptualization	Original data (excerpts from residents' words)
OC-01	Accessibility	Pedestrian accessibility	"I can reach the green space within a few minutes' walk after leaving home. The Zhaoqing Government Site Park isn't far either. Even if you walk slowly, you can still get there." (R09)
		Convenient access	"You don't need to take a detour to get to Baoyue Park. Just follow the main road. You can go anytime without taking a special bus." (R02)
		Clearly defined entrances	"Some pocket parks place their entrances directly adjacent to the roadside, making access immediately visible at a glance; you no longer need to ask for directions when you approach, as was often the case previously." (R14).
OC-02	Facility suitability	Shaded seating	"I really like the row of shaded seats; they protect against sun exposure, and sitting there to enjoy the breeze prevents leg soreness after a brief rest." (R15).
		Fitness equipment	"I use that fitness equipment for stretching and twisting every day. I'm not trying to get very strong; I just want to loosen my muscles and joints." (R07)
		Elderly-friendly facilities	"For us older adults, it's more important that the steps aren't too high, handrails are installed, and the ground isn't slippery than that the scenery looks nice." (R12)
		Children's facilities	"At Baoyue Children's Park, which features slides and open areas, children begin playing as soon as they are released, allowing adults a brief respite." (R10).
OC-03	Visitation frequency	Regular visits	"I walk there essentially every day after meals; even a single circuit suffices, and if I skip it I feel as though my day is incomplete." (R06).
		Availability at all times	"Being nearby is a real advantage. When I'm in a bad mood, I just go downstairs and walk over. I'll be back in about ten minutes, and I don't even need to change clothes." (R13)
OC-04	Length of stay	Short rest stops	"I usually just sit there for ten minutes, watch people coming and going, calm down and then go back to cook." (R02)
		Prolonged stays	"When the weather is nice, I can sit there for a long time, especially beside the Pond. Watching the water surface slowly ripple, time just seems to fly." (R16)
		Stable presence	"I come here at about this time almost every day and sit in this same seat; it has become a small personal rule. Sitting here calms me." (R09)
OC-05	Social interaction	Neighborhood interaction	"You are most likely to run into acquaintances in the green space. Brief greetings and small talk about daily life quickly dispel feelings of loneliness." (R07)
		Group activities	"Several of us older neighbors arrange to walk together; we talk as we go, maintaining a slow pace that never leaves us fatigued. Above all, we value the companionship." (R01)
		Mutual care	"Those with children understand this best: when someone steps away to answer the phone or fetch water, nearby neighbors help watch the children. Because we are all neighbors, we feel secure." (R12)
		Collective participation	"At night, some people dance and others exercise. I don't always join them, but simply watching the activity from the sidelines lifts my spirits." (R05)
OC-06	Stress relief	Alleviation of fatigue	"After a busy day, my back and waist ache. When I go to the green space and take part in activities, the soreness gradually fades, and I don't feel as sluggish when I get home." (R08)
		Reduction of stress	"When I feel stressed, stepping outside for fresh air substantially improves my condition. As I walk, my breathing calms and my tension diminishes." (R17)
OC-07	Place identity	Familiar and amiable atmosphere	"I know this road and row of trees intimately; the moment I enter, I feel enveloped by a personal space that affords me a deep sense of security." (R02)
		Sense of neighborhood belonging	"All of the people I encounter here are familiar; we know one another. Simply sitting together and engaging in a brief conversation gives me a palpable sense of warmth within our neighborhood." (R16)
		Preservation of local memories	"When I view the walls and the buildings around the Zhaoqing Government Site Park, memories of the past arise immediately; it feels as though this place remains intimately connected to our everyday lives." (R06)

Axial coding

During axial coding, using the preliminary categories generated by open coding as the focal point, we further examine the internal relationships among concepts in the interview texts and clarify the logical relations and chains of action connecting the different categories. Based on the 14 sub-categories identified through open

coding, this study performed concept aggregation and semantic integration using the constant comparative method. Similar concepts were consolidated and overlapping categories clarified, yielding four principal categories: green space perception, recreational activities, psychological restoration, and place attachment (table 4).

Table 4. Primary categories emerged by axial coding

Main category	Corresponding category	Main category	Corresponding category
Green Space Perception	Accessibility	Recreational Activities	Visitation frequency
	Connectivity		Length of stay
	Sense of security		Activity types
	Cleanliness		Social interaction
	Maintainability	Place Attachment	Place dependence
Psychological Restoration	Facility suitability		Place identity
	Emotional soothing		
	Stress relief		

Selective coding

The mechanisms through which green spaces in older neighborhoods influence residents' subjective well-being are complex and

multifaceted. Based on analysis of the primary and subsidiary categories, the resulting storyline can be summarized as follows (figure 1):

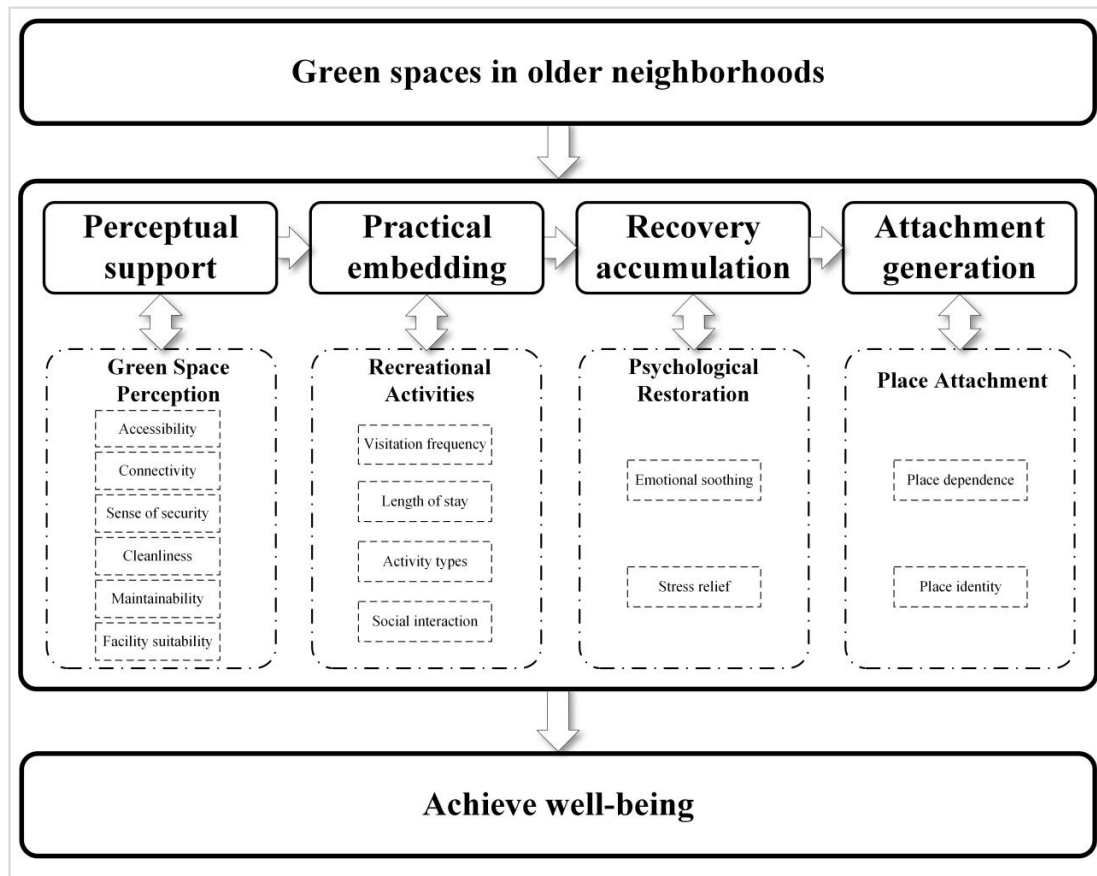


Figure 1. A mechanism model linking green spaces in older neighborhoods to residents' subjective well-being

Within the context of neighborhood renewal and routine governance, green-space nodes in older neighborhoods examples include Zhaoqing Government Site Park, pocket parks, and Baoyue Park offer residents spatially proximate public areas. This proximity allows residents to form initial perceptions of the green spaces. Residents specifically describe green spaces as “convenient to access and smooth to move around,” emphasizing their accessibility and connectivity. They also evaluate these spaces as “feeling safe to use and comfortable to stay,” reflecting judgments about safety, cleanliness, and maintenance. In addition, elements such as seat shading, fitness equipment, and the appropriateness of facilities further enhance both the attractiveness for lingering and the potential for activity within these green spaces. Under these conditions, residents’ leisure pursuits have become progressively and reliably woven into daily life: visit frequency is more regular, stay durations are steadier, and activity types walking for exercise, child care, and scenic relaxation have diversified. Daily experience is further enriched and consolidated through social interactions, including neighborhood conversations, group activities, and mutual caregiving. As activities persist, residents begin to experience psychological recovery. Emotional soothing coupled with stress relief diminishes irritability and dissipates fatigue, which in turn reinforces more positive evaluations of their living conditions. Through prolonged positive experiences, residents progressively cultivate place attachment to neighborhood green spaces. Practically, they develop a place dependence on these areas, regarding them as “convenient, essential, and irreplaceable.” Concurrently, residents accrue emotional bonds familiar and amiable atmosphere, sense of neighborhood belonging, and local memories that together constitute place identity. Ultimately, residents converted improved green-space conditions into psychological benefits through habitual daily use and self-assessment, thereby forming relatively stable subjective well-being.

The mechanism by which green spaces in older neighborhoods influence residents’ subjective well-being follows a progressive sequence: “perceptual support practice embedding recovery accumulation attachment generation.” This sequence reveals a social-construction logic in which neighborhood green

spaces, through daily life processes, drive the emergence of well-being.

Theoretical saturation test

The remaining one-third of the samples were reserved for recoding and categorization to assess theoretical saturation. Results indicated that the model’s theoretical categories had reached a high level of richness. Beyond the four established theoretical categories, no additional categories or interrelationships have been identified, nor have new constituent factors arisen within those primary categories. This finding supports the reasonableness of the model developed in this study for the influence mechanism of older neighborhoods green spaces on residents’ subjective well-being.

Mechanisms of green spaces’ influence on residents’ subjective well-being in older neighborhoods

Green space perception

Residents’ overall perceptions of neighborhood green spaces encompassing accessibility, facility conditions, and environmental order substantially influence their visitation and duration of stay, and are further associated with well-being outcomes such as life satisfaction and mental health (Delgado-Serrano et al. 2024).

Residents’ perceptions of green space in older neighborhoods are clearly oriented toward “daily availability.” Their primary concerns are whether they can reach neighborhood green spaces safely and whether routes are continuous. As one resident noted, “I usually only walk on the well-lit section at night. In some areas, there isn’t enough lighting and the ground is uneven. It’s easy for the elderly to trip” (R03). Such risk sensitivity directly reduces residents’ willingness to visit and shortens their duration of stay. Given smooth access to green space, residents then evaluate the quality of the experience: whether the environment feels comfortable, whether it is clean and well kept, and whether facilities and surfaces are properly maintained. For example, one resident observed, “There are many places to sit and many trees in Baoyue Park. It’s not sunny in summer, and people will feel much more comfortable after walking around the park” (R11). This comment indicates that seating availability and shaded areas not only improve physical comfort but also enhance residents’ overall appraisal of the space. In contrast,

inadequate sanitation and maintenance can rapidly erode this favorable perception and willingness to stay. As one resident observed, "Children like to play in the children's park, but sometimes the poor sanitation and the failure to clean up the garbage in time make them feel uncomfortable after staying there for a long time" (R17). This comment indicates that environmental order and cleaning maintenance not only shape the user experience but also affect individuals' psychological responses through emotional channels.

Perceptual factors such as "safety," "comfort," and "tidiness and maintenance" collectively establish the fundamental conditions required for residents to enter and remain in neighborhood green spaces. When green spaces reliably meet expectations for accessibility, circulation, facilities, and order, their restorative potential is more readily activated, making these areas a prerequisite for subsequent leisure activities.

Recreational activities

Leisure activities can steadily enhance individuals' subjective well-being by increasing contact with nature and facilitating social interaction (Ji et al. 2025). In the green spaces of older neighborhoods, residents routinely undertake a range of activities walking, exercising, enjoying the scenery, and caring for children that together constitute stable daily behavioral practices. Over time, these frequent, dispersed, and cumulative patterns of use convert neighborhood green spaces from mere "space providers" into vital channels through which residents obtain immediate restoration, experience positive emotions, and receive social support, thereby establishing the basis for subsequent psychological restoration and the development of place attachment.

Many residents visit the green space during their daily routines, using frequent stops there for emotional regulation and light physical activity. For example, one participant noted, "I basically go there every day. It doesn't have to be intense exercise. Just taking a walk and looking at the water makes me feel better" (R03). This suggests that even low-intensity walking and passive sightseeing can provide immediate emotional relief and a sense of psychological comfort. The flexible stay duration accommodates both "short-term recovery and long-term companionship."

Residents described typical uses: "After buying groceries in the morning, I take a detour

and sit here for a dozen minutes, soak up the sun and then go home. It's more comfortable than staying cooped up indoors." (R16) and "I bring my grandson here to play. He runs around while I watch him from the side. I also chat with other parents. Before I know it, I've been sitting here for over an hour." (R15) By lowering the threshold for leisure participation, this model renders green spaces an easily accessible restorative resource within daily life.

Leisure activities in green spaces also produce a clear social-interaction effect. For example, one resident described daily walks: "when we take walks, we remind each other of slippery roads and broken lights. Sometimes we also help take care of each other's children. It makes me feel really at ease." (R05). These casual, context-driven interactions and quick acts of mutual assistance reinforce neighborhood cohesion and a sense of belonging.

Psychological restoration

Stress Recovery Theory (SRT) and Attention Restoration Theory (ART) indicate that, relative to urban daily environments characterized by high stimulation and heavy information loads, green spaces incorporating natural elements such as water bodies and vegetation more effectively foster emotional calm and reduce stress levels (Ulrich et al. 1991; Yin et al. 2023). Stressors affecting residents of older neighborhoods are often characterized by their triviality and persistence. Crowded living conditions, the demands of housework and caregiving, frequent interpersonal frictions, and age-related declines in physical function combine to sustain elevated levels of emotional tension. In this context, neighborhood green spaces located within walking distance, readily accessible with low barriers to entry, and available at all hours have become the most commonly used "stress buffer zones" in residents' daily lives.

Many participants emphasized that green spaces offer a low-cost, immediately accessible outlet for emotion regulation. "Sometimes when there are too many things to deal with at home, I get annoyed. Then I go out and take a slow walk along the water. After that, I don't feel like getting angry when I get back home" (R02). This account suggests that a leisurely walk by the water can rapidly reduce irritability and impulsive emotions, allowing individuals to return to a calmer psychological state. Residents typically do not engage in vigorous exercise or pursue specific

fitness objectives. Rather, they achieve prompt emotional relief and attention restoration through low-intensity activities such as brief stays and sitting. For example, one resident remarked, “I don’t have to do anything. Just sitting under the tree and listening to the wind for a while will clear my mind and ease my heart” (R13). This form of “non-purposeful stay” underscores the importance of natural soundscapes and shaded spaces in reducing emotional stress. For individuals who experience nighttime sleep disturbances, nearby green space also provides a setting for physical and mental restoration. “When I can’t fall asleep at night, I’ll go downstairs for a walk. After coming back and taking a shower, I feel completely relaxed” (R17). This account suggests that brief nocturnal walks and a change of environment can interrupt prolonged stress and facilitate the recovery of physical relaxation.

The restorative effects of neighborhood green spaces are not singular, intense events but recurring “micro-restorations” that take place in daily life. Through repeated daily experiences, these micro-restorations accumulate and evolve into a more enduring sense of physical and mental well-being, which in turn fosters the development of place attachment.

Place attachment

Place attachment, a stable psychological bond between an individual and a specific location, typically comprises two components: place dependence and place identity. Place dependence highlights the place’s perceived “irreplaceability” for accomplishing daily goals, whereas place identity captures the individual’s internalization of the place’s meaning as part of the self-concept and emotional life. This internalization is further linked to higher subjective well-being (Williams and Vaske 2003; Lewicka 2011).

Residents of older neighborhoods routinely use nearby green spaces for exercise, short rest breaks, social companionship and care, and emotional regulation. Over time, these repeated behaviors engender a functional dependence on these green areas. One resident captured this reliance: “It’s too far to go to other parks. I can reach this one just by going downstairs. I walk a couple of laps and sit for a while. I rely on it for my daily activities” (R04), underscoring how proximity and ease of access make the neighborhood green space the preferred or sometimes sole option for everyday needs.

Several residents noted that the green space has become part of their default routes for family outings and caregiving: “When there are guests at home or I’m with my kids, my first instinct is to come here. It’s convenient and the least hassle” (R06). Familiar routes, fixed stopping points, and repeated daily experiences gradually coalesce into place identity as “an integral part of life.” As one resident observed, “You may not feel anything special about some places after one or two visits, but here you see it every day, and it slowly becomes like a part of your neighborhood” (R12). In this way, neighborhood green spaces shift from mere public amenities to emotionally resonant places that embody memories and a sense of security, forming a crucial foundation for the sustained accumulation of well-being.

Place attachment does not form instantaneously; rather, it deepens progressively through a recurring cycle of “Place dependence Place identity” (Scannell and Gifford 2010). As residents experience relaxation and restoration in green spaces, they tend to return more frequently, actively uphold norms of use, and reinforce their responsibility and sense of belonging through the daily rules they collectively follow, thereby further consolidating their place identity (X. Xie and Wang 2024). For example, several residents explicitly associated emotional recovery with pro-environmental behavior. One participant observed, “When I’m upset, coming here can soothe my emotions. So I also remind others not to litter. If the environment gets worse, no one can benefit from it” (R14).

Discussion

Linking findings to existing literature

Previous studies have generally reported a positive association between urban green spaces and subjective well-being. However, these investigations have predominantly focused on large urban parks or on aggregate measures of green quantity (Wolch, Byrne, and Newell 2014; Poortinga et al. 2024). This study supports the prior contention that “environmental experience is the key channel for the transformation of subjective well-being” and extends it by showing that, within older neighborhoods, perceived attributes accessibility and connectivity, safety and order, and cleanliness and maintenance serve as structural prerequisites for residents’ outings and time spent outdoors and directly influence their residential comfort and sense of security (H. Li et al. 2023; Wang et al. 2025). Leisure

activities such as walking for exercise or pausing to enjoy the scenery not only offer recurring opportunities for psychological restoration but also foster the accumulation of social support via neighborhood interactions and weak-tie relationships, aligning with research that highlights the central role of social connections in well-being (Zahnaw 2024; Xian et al. 2024).

Methodologically, this study advances prior work by shifting attention from external policy assessments to residents' own discourses. Using grounded theory, we show how neighborhood green spaces are linked to emotional transformation via generative logic, thereby addressing the gap in understanding how green spaces in older neighborhoods affect subjective well-being. Theoretically, this study further integrates "green space perception and recreational activities (S) psychological restoration and place attachment (O) subjective well-being (R)" within the SOR framework, embedding restorative theory and the place-attachment pathway in the context of green-space renewal in older neighborhoods. This integration supplements existing research on process mechanisms and boundary conditions.

Contextual implications for older neighborhoods in Zhaoqing City

In Zhaoqing City's older neighborhoods, practical constraints population aging, limited space, and deteriorating infrastructure drive residents' perceptions of green space toward a pronounced emphasis on "daily availability." Therefore, renewal strategies for green space in older neighborhoods should prioritize low-cost, high-impact interventions alongside consistent day-to-day operations and maintenance to improve accessibility and usability. Such measures allow these spaces to reliably support leisure activities and social interaction, thereby enhancing residents' subjective well-being. This study advances the discourse on the relationship between "green spaces in older neighborhoods and subjective well-being" by moving beyond correlation to propose an interpretable generative mechanism. It also offers a renovation strategy for renewing older neighborhoods that emphasizes "detailed improvement operation and maintenance."

Limitations and future research

This study examines two older neighborhoods in Zhaoqing City as case examples, offering a

plausible mechanistic explanation. Nevertheless, the scope is limited with respect to city and neighborhood types, and the generalizability of the findings remains to be tested with additional cases. Future research should undertake comparative studies of older neighborhoods across diverse cities and neighborhood typologies to delineate the boundary conditions and identify differentiated pathways of the proposed mechanism. Alternatively, a mixed-methods approach could be employed: supplementing observations with questionnaires and structural equation models to test causal pathways and thereby construct a more complete evidentiary chain of "space behavior experience well-being." This strategy would both strengthen the generalizability of the findings and increase their practical utility for planning.

Conclusions

Residents of older neighborhoods primarily evaluate green spaces in terms of "daily availability." Residents evaluate neighborhood green spaces primarily by their capacity to integrate reliably into daily life. Key considerations include accessibility and connectivity, safety and public order, cleanliness and upkeep, and whether amenities meet routine needs particularly for the elderly and children.

Use of green spaces in residential neighborhoods follows a life-embedded pattern characterized by "high frequency, fragmentation, and accumulability." Unlike urban parks, green spaces in older neighborhoods are woven into everyday routines grocery trips, after-dinner walks, childcare, and brief rests producing a usage regime of "short-term recovery and long-term companionship." Daily experiences and social support accrue through low-threshold neighborhood interactions. Consequently, neighborhood green spaces function as fundamental public resources within residents' living circles, deriving their value from a reusable, daily provision rather than from one-time consumption.

Subjective well-being is not produced "automatically" by green space. Rather, it emerges progressively along a sequence of stages perceptual support, practical embedding, recovery accumulation, and attachment generation and is strongly constrained by

contextual conditions. When green spaces are consistently perceived as convenient and reliable, residents establish stable patterns of visitation and duration of use. Repeated use fosters psychological restoration emotional soothing and stress reduction which, over time, accumulates into place dependence and place identity. As a result, well-being benefits become embedded and stabilized in daily life. However, this trajectory is highly sensitive to factors such as lighting, circulation, maintenance, and facility adaptation; failure in any one element can disrupt the accumulation of restoration and attachment, preventing neighborhood green spaces from evolving into places that consistently foster subjective well-being.

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Author(s) contribution

Zhang Yana contributed to the research concepts preparation, methodologies, investigations, data analysis, visualization, articles drafting and revisions.

Azizan Marzuki contribute to the research concepts preparation and literature reviews,

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