



Effects of Therapeutic Quality of the Recreational Belt Around Metropolis on Perceived Health Benefits: A Case Study of Hangzhou Xixi Wetland Park

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Abstract: To explore the internal mechanism among the therapeutic quality of Recreational Belt Around Metropolis (ReBAM), tourist satisfaction and perceived health benefits, this study takes Hangzhou Xixi National Wetland Park as the research case, constructs a theoretical model of Recreational Belt Around Metropolis (ReBAM) therapeutic quality-satisfaction-perceived health benefits, and conducts empirical analysis by adopting the structural equation model.

The results indicate that: (1) Among the dimensional attributes of ReBAM therapeutic quality, only the built attribute exerts a significant positive effect on tourist satisfaction, while the effects of natural, social and symbolic attributes are insignificant; (2) Tourist satisfaction has a significant positive effect on perceived health benefits; (3) The natural attribute presents a significant direct positive impact on perceived health benefits, whereas the direct effects of built, social and symbolic attributes are not statistically significant; (4) Satisfaction plays a significant mediating role only between the built attribute and perceived health benefits.

Based on the above conclusions, practical implications are proposed from four aspects: optimizing the built environment, highlighting the natural therapeutic value, improving the comprehensive recreational experience, and perfecting the transmission mechanism. This study aims to provide theoretical basis and practical references for the healthy development and quality improvement of ReBAM.

Keywords: Therapeutic Quality of the Recreational Belt Around Metropolis, Tourist Satisfaction, Perceived Health Benefits, Xixi National Wetland Park

Against the backdrop of rapid urbanization in China, accelerated life rhythms and mounting environmental stress has led to a growing prevalence of physical and mental health issues. In this context, suburban recreational spaces endowed with rich ecological and leisure functions have become vital venues for urban residents to alleviate stress and achieve physical and mental recovery (Huang et al., 2020). Meanwhile, urban recreational demand has gradually shifted from downtown areas to suburban outskirts, forming a peripheral recreational belt known as the Recreational Belt Around Metropolis (ReBAM). This ring-city spatial pattern offers convenient transportation and primarily satisfies the short-term leisure and vacation needs of urban residents (Wu, 2001). Prior research has verified that intimate contact with recreational environments can effectively restore people's physical and mental well-being. Perceived health benefits, defined as visitors' subjective feelings of fatigue relief, emotional stability, and vitality recovery gained from outdoor recreational activities, have become a core indicator of ReBAM functional value (Liu et al., 2018).

The existing literature primarily focuses on the health effects of single recreational spaces, such as forest parks and urban greenways, examining the roles of recreation motivation, environmental features, and place attachment (He & Jin, 2023; Zeng et al., 2019). Nevertheless, few studies have systematically examined the influencing paths and mediating mechanisms of ReBAM's four-dimensional therapeutic attributes on visitors' health perception. Diversified healing experiences obtained in ReBAM significantly affect tourists' perceived health gains. On this basis, this study constructs a theoretical structural model based on health perception theories, selecting Hangzhou Xixi Wetland as the typical research case. This paper intends to explore the influencing mechanism of ReBAM therapeutic quality and tourist satisfaction on perceived health benefits, so as to provide empirical support for the therapeutic optimization of suburban recreational spaces and offer practical references for the implementation of the Healthy China Strategy.

2.1 Therapeutic Quality of the Recreational Belt Around Metropolis

The Recreational Belt Around Metropolis represents a unique form of urban spatial morphology. Relevant domestic research in China originated from the conceptual proposition put forward by Professor Wu Bihu in 2001. Since then, academic discussions have mainly focused on the spatial pattern of urban residents' leisure and tourism activities in suburban areas as well as the development of regional leisure tourism, and the concept of "recreational belt around metropolis" has also been introduced. As an essential component of urban green open space, ReBAM primarily serves the short-distance and short-term leisure and tourism demands of urban residents, acting as a core carrier for people to get close to nature, relieve pressure, and achieve physical and mental restoration (Yupei & Honghu, 2023).



The therapeutic quality of ReBAM aims to promote individual physical and mental health by mediating the interaction among restorative landscapes, physical spatial environments, and behavioral spatial environments (Yating et al., 2023). The therapeutic quality of ReBAM is formed through the synergistic integration and organic coupling of four major environmental attributes: natural, built, social, and symbolic (Yupei & Honghu, 2023). The natural attribute centers on landscape elements such as mountains, waters, and vegetation to provide sensory pleasure and psychological relief. The built attribute relies on complete supporting facilities, convenient transportation, and humanized services to ensure recreational comfort. The social attribute facilitates interpersonal interaction and enriches connotations of healing through social spaces and recreational activities. The symbolic attribute endows the space with cultural heritage and spiritual value to satisfy people's spiritual sustenance. The four attributes are indispensable to one another (Yafei et al., 2022).

Scholars such as Dang Ning (2025) pointed out that urban residents participate in short-distance and high-frequency recreational activities within ReBAM. The space provides heterogeneous experiences, and therapeutic value is generated in the interaction between humans and places. These attributes act on recreational users, enabling them to feel relaxed, comfortable, and secure, gain a sense of inclusion and belonging, perceive the meaning of life and spiritual pleasure, and accomplish self-cultivation. Ultimately, visitors can acquire perceived health benefits at the physiological, psychological, and spiritual levels.

2.2 Satisfaction

In the recreational context, there exists a close and interactive relationship between tourists and recreational destinations. Numerous scholars have interpreted tourist satisfaction profoundly from diverse dimensions. Pizam (1978) proposed that tourist satisfaction refers to the psychological outcome when tourists compare their expectations of a destination with actual visiting experiences, and the real experience meets prior expectations. Beard et al. (1980) emphasized that it represents the congruence between positive expectations and the perception of actual experience. Pearce and Moscardo (1985) pointed out that for cross-cultural tourists, the formation of satisfaction is closely related to the degree of compatibility with the host community's value system. Ma Jun (2007) argued that the higher the degree of tourists' integration into the tourism environment, the higher their satisfaction level.

In specific recreational scenarios, Huang Jing (2025) conducted a study on visitors in forest parks. The results revealed that satisfaction with recreational facilities reflects the extent to which various park facilities meet visitors' practical needs. It covers basic leisure facilities such as pedestrian paths and rest pavilions, as well as cultural and entertainment facilities, including cultural exhibition halls and themed recreational projects. The rationality of facility layout, the completeness of functions, and the comfort of use all exert a direct impact on visitors' overall recreational experience in the park.

2.3 Perceived Health Benefits

As a core construct in the field of behavioral health, the connotation of perceived health benefits is rooted in the Health Belief Model (HBM). It refers to individuals' subjective beliefs about the health gains brought by specific behaviors or interventions. Such subjective cognition directly affects individuals' health decision-making, behavioral adoption, and acceptance of interventions, serving as a crucial antecedent driving health-related behaviors (Subedi et al., 2023).

The Health Belief Model clarifies the driving mechanism of the five core dimensions of health behaviors. As a core element sustaining individuals' willingness and motivation to engage in healthy behaviors, perceived health benefits run through the whole process of health behavioral decision-making, highlighting its fundamental theoretical value (Zhang et al., 2023).

In international academic research, studies in different regions show distinct thematic preferences and characteristics. Centering on nature contact, Western academic circles, mainly taking Nordic countries as research settings, focus on the correlation between nature exposure and individual perceived susceptibility. Taking urban forests and other natural spaces as carriers, scholars explore the intervention effect of natural recreation on specific health problems. A number of studies have verified that nature-based activities can facilitate stress recovery and physical and mental well-being, confirming the positive enabling effect of nature contact on perceived health benefits (Jiricka-Pürrier et al., 2019; Memari et al., 2021).

In sharp contrast to the nature-oriented Western research, domestic studies attach importance to exploring the cultural uniqueness of behavioral cues and forming a distinctive research paradigm that integrates behavioral clues with traditional Chinese culture. For instance, some studies carry out suburban farming experiences based on traditional solar terms. Such activities not only enhance the public's subjective perception of health gains and strengthen perceived health benefits, but also promote the interactive development of cultural identity and health perception, forming a research path with both cultural inheritance and health promotion values (Kwok et al., 2019; Lin et al., 2025).

3.1 Therapeutic Quality of ReBAM and Satisfaction

Numerous scholars have conducted multi-faceted research on the ReBAM. As a special form of urban spatial morphology, ReBAM is widely recognized due to its core function of satisfying urban residents' demand for short-distance leisure and tourism (Wu, 2001).

Existing studies have confirmed that the therapeutic quality of ReBAM is synergistically composed of four major attributes: natural, built, social, and symbolic (Yupei&Honghu,2023). Such therapeutic quality can promote individuals' physical and mental well-being, enable recreational users to obtain physiological, psychological, and spiritual health benefits, and further enhance tourist satisfaction (Dang et al., 2025).

Based on the above analysis, the following hypotheses are proposed:

H1a: The natural attribute has a significant positive effect on tourist satisfaction.

H1b: The built attribute has a significant positive effect on tourist satisfaction.

H1c: The social attribute has a significant positive effect on tourist satisfaction.

H1d: The symbolic attribute has a significant positive effect on tourist satisfaction.

3.2 Satisfaction and Perceived Health Benefits

In the outdoor recreational context, there is a close correlation between tourists' subjective evaluation of recreational experience and their perceived health gains. Tourists usually visit recreational spaces driven by diverse motives such as getting close to nature, relieving stress, relaxing body and mind, and pursuing leisure and wellness.

Existing studies have verified that recreation satisfaction serves as a core indicator for measuring the quality of recreational experience. Huang Jing (2025) further pointed out in a study on forest park visitors that recreational users' satisfaction with facilities mainly depends on the degree to which site facilities, environmental services, and other elements match and satisfy their actual recreational needs. A favorable recreational experience and satisfactory site perception can effectively strengthen tourists' positive cognition in physical relief, psychological adjustment, emotional healing, and other aspects. Accordingly, the following research hypothesis is proposed:

H2: Tourist satisfaction has a significant positive effect on perceived health benefits.

3.3 Therapeutic Quality of ReBAM and Perceived Health Benefits

In current relevant research, the ReBAM has become a research focus. It possesses prominent therapeutic quality, which is collaboratively shaped by four attributes: natural, built, social, and symbolic. As individuals' subjective cognition of health gains, perceived health benefits are influenced by the Health Belief Model, playing a vital role in tourists' experience and behavioral decision-making.

Against this backdrop, scholars have suggested integrating natural healing with cultural experience (Lin et al., 2025), which provides a new perspective for the development of ReBAM. Notably, the therapeutic quality of ReBAM is closely linked to tourists' perceived health benefits. A favorable therapeutic environment can enhance perceived health benefits and further affect tourists' satisfaction and behavioral choices.

Based on the above analysis, the research puts forward the following hypotheses:

H3a: The natural attribute has a significant positive effect on perceived health benefits.

H3b: The built attribute has a significant positive effect on perceived health benefits.

H3c: The social attribute has a significant positive effect on perceived health benefits.

H3d: The symbolic attribute has a significant positive effect on perceived health benefits.

H4a: Natural attribute exerts a positive effect on perceived health benefits through the mediating role of satisfaction.

H4b: Built attribute exerts a positive effect on perceived health benefits through the mediating role of satisfaction.

H4c: Social attribute exerts a positive effect on perceived health benefits through the mediating role of satisfaction.

H4d: Symbolic attribute exerts a positive effect on perceived health benefits through the mediating role of satisfaction;

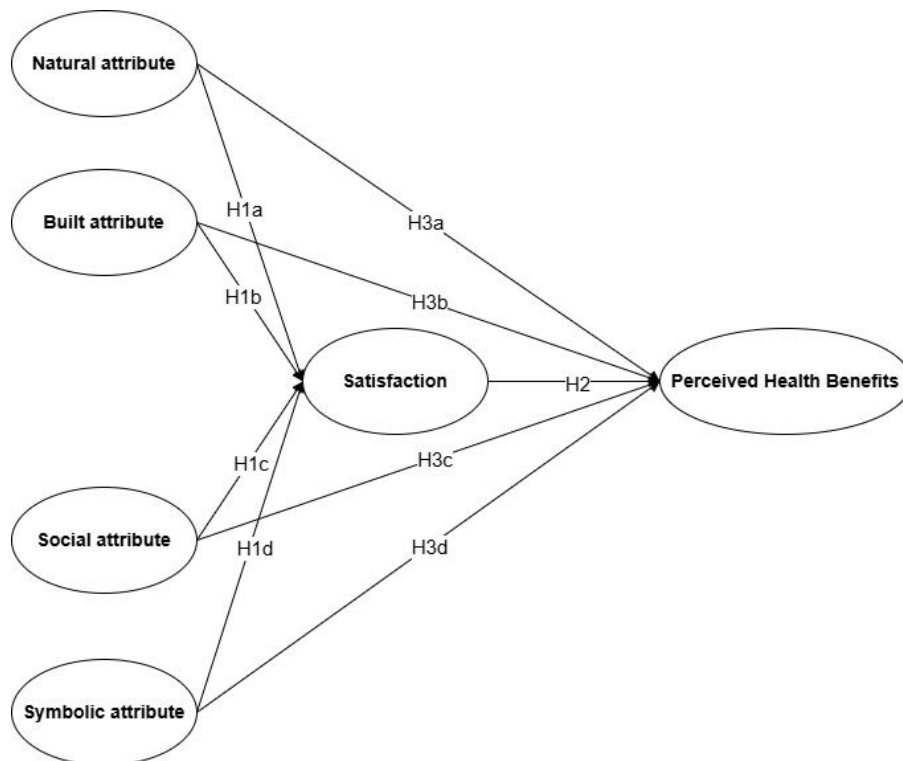


Figure 1: Conceptual Research Model

4.1 Overview of the Study Area

Xixi Wetland is located in the western part of Hangzhou, at the junction of Xihu District and Yuhang District. It lies within the urban ecological corridor, approximately 6 kilometers from Wulin Gate and 5 kilometers from the West Lake. As a typical suburban area of Hangzhou, its geographical location and spatial characteristics highly conform to the definition of the Recreational Belt Around Metropolis. Covering an area of about 11.5 square kilometers, Xixi Wetland is

China's first national urban and cultural wetland park and serves as a benchmark suburban recreational destination in Hangzhou.

In terms of natural endowment, Xixi Wetland features crisscrossing water networks and luxuriant vegetation, with more than 900 plant species and over 200 bird species. The concentration of negative oxygen ions remains at a high level all year round, forming an excellent natural healing environment. In terms of the built environment, the wetland is equipped with complete slow greenways, waterside plank roads, standardized guidance systems, and convenient service facilities, which can well meet tourists' daily leisure needs. From the symbolic perspective, it carries the profound regional culture of Jiangnan water towns, enabling visitors to gain cultural resonance and spiritual comfort during recreation. Socially, Xixi Wetland adopts the model of ecological protection combined with public opening, and has become an important leisure and wellness space for citizens of all ages and occupations. It received over 6.6 million visitors in 2025, with diversified tourist groups and sufficient sample representativeness.

Given its typical suburban location, complete four-dimensional therapeutic attributes, stable passenger flow, and diversified tourist structure, Xixi Wetland is highly suitable as the research case for exploring the relationship between ReBAM therapeutic quality and visitors' perceived health benefits.

4.2 Questionnaire Design and Data Collection

This study targeted tourists of Hangzhou Xixi Wetland within the ReBAM. Considering seasonal and passenger flow differences, data collection was carried out from June 2025 to March 2026 via both offline and online channels.

The questionnaire was developed based on a literature review and pre-survey according to the local resource characteristics and recreational experience of Xixi Wetland. It contains five sections. The first section collects basic demographic information such as gender, age, and education. The second section is a 12-item therapeutic quality scale covering natural, built, social, and symbolic attributes (Dang et al., 2025). The third section adopts four indicators to measure tourist satisfaction, namely experience enjoyment, destination worthiness, emotional preference, and overall satisfaction (Liu et al., 2022; Han, 2015). The fourth section employs a mature perceived health benefits scale developed by Peschardt & Stigsdotter (2013), including fatigue relief, vitality recovery, emotional stability, and concentration improvement, to evaluate tourists' physical and mental gains from wetland recreation. All scale items use a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

This research strictly abided by academic ethical standards. All participants were fully informed of the research purpose, usage, and confidentiality rules and participated voluntarily. Stratified random sampling combined with convenience sampling was applied. Surveys were conducted at main entrances, greenways, and core scenic spots across weekdays, weekends, and holidays. The offline-online distribution ratio was 65% to 35%. Offline questionnaires were delivered face-to-face, while online versions were released via tourism platforms and communities, specifically targeting respondents who had previous visiting experience of Xixi Wetland.

Strict sample inclusion and exclusion criteria were formulated. Eligible participants were visitors who had entered the wetland and participated in recreational activities. Excluded samples included non-visitors, simple passers-by, those who completed questionnaires randomly, and those with extremely short response times. A three-step screening process was implemented, including on-site preliminary confirmation, formal completion, and post-collection screening to remove patterned, identical, and largely missing responses. In total, 428 questionnaires were distributed, yielding 364 valid samples with an effective rate of 85.04%.

5.1 Demographic Characteristics

Variable Category	Item	Frequency	Percentage(%)
Gender	Male	166	45.6
	Female	198	54.4
Age	Under 18	30	8.2
	18–35	130	35.7
	36–45	106	29.1
	46–60	61	16.8
	Over 60	37	10.2
Education	Primary school or below	7	1.9
	Junior high school	25	6.9
	Senior high school / Technical secondary school	92	25.3
	Junior college / Bachelor's degree	205	56.3
Visit Frequency	Master's degree or above	35	9.6
	≤1 time per week	167	45.9
	2–3 times per week	120	33.0
	4–6 times per week	58	15.9
	≥7 times per week	19	5.2

Table 1: Descriptive statistics results (N=364)

Descriptive statistical analysis was conducted on the valid research samples (Table 1). In terms of gender, male respondents accounted for 45.6% and female respondents accounted for 54.4%, showing a basically balanced gender

structure. In terms of age, the youth group aged 18–35 was the dominant group, accounting for 35.7%, followed by the middle-aged group aged 36–45 at 29.1%, while the remaining age groups were evenly distributed.

The educational level of the samples was generally high. More than half of the respondents held junior college or bachelor’s degrees, accounting for 56.3%, followed by those with senior high school or technical secondary school education at 25.3%, and the distribution of other educational levels was reasonable.

From the perspective of recreational characteristics, respondents with a recreational frequency of no more than once a week accounted for 45.9%, and those visiting 2–3 times a week accounted for 33.0%. The proportion of visitors with high weekly recreational frequency was relatively low. The overall visiting frequency conforms to the daily passenger flow pattern of the ReBAM, indicating that most tourists mainly engage in daily leisure activities in the surrounding suburban areas.

5.2 Measurement Model: Reliability, Validity, and Model Fit

Section	Measurement Item	Mean	Standard deviation	Factor Loading
Natural Attribute	Z1 Excellent air quality in Xixi Wetland	3.92	1.338	0.818
	Z2 Beautiful and ornamental water landscape	4.08	1.337	0.849
	Z3 Rich biological resources (flora & fauna)	4.01	1.341	0.838
Built Attribute	J1 Complete recreational facilities (seats, restrooms, etc.)	3.77	1.314	0.864
	J2 Diverse activity types (walking, cycling, boating, etc.)	3.89	1.322	0.847
	J3 Reasonable layout with themed activity zones	3.78	1.324	0.832
Social Attribute	S1 Friendly interpersonal atmosphere	4.03	1.334	0.884
	S2 Harmonious cultural construction	3.62	1.336	0.754
	S3 Enthusiastic staff service	4.06	1.352	0.830
Symbolic Attribute	X1 Emotional resonance during visit	4.04	1.367	0.866
	X2 Leisurely and comfortable atmosphere	4.06	1.356	0.809
	X3 Unique wetland landscape&cultural temperament	4.08	1.353	0.856
Satisfaction	M1 Enjoyable time in Xixi Wetland	3.39	1.357	0.832
	M2 Worth visiting	3.60	1.384	0.780
	M3 Affection for Xixi Wetland	3.59	1.374	0.798
	M4 Overall satisfactory experience	3.45	1.356	0.790
Perceived Health Benefits	G1 Relieve fatigue	3.85	1.381	0.752
	G2 Restore vitality	3.61	1.393	0.772
	G3 Stabilize emotions	3.64	1.391	0.747
	G4 Improve concentration	3.52	1.382	0.764

Table 2: Results of reliability and validity tests

Table 2 presents the descriptive statistics and factor loadings of all measurement items. All partial least squares (PLS) factor loadings are greater than 0.700. As shown in Table 3, the Cronbach's α coefficients of the six latent variables range from 0.754 to 0.814, and the composite reliability (CR) values vary between 0.755 and 0.833. All indicators exceed the threshold value of 0.7, and the average variance extracted (AVE) of each latent variable is higher than 0.5, indicating satisfactory reliability and validity of the scale.

The HTMT values among all latent variables range from 0.215 to 0.754, all of which are lower than the critical value of 0.85. Meanwhile, the square root of the AVE for each latent variable is greater than its correlation coefficient with other latent variables, which meets the criterion for discriminant validity.

	Cronbach's Alpha	CR	AVE	Fornell-Larcker Criterion						Heterotrait-Monotrait Ratio							
				G	J	M	S	X	Z	G	J	M	S	X	Z		
Perceived Health Benefits (G)	0.754	0.783	0.697	0.75													
Built Attribute (J)	0.804	0.804	0.714	0.32	0.84												
Satisfaction (M)	0.814	0.814	0.714	0.34	0.34	0.8											
Social Attribute (S)	0.763	0.763	0.64	0.25	0.58	0.26	0.82										

Symbolic Attribute (X)	0.803	0.78	0.67	0.22	0.50	0.18	0.05	0.84	0.27	0.64	0.21	0.68		
Natural Attribute (Z)	0.783	0.75	0.57	0.33	0.59	0.25	0.58	0.49	0.83	0.42	0.75	0.31	0.75	0.63

Table 3: Reliability, construct validity, and correlation

5.3 Path Coefficient Analysis

	Original Sample (β)	t-statistic	p-value	Hypothesis Testing Result
H1a: Natural Attribute \rightarrow Satisfaction	0.046	0.606	0.544	Not Supported
H1b: Built Attribute \rightarrow Satisfaction	0.268	3.586	0.001	Supported
H1c: Social Attribute \rightarrow Satisfaction	0.095	1.185	0.236	Not Supported
H1d: Symbolic Attribute \rightarrow Satisfaction	-0.021	0.305	0.761	Not Supported
H2: Satisfaction \rightarrow Perceived Health Benefits	0.253	4.871	0.001	Supported
H3a: Natural Attribute \rightarrow Perceived Health Benefits	0.188	2.409	0.016	Supported
H3b: Built Attribute \rightarrow Perceived Health Benefits	0.117	1.591	0.112	Not Supported
H3c: Social Attribute \rightarrow Perceived Health Benefits	-0.003	0.037	0.97	Not Supported
H3d: Symbolic Attribute \rightarrow Perceived Health Benefits	0.023	0.369	0.712	Not Supported

Table 4: Hypothesis testing results

This study adopted the Bootstrap method with 5000 resamples to test the significance of path coefficients in the structural model. The results indicate that:

First, the built attribute has a significant positive effect on tourist satisfaction ($\beta=0.268$, $p<0.001$), which supports Hypothesis H1b. By contrast, the effects of the natural attribute ($\beta=0.046$, $p=0.544$), social attribute ($\beta=0.095$, $p=0.236$), and symbolic attribute ($\beta=-0.021$, $p=0.761$) on tourist satisfaction are all insignificant, and thus Hypotheses H1a, H1c, and H1d are not supported.

Second, tourist satisfaction exerts a significant positive influence on perceived health benefits ($\beta=0.253$, $p<0.001$), which supports Hypothesis H2.

Third, the natural attribute has a significant positive effect on perceived health benefits ($\beta=0.188$, $p=0.016$), verifying Hypothesis H3a. The impacts of the built attribute ($\beta=0.117$, $p=0.112$), social attribute ($\beta=-0.003$, $p=0.970$), and symbolic attribute ($\beta=0.023$, $p=0.712$) on perceived health benefits are statistically insignificant, so Hypotheses H3b, H3c and H3d are rejected.

5.4 Mediating Effect Test

Mediation Path	Original Sample (β)	Standard Deviation (STDEV)	t-statistic	p-value	Hypothesis Testing Result
H4a: Natural Attribute \rightarrow Satisfaction \rightarrow Perceived Health Benefits	0.012	0.020	0.581	0.561	Not Supported
H4b: Built Attribute \rightarrow Satisfaction \rightarrow Perceived Health Benefits	0.068	0.023	2.994	0.003	Supported
H4c: Social Attribute \rightarrow Satisfaction \rightarrow Perceived Health Benefits	0.024	0.022	1.110	0.267	Not Supported

H4d: Symbolic Attribute → Satisfaction → Perceived Health Benefits	-0.005	0.018	0.296	0.767	Not Supported
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Table 5: Results of the mediation effect test

The mediation effect results (Table 5) show that the mediating path from the built attribute to perceived health benefits via satisfaction perception is significantly positive ($\beta=0.068$, $p=0.003$), which supports Hypothesis H4b. The mediating paths of the natural attribute ($\beta=0.012$, $p=0.561$), social attribute ($\beta=0.024$, $p=0.267$), and symbolic attribute ($\beta=-0.005$, $p=0.767$) through satisfaction perception all fail to pass the significance test; hence, Hypotheses H4a, H4c, and H4d are not supported.

Based on the direct effects in Figure 2 and the indirect effects in Table 6, within the influencing mechanism of ReBAM therapeutic quality on recreational users' perceived health benefits, satisfaction perception fully mediates the relationship between the built attribute and perceived health benefits. The built attribute can not only directly enhance visitors' perceived health benefits, but also exert an indirect positive effect by improving tourist satisfaction, forming an intact and significant transmission pathway. This finding is highly consistent with the core characteristics of ReBAM, including suburban leisure orientation, high reliance on supporting facilities, and short-distance and high-frequency recreational trips.

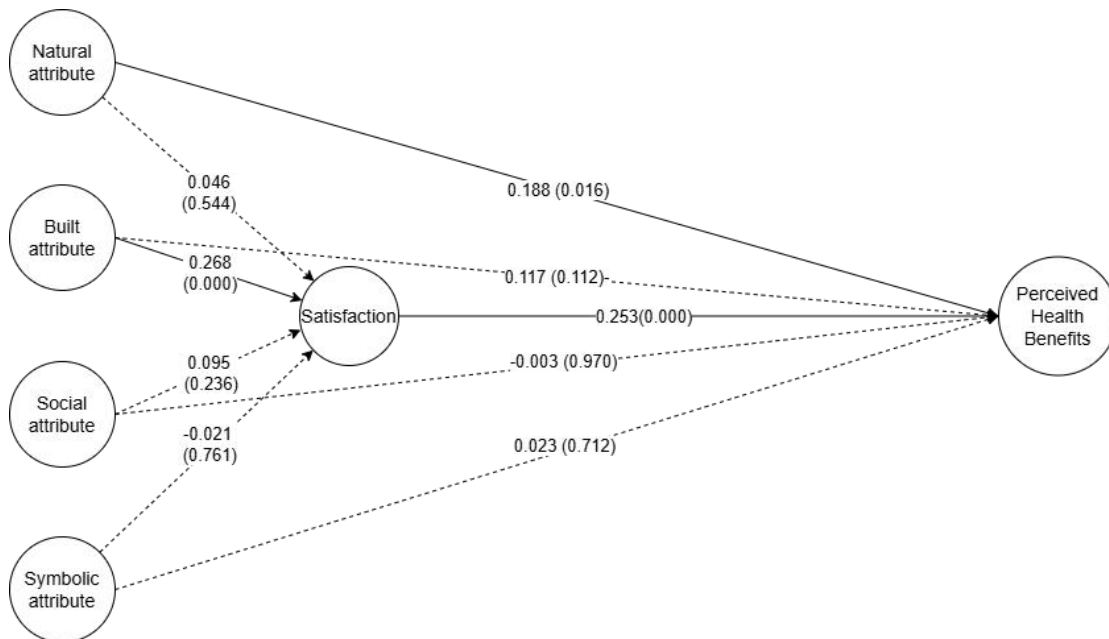


Figure 2: Structural Equation Model (SEM) Hypothesis Testing Results

Note: Solid lines represent statistically significant paths, while dashed lines indicate insignificant paths. Numbers outside parentheses are standardized path coefficients, and values in parentheses represent p-values.

6.1 Research Conclusions

6.1.1 The Impact of ReBAM Therapeutic Quality on Satisfaction

The research results show that the built attribute has a significant positive effect on tourist satisfaction, while the other three dimensions—natural attribute, social attribute, and symbolic attribute—have no significant impact on satisfaction.

First, the improved supporting facilities and reasonable spatial layout in the built environment provide a comfortable and convenient recreational environment for visitors, directly enhancing their travel pleasure and experience evaluation. This result is consistent with the research conclusions of scholars such as Li Jiangmin (2011) and also aligns with Wen Lifang's (2024) findings on the impact of tourism experience scenarios on tourist satisfaction. It confirms that in the ReBAM context, improved hardware supporting facilities are the core means to enhance tourist satisfaction.

Second, the natural attributes show no significant influence on satisfaction, which aligns with the findings of Wen (2024). A plausible explanation is that natural landscapes in suburban recreational spaces have become a basic tourist expectation and are often taken for granted, thus failing to generate differentiated satisfaction perceptions. By comparison, research on remote national parks has confirmed that natural attributes positively and significantly affect satisfaction (Digun-Aweto et al., 2019). Such differences can be attributed to the fact that remote natural destinations regard ecological scenery as their core attraction, making tourists more sensitive to and reliant on natural environmental quality. In the context of the ReBAM in this study, however, the natural environment only functions as a routine background feature, which consequently exerts no significant impact on satisfaction.

Third, the social attribute shows no significant impact on satisfaction, which is consistent with the research conclusion of Hu Wuxian et al. (2020) on suburban ecological recreational spaces. This may be due to the fact that ReBAM recreation is mainly short-distance leisure, small-group or solo travel, and tourists pay low attention to social attributes such as interpersonal interaction and service atmosphere, thus failing to exert a significant effect on satisfaction.

Finally, this study also finds that the symbolic attribute has no significant impact on satisfaction, which is inconsistent with previous results (Zhao Lili & Wang Hongyu, 2025). This may be because in the suburban ReBAM scenario, symbolic attributes such as place culture and spiritual value are not easily perceived intuitively. Tourists mainly aim at relaxation and leisure, with short stay time and vague perception, so it is difficult to have a significant impact on satisfaction.

6.1.2 The Impact of Satisfaction on Perceived Health Benefits

The research results indicate that tourist satisfaction has a significant positive effect on perceived health benefits. This result is consistent with the research conclusions of Zeng Zhen et al. (2019) and He Junjie (2025). It shows that the more positive the visitors' evaluation of ReBAM and the higher their satisfaction, the stronger the perceived health benefits, such as fatigue relief, emotional stability, and energy recovery.

High tourist satisfaction means that the recreational experience quality and service supply of ReBAM can better meet the core needs of tourists for leisure, relaxation, and getting close to nature. Such a high-quality experience can effectively strengthen tourists' subjective cognition of various health gains brought by recreational activities, thereby improving their level of perceived health benefits.

This correlation essentially reflects the accurate matching between recreational experience quality and tourists' health needs. When tourists' experience needs in ReBAM are fully met and high satisfaction is formed, their perception of the health value of recreational activities will be more acute. This further confirms the rationality and reliability of the research results and echoes the conclusions of existing relevant studies.

6.1.3 The Impact of ReBAM Therapeutic Quality on Perceived Health Benefits

This study finds that the natural attribute exerts a significant positive effect on perceived health benefits, whereas the built, social, and symbolic attributes show no significant direct influence. The results indicate that natural environmental elements within the ReBAM serve as the direct driving factor of visitors' perceived health benefits. Through nature contact and sensory stimulation, natural attributes directly facilitate emotional relief and stress reduction.

In contrast, the effects of built, social, and symbolic attributes on health benefits are not dominated by direct paths; their influences need to be transmitted through other pathways or the synergistic effect of multiple elements. The insignificant direct effects can be mainly explained as follows: the built attribute primarily affects experiential convenience rather than bringing direct physical and mental recovery; the social attribute attracts limited attention in short-distance leisure activities and thus hardly exerts a direct impact on health perception; the symbolic attribute is relatively abstract and weakly perceived by tourists, making it unable to significantly influence perceived health benefits directly.

6.1.4 Mediating Effect of Satisfaction

The mediating effect test reveals that satisfaction plays a full mediating role between the built attribute of ReBAM therapeutic quality and perceived health benefits. Centering on complete facilities, accessible spatial layout, and comfortable services, the built attribute mainly affects tourists' recreational convenience and experiential comfort. Such hardware conditions cannot directly lead to physical and mental recovery; instead, they first improve tourist satisfaction, and then are indirectly transformed into perceived health benefits through positive emotional evaluation. Accordingly, satisfaction exerts a full mediating effect.

By contrast, the mediating paths of the natural, social, and symbolic attributes are all insignificant, which is consistent with partial findings of Liu Qiaohui et al. (2023). The insignificant mediation can be explained as follows: the influence of natural attributes on perceived health benefits is usually direct and immediate. When tourists stay in a pleasant natural environment with fresh air and beautiful scenery, they can rapidly gain physical and mental pleasure and relaxation. Such health perception can be acquired directly without being mediated by satisfaction.

In terms of social attributes, social interaction in ReBAM, such as traveling with family and friends or making new acquaintances, brings emotional satisfaction and social support, which directly and strongly drive perceived health benefits. This weakens the mediating function of satisfaction. As for symbolic attributes, they are closely related to tourists' abstract cognition of the cultural connotation and identity symbolism of ReBAM. The influence of such cognition on health benefits is complicated and subtle, which can hardly be effectively mediated and reflected by satisfaction, a relatively direct and superficial indicator.

6.2 Practical Implications

6.2.1 Optimize Built Attributes to Improve Tourist Satisfaction

Built attribute is the only significant dimension affecting tourist satisfaction in Xixi Wetland. Scenic managers can carry out targeted optimization from three aspects. First, upgrade infrastructure by renovating aging greenways and slow-traffic pavements, renewing unclear and unreasonably arranged guide signs, and adding multilingual guidance as well as accessibility prompts to ensure clear navigation and convenient travel. Second, improve service facilities and safety guarantees by supplementing rest seats, drinking water stations, and restrooms, strengthening guardrails and anti-slip pavements near water areas, and optimizing accessibility services for special groups. Third, enhance tour organization through digital passenger flow monitoring and intelligent diversion, adopt one-way circular and water-land combined touring routes, and optimize parking lots and connecting transportation to improve visiting efficiency and spatial comfort.

6.2.2 Strengthen Natural Attributes to Realize Its Direct Driving Effect on Perceived Health Benefits

Adhering to the principle of ecological priority, Xixi Wetland should maintain its ecological background and original landscape to create immersive natural healing scenarios, so as to realize the coordinated release of ecological and health values. On the one hand, strengthen water environment management and biodiversity conservation, and adopt ecological monitoring networks to consolidate the foundation of ecological healing. On the other hand, build characteristic healing spaces by setting up ecological interpretation systems and leisure nodes in core ecological areas, relying on a high

negative oxygen ion environment to develop light healing experience projects and maximize the health benefits of natural surroundings.

6.2.3 Give Full Play to the Mediating Effect of Satisfaction between Built Attributes and Perceived Health Benefits

Satisfaction plays a critical mediating role between built attributes and perceived health benefits, forming a stable logical transmission path. Accordingly, scenic areas should improve tourist satisfaction by optimizing the built environment, giving full play to the bridging function of satisfaction, and promoting tourists' positive emotional experience to be transformed into physical and mental recovery, stress relief, and energy enhancement, to realize the effective conversion from recreational environment perception to health benefits.

6.3 Research Limitations and Future Prospects

Taking Hangzhou Xixi Wetland as the case site, this study empirically examines the transmission mechanism among ReBAM therapeutic quality, satisfaction, and perceived health benefits, while several limitations remain.

First, the research adopts a single case with a relatively homogeneous sample structure, mainly covering local short-distance tourists but lacking diverse groups and other types of recreational spaces, which weakens the generalizability of the conclusions. Future research can expand the research scope, conduct comparative analysis of multi-region and multi-case samples, and optimize sample structure to improve applicability.

Second, the theoretical model only adopts satisfaction as the mediating variable without introducing moderating variables, making it difficult to fully interpret the complex influencing mechanism. Subsequent studies can incorporate recreational behavior and demographic characteristics to construct a moderated mediation model and further deepen the path explanation.

Third, this study only employs a quantitative method without qualitative support, which fails to explore tourists' healing demands and internal formation mechanisms fully. Future research can adopt mixed research methods to enhance mechanistic explanation, so as to provide more targeted theoretical support and practical strategies for the optimization of wetland healing function and the healthy development of the ReBAM.

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