

THE HOT SPRING RESORT VISITORS' ATTITUDE TOWARDS
THE ECOLOGICAL ENVIRONMENT FACTOR OF
OUTDOOR HEALING LANDSCAPE IN YUNNAN, CHINA



A THESIS SUBMITTED IN FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF PHILOSOPHIC DOCTOR PROGRAM
IN MULTIDISCIPLINARY DESIGN RESEARCH
FACULTY OF ARCHITECTURE
KING MONGKUT'S INSTITUTE OF TECHNOLOGY LADKRABANG
2024

KMITL-2024-AR-D-007-032

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Thesis	The Hot Spring Resort Visitors' Attitude Towards the Ecological Environment Factor of Outdoor Healing Landscape in Yunnan, China
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ABSTRACT

The quality of hot spring's outdoor environment has become a crucial factor in determining visitor satisfaction. Whether a hot spring resort can function well in the long term and continuously achieve the optimization of the hot spring environment depends on tourists' satisfaction with the hot spring environment. The main aim of this study was to investigate the hot spring visitors' attitudes towards the ecological environment factor, comprising of six components of the outdoor healing landscape. Data of 420 respondents were collected using a questionnaire survey at Anning Jinfang Hot Spring Resort in Yunnan Province. Results from the *t*-test and ANOVA exhibited that the operational variables of visitors' characteristics and behaviors display statistically significant relationships with six components of the ecological environment factor—hot spring water, air quality, plants and vegetation quality, topographic features, plant species diversity, and environmental cleanliness. However, this is not the case for climate comfort. Furthermore, the comparison of visitors' attitudes and satisfaction suggested that the components of hot spring water and environmental cleanliness were the two components that the Anning Jinfang Hot Spring Resort should prioritize improving.

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to many individuals who supported and helped me complete thesis successfully. Firstly, I would like to give my special thanks to Assistant Professor Amon Boontore, Ph.D., for his support as the thesis advisor. He has been a lighthouse for me, shining my academic way forward. I would like to express my gratitude for his invaluable advice, guidance, and dissertation assistance during the research process and for teaching me how to conduct in-depth research and uphold the spirit of science in my work. His patience and wisdom have enabled me to find the way forward on a complex research topic.

Secondly, the researcher would like to thank the members of the Dissertation Examination Committee, who provided many valuable suggestions and guidance to improve my dissertation. These multi-perspective comments helped the researcher refine and optimize the content of the thesis to make it more scientifically reliable. The expertise and rigor of the committee members played a vital role in the enhancement of the thesis. Thirdly, the researcher would like to thank King Mongkut's Institute of Technology Ladkrabang, especially the Faculty of Architecture for providing a quality platform for learning and conducting research. The rich resources and favorable academic atmosphere of KMITL enabled the researcher to make significant progress and apply various skills learned to my dissertation with good results.

Additionally, the researcher would like to thank seven postgraduate students at Yunnan Arts University who assisted in the data collection process. Your meticulous and responsible attitude has made distributing questionnaires to a large sample possible. Your contributions were crucial to this study and deeply appreciated by the researcher. Finally, the researcher would like to thank the administrators and staff of the Anning Jinfang Hot Spring Resort in Yunnan Province for their full support and cooperation, especially in the survey and data collection processes. Your help enabled the researcher to conduct the survey smoothly, collect rich and valuable data, and lay a solid foundation for the completion of the thesis. It is due to all the above support that the thesis has been successfully completed. Once again, I would like to express my sincere gratitude to all of you.

Gu Yongli

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Chapter 1

INTRODUCTION

1.1 Research Background and the Statement of the Problem

Soaking in the warm and mineral-rich waters of hot springs has been proven to produce various health benefits, like enhancing cardiovascular health, soothing skin conditions, improving health in general, and so on. Moreover, bathing in the hot spring water, a practice dating back thousands of years, also provides mental-soothing effects. This cultural practice has developed into one of the most popular tourism businesses, especially in the form of hot spring resorts, which have become tourist destinations that combine leisure and healing functions (Zhang, 2021; Liu et al., 2020). According to the Global Recreation Economy Observation Report (2022), jointly published by the Global Recreation Research Institute and Stanford University, there are about 35,818 natural hot springs in the world, and a total of about 33,712 hot springs in Asia. Currently, there are about 5,313 hot springs in China, which accounts for one-seventh of the global hot spring resources. Moreover, Yunnan province is home to 1,236 hot spring facilities, making up nearly one-fourth of all hot springs in the nation. The global hot spring healing industry is considered as significant worldwide; in the year 2020, the global health economy was estimated to be worth US\$ 4.4 trillion, US\$ 1.5 trillion for the Asia-Pacific region, and US\$ 682.7 billion for China. In the year 2020, (China Hot Spring Tourism Development Report, 2021) stated that there were more than 3,800 hot spring enterprises in China serving up to 388 million visitors and generating an income of RMB 43.444 billion. In 2022, there were 27,337,800 customers visiting hot springs in Yunnan; an estimated income of RMB 6,508 million was generated (China Hot Spring Tourism Development Report, 2021). These hot spring enterprises not only provide hot spring healing services but also offer pleasant outdoor landscapes to attract tourists who seek physical and mental relaxation.

Seeking to relax and restore mental and physical health affected by the fast-paced and high-stress modern life, as a unique tourist magnet, it is undeniable that the core attraction of the hot spring resorts lies in the quality of the hot spring water. Apart from effective layout planning, architectural design, and appealing building

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decoration, the outdoor landscape also plays an important role in positively improving the physical and emotional well-being of visitors (Wang & Zhang, 2016; Yang et al., 2017). The healing landscape theory emphasizes that through landscape design, it is possible to create environments that help people regain their attention and cognitive function, which is important in relieving stress and fatigue (Kaplan & Kaplan, 1989; Wilson, 1984). Furthermore, one of the key factors affecting the outdoor healing landscape is the ecological environment factor, which is intertwined among components of climate comfort, hot spring water, air quality, plant and vegetation quality, topographic features, plant species diversity, and environmental cleanliness (Ulrich, 1991). A clear understanding of the factors of the outdoor healing landscape will allow for the development of the quality of the hot spring businesses.

Most recent studies focus on pursuing the design standard for the hot spring pools regarding the area of the hot spring water quality and hygiene, therapeutic effects of the spa water, mineral composition and temperature (Gao & Zhang, 2021), harmonious design with the natural landscape, and visitors' recreational experience (Chen & Zhao, 2021; Li & Sun, 2020). Moreover, most of the current studies on the hot spring environments are based on visitors' comprehensive satisfaction, such as environmental satisfaction, service satisfaction, and product satisfaction (Li & Sun, 2020). As specific studies about the factors of the outdoor healing landscape are still scant, the main goal of this study was to investigate the hot spring resort visitors' attitude towards the ecological environment factor of the outdoor healing landscape, taking Anning Jinfang hot spring resort as our case study.

1.2 Research Objective

1) To examine the relationship between the hot spring resort visitors' characteristics and their attitudes towards the ecological environment factor of the outdoor healing landscape.

2) To explore the relationship between the hot spring resort visitors' behaviors and their attitudes towards the ecological environment factor of the outdoor healing landscape.

3) To suggest the improvement guidelines for the Anning Jinfang hot spring resort in the area of the ecological environment factor of the outdoor healing landscape.

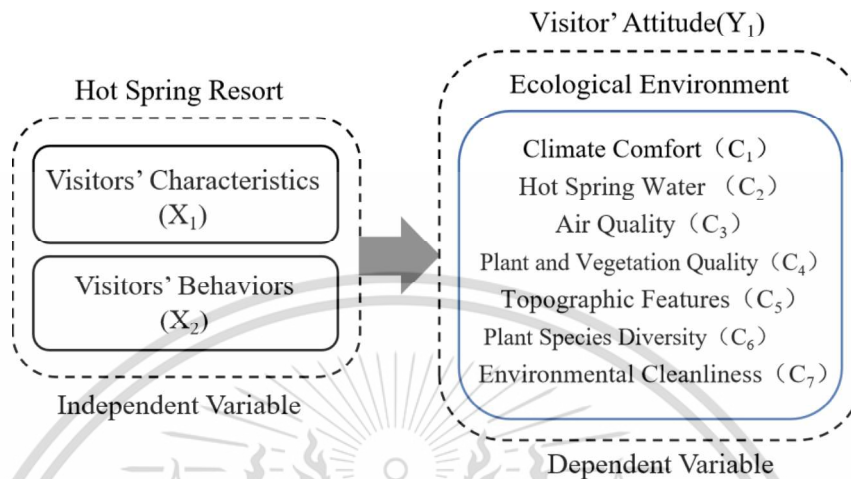


Figure 1.1 Research Framework

1.3 Scope of the Study

1.3.1 Scope of the Research Content

This study focuses on the factors influencing the outdoor healing landscape. Theoretically, there are four main factors influencing the outdoor healing landscape, including 1) ecological environment, 2) supported facility, 3) spatial perception, and 4) sensory experience. This study pays attention to the ecological environment factor, which is directly related to the outdoor environmental elements of the hot spring resort and consists of climate comfort, quality of hot spring water, air quality, plants and vegetation quality, land topography, plant species diversity, and environmental cleanliness. These seven components of the ecological environment factor serve as operational dependent variable of this study.

1.3.2 Scope of the Research Variable

There are two conceptual independent variables: visitors' characteristics and visitors' behaviors. While the dependent variable of the study is the ecological environment of the outdoor healing landscape of the hot spring resort.

1.3.3 Scope of Research Population and Samples

The Anning Jinfang Hot Spring Resort, which has been operated more than 20 years in Yunnan Province, was selected as our case study (see sections 3.2.1 and 3.2.2). It occupies an area of more than 60 acres, with 37 hot spring pools (Yunnan Hot Spring Association, 2022). Its physical elements encompass the ecological environment factor, allowing the investigation of the outdoor healing landscape. It was reported that the average number of annual visitors was about 273,000 in 2022 (Yunnan Hot Spring Association, 2022). Therefore, applying Taro Yamane's formula in deciding the sample size of this study, we aimed to collect data from 420 samples.

1.4 Significance of the Study

By investigating and studying the importance of the healing factor of the outdoor environment of hot springs-satisfaction, it has the following significance:

1) Enhancing the healing and competitiveness of hot spring environment. Hot spring tourism is an important part of Yunnan Province's tourism economic income, and the survey and analysis of the importance of healing factors in outdoor hot spring areas has universal value. Through the survey and analysis of the results, we will learn the importance of visitors' attitudes towards the healing factors of the ecological environment category; and visitor satisfaction is one of the key indicators for assessing the attractiveness and competitiveness of hot springs tourism destinations. An in-depth study of visitor satisfaction in the hot spring resort will help to reveal the strengths and weaknesses of the resort in terms of ecological environment healing factors and ecological environment healing components, thus providing efficient references for optimizing the design and construction of the outdoor landscape environment and enhancing the comprehensive competitiveness of hot spring operating enterprises.

2) Optimize the visitor experience of the hot spring outdoor environment. Visitor satisfaction directly affects the re-visit willingness of tourists and word-of-mouth spreading, which is crucial for continuously attracting tourists. By gaining a deeper understanding of visitors' needs and expectations, hot spring resorts can optimize

service quality and enhance the experience, thereby achieving a higher level of visitor satisfaction and continuing to attract visitors.

3) Support sustainable development. The sustainable development of a spa resort goes beyond the economic dimension and encompasses social and environmental responsibility. Studying the importance-satisfaction of tourists to the healing factors of the ecological environment helps to find a path to balance the economic, environmental and social aspects, and provides specific guidance for the sustainable development of hot spring environments.

4) Decision support and strategy development. Through in-depth research on the characteristics of tourists' importance-satisfaction of healing factors, managers of hot spring resorts can more accurately understand the needs of tourists and formulate targeted improvement strategies, and scientific data support will also provide a more powerful basis for decision makers. On the other hand, visitor satisfaction feedback on the outdoor environment of hot springs will also enable designers to obtain effective information feedback on design, optimize future design strategies, and allow visitors to benefit in the long term as well.

5) Complementary research in the field of hot spring environment Despite the widespread interest in the development of hot spring tourism, there are still many gaps in research on the importance of healing factors-visitor satisfaction-specific to the outdoor environment of hot spring resorts. This study will provide new perspectives and in-depth exploration of the field. Few researchers have studied outdoor hot spring ecosystem healing factors from both importance-satisfaction dimensions in determining the selection of determining healing factors for outdoor hot spring environments. On the other hand, in this study, a mixed questionnaire, plus Likert scale was chosen to make the acquired survey information more adequate. Through statistical descriptive statistics, correlation analysis and post hoc efficacy analysis, the correlation of healing factors affecting the outdoor environment of hot spring resorts can be understood more scientifically.

1.5 Limitation of the Study

The outdoor spa environment consists of two main categories: ecological factors and healing facility factors. In this study, we focus only on ecological factors. For special healing environments such as hot springs, visitors often have very close contact with natural and facility factors when they move in the space, so special attention to detail is needed in the design and construction of the environmental space, which makes both ecological environmental factors and healing facility factors have complex component systems, and their contents and evaluation criteria are quite different, so this study only focuses on the ecological environmental factors. ecological factors and will continue to address facility-based healing factors in future studies.

In selection of healing components, this study will analyze the key healing components of the ecological environment category in depth, different resorts may have their own unique factors. This study will select the key spa environmental quality impact components of the ecological environment factors to be analyzed based on the research context and literature review and cannot exhaust all possible components.

In this study, the comprehensive Anning Jinfang Hot Spring Resort in Yunnan Province was selected as a case study and was not extended to other different types of hot spring tourism destinations. Therefore, the conclusions and recommendations are only applicable to integrated hot spring resorts, and it is possible that there are differences in other types of resorts. This study will focus on the visitor groups visiting during normal weekdays, weekends, and "Golden Week" public holidays, and will not cover the types of visitors and their needs in other cases.

This study collected data from visitors using questionnaire, which may not be able to cover all aspects of visitor experience. Therefore, the results of the study may have some limitations for some detailed situations. Moreover, in terms of timeframe, this study chooses to conduct the survey in the timeframe of the peak season of fall hot spring tourism from September to October 2023, but it may not be able to capture the changes of visitor satisfaction in the resort in different seasons, different holidays, and so on.

1.6 Important Terminology

Healing landscapes: In a narrow sense, rehabilitation landscapes refer to the outdoor garden landscapes of spaces such as hospitals, nursing homes, psychiatric hospitals, children's hospitals, specialized clinics, and nursing homes. People living in these places for a long or short period of time suffer from certain illnesses or are in poor physical condition and require specially designed environments to aid in their healing to promote recovery from their illnesses or to achieve a better physical and mental state (Marcus & Barnes, 1999; Ulrich, 1984). Broadly speaking, rehabilitation landscapes are all landscape environments in urban spaces that utilize elements of rehabilitation landscapes in parks, scenic areas, resorts, and public green spaces to create aids to treatment to prevent and treat illness, promote health, and enhance physical fitness (Kaplan & Kaplan, 1989; Thwaites et al., 2005;). Three aspects are included in rehabilitation spaces: first, to alleviate illness and pain to some extent; second, to reduce people's stress and improve their comfort; and third, to improve people's overall health (Marcus & Barnes, 1999; Ulrich, 1984).

Hot springs rehabilitation landscape: hot springs rehabilitation landscape is to take Hot spring water as the core rehabilitation factor, together with the plant landscape, activity space and environmental facilities around the hot springs and other elements, so that tourists can carry out various activities in the hot spring environment such as enjoying the scenery, taking a bath, exercising in the water, resting, and partying, and get away from daily life to achieve the relaxation and recovery of the body and the mind (Chen, 2009; Gaglio et al., 1999; Gaglio, & Shoup, 1999; Shoup, & Glasgow, 2013).

Ecological environment: an ecological environment is a complex of biotic communities and their abiotic environments and is the result of the interaction of all organisms with their surroundings (Smith & Smith, 2012; Odum, 1971). The ecological environment includes biotic factors (e.g., plants, animals, microorganisms, etc.) and abiotic factors (e.g., climate, water, soil, air, etc.), which together form a complex ecosystem. The health, quality, and stability of the ecosystem is critical to the survival of humans and all living things (Smith & Smith, 2012; Odum, 1971). It not only provides

the basic resources for living, but also supports the physical and mental healing of visitors through the ecosystem. Therefore, protecting and optimizing the ecosystem is key to achieving environmental healing and sustainability (Chapin et al., 2000; Daily, 1997).



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Chapter 2

LITERATURE REVIEW

As a form of tourism that combines leisure, entertainment and healing, hot spring resorts have been favored by more and more tourists in recent years. Hot springs tourism can not only provide tourists with a way to relax, but also has potential healing functions, especially in outdoor hot springs areas, where the unique natural environment and rich ecological resources provide possibilities for the realization of healing effects (Smith & Puczkó, 2014).

With the rise of ecotourism and wellness tourism, researchers have begun to focus on the effects of ecological environments in spa resorts on visitors. Aspects of ecosystem-based healing factors, such as climatic comfort, quality of spa water, air quality, and quality of plants and vegetation have been shown to play a crucial role in the physical and mental well-being and overall experience of visitors (Lee et al., 2015; Packer & Ballantyne, 2016). However, while a number of studies have explored various aspects of the ecological environment, systematic research on the importance and satisfaction of these healing factors for visitors in spa resorts specifically, and outdoor spa areas in particular, remains relatively limited (Brown, 2018; Williams & Buswell, 2003; Zhang & Xie, 2019).

The present study aims to complement and refine the research in this area by providing an in-depth analysis of visitors' attitudes towards the importance and satisfaction of nature-based healing factors based on the characteristics and behaviors of spa resort visitors, and ultimately identifying and clarifying the factors and components of ecological-environmental-based healing landscapes in outdoor spa areas. Through an extensive literature review, this study hopes to provide a scientific basis for the design and management of hot spring resorts and to point the way for future related research. This part of the literature review will first introduce the theories and concepts related to hot spring resorts and their ecosystem-like healing factors, followed by a review of relevant empirical studies, and finally a discussion of the current state of research, existing research gaps, and potential directions for future research (Chen & Prebensen, 2017). Through a systematic literature review, this paper will lay the theoretical foundation for subsequent empirical studies.

2.1 Healing Landscape

2.1.1 Definition of the Healing Landscape

The healing landscape in the narrow sense refers to the outdoor garden landscape of hospitals, nursing homes, psychiatric hospitals, children's hospitals, specialized clinics, nursing homes and other spaces. People who live in these places for a long time or for a short time suffer from certain diseases or are in poor physical condition, and need a specially designed environment for their auxiliary treatment in order to promote the recovery of the disease or to achieve a better physical and mental state; the healing landscape in a broader sense refers to all landscape environments that utilize the factors of the healing landscape in the urban space, and are used in the space of parks, scenic spots, resorts, and public green spaces for the purpose of preventing and treating diseases, promoting health, and enhancing physical fitness. All landscape environments that assist in healing. In the healing space includes three aspects of significance: first, to a certain extent, to alleviate the pain of disease; second, to reduce people's stress and improve comfort; third, to assist in improving people's overall health.

The theory of healing landscapes originated from concerns about the impact of the natural environment on human health and well-being. The theory is based on that the natural environments, especially landscapes with specific healing qualities, are effective in promoting psychological and physical healing (Ulrich, 1984). This theory emphasizes the importance of natural elements, such as water, vegetation, topography, and air quality, in providing relaxation and restorative energy (Kaplan & Kaplan, 1989).

Healing landscapes involve not only the physical characteristics of the environment, but also the psychological and emotional dimensions of the environment. These environments have the ability to influence an individual's state of well-being through a variety of sensory pathways including sight, smell, and touch (Velarde et al., 2007). In recent years, researchers have begun to explore the role of healing landscapes from a more integrative perspective, incorporating theories and methods from multiple disciplines including psychology, environmental science, and health (Gesler, 1992). There are currently four main categories of theoretical frameworks and models of healing landscapes in the field of healing landscapes.

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2.1.2 Key Theories of the Healing Landscape

The health value of landscapes has been widely recognized by Relf (2001), who classifies landscape values into three broad categories: promotion of environmental quality, promotion of economic development, and promotion of human health. The use of gardens to promote health has a long history in many civilizations. Ancient Greeks sleep garden, ancient Rome's military hospital garden and medieval monastery garden is the original form of ancient European rehabilitation garden; Eastern natural health care method focuses on the combination of nature, talking about the "unity of man and nature". Ancient methods of natural health care continue to this day. However, it is difficult to support the systematic research of healing gardens only by application experience. It was not until 1981 that Roger Ulrich pioneered the study of the benefits of natural landscapes, waters, greenery, vegetation and other elements for human beings, and put forward the Biophilia Hypothesis, which was later regarded as the foundation of the healing garden hypothesis and related theories. Taking this as a starting point, related studies have proposed a number of complementary and partially overlapping theories from different contexts to explain the causal mechanisms of rehabilitation benefits.

1) Landscape preference theory

It is not for no reason that most people prefer natural environments with beautiful scenery and pleasant climate, but it is based on the human spirit's need for beauty. Kaplan (1982) summarized that environments with a high degree of human preference should have the following qualities: coherence, complexity, legibility, mystery, complexity, legibility, and mystical qualities. The reason why landscapes are preferred by human beings. Landscapes are preferred by humans for the following reasons.

Exhaustion and stimulation in life: Changes in the living environment have resulted in the surrounding area being filled with too much noise and visual disturbances, causing us to be constantly stimulated and to feel uneasy and worried in our lives. The natural environment itself has a sense of harmony and contact with the natural environment creates a sense of harmony and security that eliminates tension and fatigue.

Learning experience: This theory is based on our past experience of living in an

agricultural era where there was a lot of green resources and native plants around us, so people naturally have a historical background of disliking the city and preferring the countryside.

Evolution: This evolution-based theory is more commonly accepted and recognized by scholars. They believe that we respond positively to the combination of plants, water or rocks because in the past humans lived on these things, for example, picking fruits from trees, walking into the forest paths have a sense of security and perceptual joy, which gives us a sense of emotional security and produces natural and peaceful behaviors.

2) Horticultural Therapy Theory

Horticultural Therapy can be simply explained as the use of horticulture for treatment. The American Horticultural Therapy Association defines horticultural therapy as follows: Horticultural therapy is an effective method of adjusting and renewing the social, educational, psychological and physical aspects of people who need to improve their physical and spiritual aspects by utilizing plant cultivation and horticultural activities. The core of horticultural therapy is to take the natural landscape as the object and participate in horticultural labor, plant cultivation and other technically demanding active activities under the guidance of horticultural therapists and healers, emphasizing the benefits of participating in the process of experiencing itself, which mainly includes the following aspects.

Stimulation of the five senses: Horticultural therapy can be described to a certain extent as a scientific method of perceiving the characteristics or properties of things and other substances through the human senses of sight, smell, taste, hearing and touch. The five senses of stimulation contain two basic points: one, that the sensory response to something is a synthesis of the results of multiple sensory responses; and two, that sensation is based on a synthesis of several theories, mainly experimental, social, psychological, physiological and statistical. Natural elements, mainly plants, can bring good sensory stimulation to human beings and trigger human sensory experience, thus bringing positive benefits to the human body.

Instinctive stimulation: Human beings are social animals that cannot survive on their own and can only live normally if their instincts are fully stimulated. Horticultural activities contain mechanisms to stimulate a variety of instincts, such as establishing a

connection with the growth of plants, a process that involves acquiring and cultivating instinctive behaviors; establishing a connection with others in the process of horticultural activities to satisfy the social needs of human survival; gardening activities can be a temporary escape from the complexity of social life, so that people can live a more humane life.

Psychological recovery: the relationship between good sensory stimulation and psychological recovery has been confirmed by more and more studies, including the "brain and mind" research that when a person is subjected to external stimuli will produce some kind of impression, which is reflected in the intuitive psychological feelings is the perceptual, and the five senses is the external stimulus sensors.

Physical exercise: most of the activities of horticultural therapy are accompanied by a variety of physical action, the exercise itself can enhance the function of muscles and bones, improve cardiorespiratory function, improve immunity and eliminate fatigue, thus stimulating the recovery of the human body.

3) Restorative Environment Theory

Restorative environment, also known as healing environment, is a research hotspot of environmental psychology in recent years, which contains two basic theories, psychological evolution theory and attention restoration theory.

Psychological evolution theory: Roger Ulrich (1983) proposed the psychological evolution theory is also known as the stress reduction theory. The theory assumes that recovery is predicated on the individual being in a state of stress, and that stress can lead to negative emotions, short-term changes in physiological systems, and abnormal behavior. It also suggests that when a person is in an environment that is rich in natural elements and more fascinating, attention is easily shifted, thus blocking negative thoughts or replacing negative emotions with positive ones, thus bringing about recovery of the organism. Ulrich emphasizes that the immediate response to environmental stimuli is emotion, which does not need to be modulated by cognition, and furthermore preferences for these environments are unlearned predispositions and positive responses that are the result of long term evolution. In 1991 Ulrich tested physiological indicators of physical functioning and psychological responses in 120 healthy subjects watching traffic, urban boulevards, and natural environments, and the results showed that subjects who watched natural environments were the fastest to

reduce stress and recover emotionally.

Attention Restoration Theory: Kaplan & Kaplan (1989), environmental psychologists at the University of Michigan and successors to Roger Ulrich's research, proposed the Attention Restoration Theory to explain why landscapes contribute to healing. The theory suggests that a lack of resources contributes to stress, that attention (directed attention) is an important, far-reaching, and easily depleted resource, and that reduced attentional capacity and stress often occur together. Focused attention mechanisms are energy intensive and easily fatigued because they require ignoring all potential distractions, at which point stress occurs (Kaplan, 1995; Kaplan & Kaplan, 1989). The Kaplan's summarized four characteristics of restorative environments.

Environmental remoteness: this refers to the elicitation of mental content that is different from that of the usual situation, which prevents fatigue of the mental content and thus restores attentional capacity.

Environmental attractiveness: This means that when the environment is attractive, no effort is needed to pay attention, the effort to inhibit distraction can be relaxed, and the ability to focus attention can be restored.

Environmental Extensibility: is when the environment has enough content and structure to make it occupy the mind for a long period of time, thus allowing attention to rest.

Environmental compatibility: is when the activity provided, encouraged, or required by that environment is a good match for the individual's purpose or inclination.

Conclusion: Throughout the different understanding of the recovery landscape theories in the academic world, all of them have specific research backgrounds and limitations. For example, Ulrich's psychological evolution theory only focuses on the recovery of the environment for the emotions and lacks the exploration of the recovery of the physical functions; Kaplan's theory of the recovery of attention does not give a reasonable answer to the relationship between the recovery of attention and the reduction of stress; and there are many other theories that are only attempts to mention, and even less systematic. Kaplan's Attention Recovery Theory does not provide a reasonable answer to the relationship between attention recovery and stress reduction. Integrating healing garden theory can better address the diversity of people

and the complexity of situations and can avoid one-sided solutions and insufficient programs. Therefore, healing environment design should not only rely on one-sided theories such as stress reduction theory and attention restoration theory, but also establish a more systematic healing garden theory based on the understanding of the close connection between human physiology, psychology and physical environment.

2.1.3 Mechanisms of Action in the Healing Landscape

The mechanism of action of the healing landscape refers to the principle and pathway of its efficacy. Relevant research agrees that human's environmental cognitive process of the healing garden is the basic way to realize the benefits of rehabilitation, i.e., the human body receives the information of the garden through the process of various senses, such as perception, sight, hearing, smell, taste, and touch. The healing landscape concentrates the ecological factors and utilizes the interaction process between users and the healing garden to activate the healing mechanism. This paper focuses on the health benefits of healing landscapes on human physiology, psychology, and cognition, and summarizes the model of healing landscape action mechanism.

The three dimensions of the mechanism of action are in fact interactive and mutually causal, with the purpose of ultimately obtaining sustained healing benefits, such as focusing attention, improving memory, endurance and physical strength, enhancing confidence, and promoting sleep.

1) Physiological healing mechanism

Physiological healing mainly refers to the improvement of physiological conditions by landscape factors. The color, shape and smell of plants, the form and sound of water, fresh air and sunshine are all good healing media. The physical exercise provided by horticultural activities also falls into the category of physiological healing benefits of landscapes. Relevant research has believed that there is a way for its effect to occur: ecological environment factors such as fresh air, sunshine, water flow, plant aroma, etc. are directly involved in the physiological process of the human body, and give people good physiological and psychological stimulation through human sensory organs; and through participation in certain suitable horticultural activities to strengthen the human body. It can be seen that the core of the physiological rehabilitation mechanism of healing landscape is the five senses experience, that is,

visual, auditory, olfactory, tactile, gustatory stimulation and body movement, which is the basic way for people to feel the environment and is also the premise for the healing landscape to play a beneficial role.

How the channel between the five senses stimulation and the healing effect is established, related research is mostly focused on the medical field. Take landscape regulation of the immune system as an example, many researchers believe that the rehabilitation effect is mainly through the immune cell membrane with neurotransmitters and hormones on the receptor, after receiving the stimulation of the immune effect molecules generated, and then can be feedback on the neuroendocrine system, and each other to promote each other, so that the immune function can be improved, that is, through the "neuro-endocrine-immune system" loop to realize. This is realized through the "neurological-endocrine-immune system" loop. The experiment suggests that the mental mood is closely related to the occurrence of the above mechanism, and the five senses stimulation is closely related to the mental mood, so it can be seen that the occurrence of this mechanism not only requires a single loop of the "neurological-endocrine-immune system", but also may be the result of the cross-effects with other loops. On the other hand, the benefits of rehabilitation are achieved through physical exercise. The main method in the rehabilitation garden is horticultural activity, which involves the process of sowing, watering, pruning and trimming of branches and leaves to exercise the muscles and train the balance and hand-eye coordination. The essential difference between this activity and ordinary labor is that the starting point is different, and the former places more emphasis on the process of exercise. Jiang Ziyi, in "Research on Localized Practices of Yikang Garden", summarizes the empirical studies on the physiological and psychological effects of the natural environment at home and abroad, which mainly focus on the physiological aspects of the performance of the empirical evidence, but lack of explanations of its mechanisms.

2) Healing mechanism of psychological dimension

The psychological healing mechanism refers to the improvement of the psychological condition by the healing landscape factors, including the regulation of stress, emotions, etc. Typical studies for the two basic theories of restorative environments, psychological evolution theory and attention restoration theory, both

involve restorative environments with the recovery of stress and emotions, as follows.

Emotional aspects: in the emotional research of restorative environment, Ulrich (1979) showed through questionnaires that the visual and perceptual aspects of the natural environment can ease the anxiety, stress and fear of the subjects, and improve the positive psychological impact and attention. Ulrich (1981) studied the effects of visual natural experience and urban environmental experience on psychological benefits, and also found the above pattern. Preference is an emotional response and an important psychological benefit. Human beings prefer beautiful ecological environments for the following reasons: (1) beautiful ecological environments can give people a sense of pleasure; (2) natural environments provide people with access to functions and effective information management, allowing them to explore the environment comfortably and confidently; (3) ecological environments help to recover from psychological fatigue (Kaplan & Kaplan, 1989).

Stress and a sense of calm: the findings of many scholars suggest a relationship between healing landscape recovery effects and stress reduction, and many scholars have suggested that interacting with nature reduces tension and stress, and that even just looking at nature is conducive to relaxation and stress relief, as well as being beneficial to emotional and physiological states.

One study explains the relationship between psychological rehabilitation and the healing landscape from a neuroscientific perspective, suggesting that when a person receives external stimuli through the five senses, information conveying these sensations rises in parallel and enters the sensory areas of the cerebral cortex, which controls each sensation, where synapses of additional nerve cells connect with multiple sensory cortices, and the information is processed in parallel and united so that it can be recognized as being in the external environment at that time. At this point some kind of impression is produced, which consists of the experience of being aroused and governed by the sensation, as well as the feelings and impulses that accompany the sensation. A beautiful natural environment will be a good memory store for the average person.

3) Cognitive dimension of the healing mechanism

The benefits of healing landscapes for cognition are mainly manifested in the restorative effects on social activity deficits and intelligence. Sensory stimulation

arouses the curiosity of the individual, which in turn arouses interest and motivation to learn about the ecological environment, leading to the acquisition of new knowledge, improved communication, arousal of curiosity, improved observation, stimulation of the perceptual senses, and improved self-control and problem-solving abilities. Ongoing benefits in these areas are the promotion of thinking, comprehension, prediction and speculation, anticipation, and communication skills.

Conclusion: The above analysis of the mechanism of action of healing landscapes is a multidisciplinary literature summarization study based on the idea of "Benefit and Mechanism", which is a way to interpret the mechanism of action from the efficacy of healing landscapes from the surface to the inside, because the benefits of rehabilitation exist objectively and can be detected scientifically, and the research on the mechanism of rehabilitation based on this can be well documented. can be followed. However, the various restorative manifestations should not be viewed separately; each restorative manifestation is not a separate loop, but rather there are multiple loops that are linked so that the combined benefits of the restorative landscape can be interpreted, such as restorative environment theory research that suggests that the process of recovering from mental fatigue and the negative emotions that go along with stress is accompanied by physiological recovery. Therefore, it is necessary to view the various healing manifestations as a system, and to construct a theory that integrates the above mechanisms of action, including identifying the sources of healing manifestations, the order of association of each healing manifestation dimension, and the mechanism of maximizing the contribution of benefits. This is of great significance for the evaluation of healing landscapes and further research.

2.1.4 Current Status and Trends on the Healing Landscape

1) Current Status of International Research

Healing landscapes have evolved from medical environments over a long period of time, starting in the 6th century BC. In the 1970s, after Ulrich's landmark quantitative study of the healing benefits of natural environments in courtyards outside hospitals, the study received widespread attention from practitioners of rehabilitation medicine and landscape environments. Since then, numerous researchers have also made great

contributions to the development of rehabilitation landscapes, such as Cooper-Marcus and the Kaplan's, and their studies have gradually gone deeper and deeper, such as design principles, landscape characterization, implementation process, post-use evaluation, and more in-depth rehabilitation benefits. Research methods are also endless, such as the selection of physiological and biochemical indicators, biological experiments and so on.

A large number of research have proved that a good ecological environment will improve the health condition of the population and promote physical and psychological rehabilitation. In the 1980s, after Ulrich's (1981) study on the rehabilitation benefits of natural environments outside hospitals, rehabilitation landscapes came back into people's view. Scholars in various countries have also explored various aspects of the rehabilitation landscape theory, such as the biological proximity hypothesis and the geographic prospect refuge theory (Kellert, 1993; Appleton, 1975). Eventually, in the context of psychology and sociology, the stress relief theory and the attention restoration theory were formed (Kaplan et al., 1995; Ulrich, 1981), and both of them, as the mainstream theories of the rehabilitation landscape, provide guidance at the theoretical level for the development of rehabilitation landscapes, and also promote the development of rehabilitation landscapes. The keys possessed by recovery gardens with stress-relieving qualities are a sense of control, social support, movement and exercise, and positive nature interventions, while environments focusing on attention restoration should be characterized by remoteness, scope, fascination, and compatibility.

Under the guidance of recovery theory, numerous researchers have contributed greatly to the development of recovery landscapes, such as Cooper-Marcus (1995) and Tyson (2002), who have proposed a series of guidelines and provided technical support for the practice of recovery landscapes. With the maturity of the theoretical system, its research content has gradually deepened and started to study the rehabilitation effect of different landscape elements. Some scholars measure different landscape elements through the changes in physiological and biochemical indicators, pointing out the effects of landscape on human health. For example, natural landscape and sound stimulation can reduce the feeling of pain (Cooper-Marcus, 1995); the scenery outside the window is more conducive to the return of the heart rate to normal (Kahn

et al., 2008); greenery also relaxes people (Nakamura et al., 1992); the scent of greenery attenuates the stress response of systolic and diastolic blood pressure in humans (Oka, 2008); and the fenphenanthridine contained in the volatiles of greenery has a physiological therapeutic effects (Vatana, 2011); outdoor sunlight helps in the synthesis of vitamin D (Sato et al., 2003), and green plants in different places are helpful for health and concentration. Green plants in schools, hospitals, and offices enhance health, concentration, and so on. There are also studies that say plants and green spaces have improved cognitive abilities in children (Taylor, 2009). The concept of rehabilitation is gradually gaining ground, but the scope of research on rehabilitation landscapes is also expanding, and specialized rehabilitation landscapes catering to different groups of people, such as people with Alzheimer's disease, psychiatric disorders, the elderly, and adolescents, are emerging (Cheetal., 2014; Kidgeretal., 2012; Liddicoat, 2019). Khodeir (2018) identified the most important healing environment factors suitable for cancer patients as choice and control, privacy and social support, and positive interventions, and proposed indoor environment creation strategies based on the above factors. Based on the above literature review it can be found that the healing role of landscape was initially related to vision and eventually extended to smell, hearing, etc. At first, the research on rehabilitative landscape paid more attention to the rehabilitation benefits of natural environment for human beings, and later changed to the research on the benefits of natural elements in the human environment, and the research on rehabilitative landscape gradually expanded its scope from point to line and from line to surface, and its content was gradually deepened.

2) Current Research Situation in China

At present, the population served by rehabilitative landscapes in China is also mainly inclined to disadvantaged chronic disease groups, and some foreign research methods and construction methods have been borrowed for the construction and optimization of healing spaces. Rehabilitation landscape has also become one of the disciplinary branches of landscape gardening, but China's rehabilitation landscape is still in the embryonic stage, and there are not many high-quality empirical research results on rehabilitation landscape. In recent years, the research on rehabilitation landscape has been increasing, partly because of the urgent need of the public and

partly because of the popularization of the "Healthy China" policy. This paper searches for terms related to the theme of rehabilitative landscape on KnowledgeNet and analyzes the search results with metric visualization to find out the development status of rehabilitative landscape in China, the time evolution, direction and branching, to grasp the research hotspots and to understand the current status of its development.

This paper finds that the research on rehabilitation landscape is mainly carried out in terms of the type of rehabilitation landscape, elements of the environment, functions, different groups of users, design strategies, and evaluation after use by looking up the papers and locking the subject words. China's research on rehabilitation landscapes is in its infancy, from the identification of the most basic concepts to the study of rehabilitation landscape types (Qingliang et al. 2015; Xiaobo 2012, Yanhua et al. 2011), and Shuhua (2009) provides guidance on the rehabilitative role of landscapes from the perspective of horticultural therapy. After the initial explorations of the predecessors, the subsequent studies are going deeper and deeper, and began to explore the rehabilitation role from specific environmental factors, natural landscape elements such as: the study of woody aromatic plants with health care effects, and the positive effects of aromatic plants on memory (Chisong et al., 2020; Ranxu et al., 2019). The interactive, suggestive, and depressing effects of artificial landscape facilities (Yu, 2020). On the basis of the study of environmental elements, some studies have used the concept of rehabilitation landscape to explore the design strategy of rehabilitation environment from the perspective of plant collocation, such as the design strategy of maternal and child health care hospitals (Liu Chang, 2020), and plant collocation suggestions for ageing (Junhui et al., 2019); the medical environment is the most intuitive rehabilitative place, and the research on the rehabilitative nature of the medical environment is mainly focused on the medical space, medical institutions, etc. (Jianle, 2016), with the improvement of the hospital environment research, researchers gradually shift their attention to the rehabilitation landscape research of different patients, such as the rehabilitation landscape research for the needs of children, the elderly, and the mentally ill patients (Limeng, 2017), such as the design of autistic children's healing courtyard, autistic children's healing courtyard design and so on. The aging situation in China has gradually intensified, and research for aging is also widely conducted, and a series of studies on rehabilitation environments for the elderly such

as age-friendliness, retirement communities, and institutions for the elderly have appeared (Lu, 2018; Rui, 2019; Xiaotong, 2018). The design of rehabilitation landscape is different from traditional landscape design, which requires a full understanding of the needs of the user population, and different design methods have been proposed based on such design principles. For example, evidence-based design (Li-Qing, 2016), age-appropriate design, and design based on horticultural therapy proposed based on intervention therapies (Bo-Xin et al., 2015). After the rehabilitation landscape is put into use, it is also necessary to conduct post-use evaluation based on the use of each landscape type by different populations (Zhuying, 2019).

In summary, the health effects of rehabilitation landscape on people are reflected in physiological, psychological and social aspects, and the healing effects of rehabilitation landscape on people are also very important and integrated into our daily life. Rehabilitation environment creation should not only highlight the supportive role of the environment, but also reflect the healing role of the environment. The healing effect of the environment is not only reflected in the improvement of behavioral habits, but also includes the physiological and psychological healing of the landscape factors themselves and the healing effect caused by all the activities involved in the landscape space. Rehabilitation landscape not only contains the elements and characteristics of ordinary gardens, but also focuses on building rehabilitation environments according to different groups of users. Therefore, the rehabilitation supportive landscape focuses on the functionality of assisting rehabilitation, which not only ensures that users can use the landscape space conveniently and comfortably, but also plays the role of assisting rehabilitation. Therefore, the construction of rehabilitation landscape should firstly clarify the use of the population, determine their needs and their behavioral habits, and achieve good rehabilitation effects. The main features of the rehabilitation landscape are as follows:

- 1) Natural and friendly. Rehabilitation landscape should be closely integrated with the beautiful natural environment. Good temperature and humidity environment, colorful plants, meandering beautiful water system, ever-changing sky and clouds and birds and flowers brought about by the auditory and olfactory enjoyment, etc., which provide people with sensory interest, bring a sense of cordiality and pleasantness.

- 2) Safe and reliable. Poisonous plants and plants with flotsam should be

absolutely avoided in the rehabilitation landscape. The setup location of various facilities should fully take into account the actual needs of people, and the materials of various facilities in the environment should be non-toxic and harmless, and ensure the safety of users, so as to be firm, convenient, and appropriate scale.

3) Accessibility. The overall layout of the rehabilitation landscape should be easy to "recognize", to achieve clear identification, to avoid users because of the lost or go the wrong way and produce anxiety or loss of emotion. The setup of the garden path should be accessible and convenient to maximize the convenience of using crutches or wheelchairs.

4) Variety of space. Rehabilitation landscape should be designed with public space suitable for interaction and private space suitable for conversation, which is convenient for people to rest and think individually or communicate and chat among people. At the same time, it should also have fitness space suitable for people's rehabilitation exercise.

5) Clear and positive. Rehabilitation landscape should not be strange and too abstract art forms, decorative paintings or sculptures should be expressed in a positive, simple and clear content, to give patients a good psychological implication, so that they have an optimistic attitude.

2.1.5 Factors and Components of the Healing Landscapes

Healing landscape is a type of landscape that promotes users to restore their health, and the study of the relationship between human and healing landscape is the necessary premise of design; healing landscape is also a type of landscape that intentionally creates the outdoor environment as a health resource, and the study of spatial composition factors is the ultimate destination of design. Therefore, the design of healing landscape needs to be coordinated from the activities of the main body of the healing landscape and the physical space composition of the object of the healing landscape, i.e., "human activities" and "physical space".

1) Research on the activity factor of healing landscape

The process of interaction between people and the healing landscape includes activities with positive and negative attributes. Positive attributes refer to people's active participation in the experience, including movement and activities and the

healing mechanism of social support between people; negative attributes refer to people's passive acceptance of the messages conveyed by the environment (plants, animals, water, sound, climate, etc.) through the medium of the eyes, ears, nose, tongue, body, and brain, emphasizing the sense of control of the environment; the two attributes of activities are interactive; the two attributes of activities are interactive. The two attributes of the activity are an interactive relationship, the fundamental difference lies in the different starting point, the former focus on participation in the experience, the latter focus on appreciation of the body.

Positive Attribute Activities: Positive attribute activities from the point of view of the dominant factors are plant exploration, activity exploration, art exploration, space exploration and so on.

Exploration of plants: Traditional landscape design seldom centers on plant activities. As a therapeutic exploration of plants, it is mainly through cultivation, companionship, sensation, collection and use of plants to experience the joys they bring. Cultivating plants involves a series of physical labor such as tilling, grading, planting, watering, weeding, and so on, each of which involves the collaboration of multiple actions, an activity that boosts metabolism, increases vitality, and escapes from most people's daily lives. Additionally, there is an adaptive relief of mental energy as the body's energy is depleted by physical labor. The act of picking fruit is also made up of a combination of multiple actions, and spiritually, it is a process of affirming the results of one's actions, which helps to gain a sense of accomplishment and satisfaction. The use of plants is a creative act, since it requires concentration and some fine movements; at the same time, the cooking and eating of plants is one of the most primitive of the pleasures of consumption, a release of the ego and the fulfillment of basic physiological needs.

Exploration of activities: Some activities have positive benefits in themselves, such as sand-digging games, fishing, water play, etc. With healing landscapes as the environmental support for related activities, users are encouraged to take part in activities of interest to achieve the purpose of assisting in the treatment of psychosomatic disorders in order to improve self-confidence. Using positive activities as a carrier, the treatment process is integrated into recreation. This is a quality that traditional medical methods are not as good at, and to some extent complements the

inadequacy of clinical medical techniques.

Artistic exploration: Artistic beauty is one of the motivating forces that triggers subjective activities, and artistic expression has always been regarded as the landscape designer's business. Healing landscapes have specific artistic expressions due to their different functions, and the messages conveyed to users by man-made artworks in healing landscapes must be positive and upward. Simple and clear space, roads with a clear sense of direction, delicate water features and comfortable seats are favored by most people.

Exploration of space: Space is full of interest because of its varied combinations, such as the maze of the English courtyard and the scenic courtyard. The healing landscape utilizes different environments to improve the role of the human spirit to assist in the treatment, and it is necessary to create different emotional experiences by the changeable space. Healing landscape design should focus on creating a clean, quiet overflow, a sense of security in the overall space, highlighting the richness of the space combination.

Negative Attribute Activity: Negative Attribute Activity is a passive way for people to experience natural environments such as changing seasons, weather changes, and plant growth (e.g., lounging, listening, meditating, walking). The colors, shapes, and scents of plants, fruits, the texture of flowers and leaves, the sounds of insects, birds, water, and wind in nature, and the stimulation of the five sensory perceptions by air and daylight all fall under the category of negative attribute activities. (Gold 198) refers to the environment perceivable by the human senses as the "perceptual environment", in which the ability of vision to collect environmental information and the scope of its reach is the widest, followed in descending order by the senses of sight, hearing, smell, touch, and taste. Ninety percent of environmental information is transmitted to the brain through vision, and the eyes can quickly acquire a complete picture of the environment compared to the other senses. However, in many cases, other senses can assist or enhance human's ability to perceive environmental information, and with a strong emotional coloring, can influence human's emotions and behaviors more than the information obtained through vision, such as: odor, noise, etc.

2) Research on the spatial components of healing landscape

Healing landscape involves many disciplinary fields (such as landscape

architecture, medicine, psychology, botany, etc.). The traditional landscape composition method is difficult to fully guide the relevant design, only from the physical space composition, the healing landscape is to organize the natural elements through artificial means, to create a supportive place for users to interact with the environment.

From the classification of healing landscape elements, the spatial composition of healing landscape is divided into two categories: soft and hard landscape. The healing landscape is based on the plant-based soft landscape, and the hard landscape is only the necessary environmental support facilities.

1) Soft landscape composition mainly refers to the relative construction, hard pavement, is rich in natural characteristics of the landscape composed of abundant plants, animals, water features and so on. The soft landscape environment in the healing landscape mainly includes plant environment, water environment, sound environment, wind environment and so on. Plants are the most important and direct source of the efficacy of the healing landscape.

Plant environment: plants in healing landscape are the best materials to create a good environment, soothe anxiety, and make people gain confidence in life and improve the courage to overcome the disease, which is not only used to create the landscape, but also has certain health effects. Plant communities in healing landscape: Plant communities in healing landscape are multi-layered and three-dimensional plant communities created by using ecological methods and plant species containing beneficial volatile substances and secretion substances, which have the effect of enhancing physical fitness and preventing and curing diseases. At the same time, the ecological and landscape benefits of plant communities are brought into play.

Water Environment: Water landscape is an important healing resource. Static water gives people a sense of tranquility and calmness, and at the same time, it can expand the visual space and make the virtual space far-reaching and peaceful. Dynamic water gives people a feeling of joy and brightness, giving people relaxation and enjoyment from the visual and auditory point of view, which is very beneficial to the human body. The water landscape of healing landscape can be combined with static and dynamic, built according to the terrain, especially can open up the water space, fully meet the human "hydrophilic".

Sound environment: pleasant sound can play a positive role in human health. In some foreign hospital gardens, the designers of the regular environment of the sound of the water, the sound of the pine waves, animal sounds and other natural sounds, amplified through the loudspeaker into the hospital wards, so that patients indoors can also get the "sound" of the natural landscape. There is also a combination of outdoor loudspeakers playing meditation music and art, so that it can be more artistically integrated into the healing landscape.

Windy environments: Wind is an important factor in environmental comfort, as measured by wind speed, which has been shown in studies to be the demarcation line for human comfort. A favorable wind environment can reduce the spread of disease and provide fresh air for patients.

Temperature and humidity: Temperature and humidity play an important role in healing landscapes and have a significant impact on a person's physical and mental health. The right temperature provides a comfortable environment that makes it easier for the body to relax and recover. For example, warm climates are often associated with a relaxing, pleasurable experience, whereas too high or too low temperatures can lead to discomfort and stress (Li et al., 2016). Humidity similarly influences the healing effects of the environment. Moderate humidity can help maintain skin and respiratory health and enhance feelings of comfort and pleasure (Gong, 2020). Too much humidity can be stifling and uncomfortable, while too little humidity can lead to dry skin and respiratory discomfort (Wolkoff & Kjærgaard, 2007). Therefore, temperature and humidity not only enhance the comfort of the environment, but also significantly enhance the healing effect.

2) For hardscape composition, the Dictionary of Fine Arts, Architecture and Art Volume explains hardscape as "hardscape as opposed to softscape formed by plants, which consists of all fixed tangible objects except greenery and buildings." Hardscape provides hardware support to the healing landscape, which is mainly constructed from roads and paving, resting facilities, play and fitness facilities, environmental art facilities, environmental signage facilities, and night lighting.

Roads and paving: Walking on garden trails is an important form of healing, such as Alzheimer's patients' favorite activity is walking in the garden. The design of the walkway becomes a fundamental design element for this group of people. In addition,

roads play an important role in connecting various functional units in the landscape system, and clear and smooth route design becomes the primary design consideration. Healing landscape ground (road) pavement form should not be in pursuit of special effects and give up non-slip, flat and other basic needs, to be part of the user's mobility barriers into the scope of design considerations, paving seams to prevent wheelchair wheels or crutches into which; on this basis to fully tap into the rehabilitation of the ground pavement, such as walking on pebble pavement with bare feet, can stimulate the foot acupuncture points to play a health care effect.

Sitting-out facilities: Sitting-out facilities are an important support for rehabilitation activities, providing nodes for staying and viewing, and common sitting-out facilities mainly include seats, pavilions and flower racks. Rest itself is a kind of rehabilitation, such as can be combined with plants, sunlight, air and other natural elements to arrange facilities for better results. According to the overall layout of the garden and the user's physical assessment of the results of the arrangement in the appropriate nodes and pay attention to the coordination of the surrounding environment.

Fitness and sports facilities: Game and fitness facilities are important support for positive healing landscape activities, with high frequency of use and zero-distance contact, mainly including game facilities, gardening facilities and recreational and sports facilities. The design should be based on the user's biological and psychological characteristics, mainly from the scale, color, shape, material and other considerations.

Children's play facilities: this facility is an important auxiliary therapy for children and has high requirements in terms of puzzles and safety. For example, some flexible mobile props and environments can be provided to utilize children's creativity in the game.

Art and service facilities: Environmental art facilities mainly refer to sculptures, garbage bins, outdoor drinking fountains and other facilities, which can be categorized into artistic and functional categories. Sculptures and other artworks can constitute the visual focus of the space and play a certain role in regulating or suggesting the emotions of the healers with their unique artistic beauty. Therefore, the message conveyed to the user by the artwork in the healing garden must be positive. Facilities such as garbage bins and outdoor drinking fountains are mainly functional and based

on the basic principle of ease of use. They should be uniformly arranged and carefully designed from the garden as a whole, and facilities with artistic creativity can give users additional emotional gains. Environmental signage facilities: the main function of environmental signage facilities is to guide participants to quickly integrate into the environment, and its form generally has three kinds: maps, image signs, knowledge guide signs.

Night lighting facilities: the main function of night lighting facilities is to enhance the recognition of objects, improve the safety of night travel, the normal development of night activities of users, and create a good night environment.

In summary, research on healing landscapes has made significant progress in recent years, and more and more studies have shown that natural environments play an important role in promoting mental and physical health. Existing research has focused on exploring the effects of specific elements of the natural environment, such as water bodies, vegetation, topography, and air quality, on human health (Kaplan & Kaplan, 1989; Ulrich et al., 1991). Through empirical studies, researchers have found that these natural elements can significantly reduce stress, elevate mood, improve cognitive function, and promote overall health (Pasanen et al., 2014). In addition, several studies have explored differences in the healing effects of different types of natural landscapes (e.g., forests, seashores, parks, etc.) (Bowler et al., 2010).

Future research trends will focus more on an integrated multidisciplinary research approach that combines knowledge from fields such as psychology, environmental science, medicine, and landscape design to more fully understand the mechanisms and effects of healing landscapes (Frumkin, 2001). In addition, as technology advances, the use of emerging technologies such as virtual reality (VR) in healing landscape research will become an important trend. These technologies can simulate and test the effects of different landscape environments on health, thus providing a scientific basis for actual landscape design (White et al., 2018). Overall, research on healing landscapes will continue to delve deeper into exploring the multidimensional impacts of natural environments on health and aim to provide more effective health promotion strategies and design solutions for people.

2.2 Hot Spring Healing Landscape

Hot spring healing landscape is one of the important types of healing landscape. Hot springs healing landscape is characterized by the hot spring water as the core of the healing objects, combined with the ecological environment around the hot springs and healing facilities, to play a comprehensive healing effect of the place.

2.2.1 Definition of spa and spa resort

1) Definition of spa

A spa is a natural body of water heated by geothermal heat from deep underground and gushing out of the ground. The temperature of hot springs is usually above 20°C, and high-temperature hot springs can even reach above 50°C. Onsen water is rich in a variety of minerals and trace elements such as sulfur, calcium, magnesium, sodium, and chloride, which have been shown to have a variety of health benefits (Erfurt-Cooper & Cooper, 2009). The therapeutic benefits of spas include relief of muscle and joint pain, increased blood circulation, improved skin condition, and reduction of stress and anxiety (Fioravanti et al., 2011). Spa therapies have been widely used in medical treatment and rehabilitation since ancient times, as exemplified by the spa cultures of ancient Rome and Japan (Vázquez-Sánchez et al., 2021).

2) Definition of hot spring resort

A hot spring resort is a comprehensive tourism and leisure place that takes hot spring resources as its core and combines a variety of service facilities such as lodging, catering, entertainment, and health healing. Hot springs resorts aim to provide visitors with an environment to relax and restore their health, and to achieve healing through the combined effects of hot springs hydrotherapy, natural landscapes, and other recreational facilities (Smith & Puczkó, 2014). These resorts not only focus on the therapeutic effects of the hot spring water, but also emphasize the quality of the surrounding ecological environment, such as air freshness, vegetation coverage, and landscape aesthetics, to enhance the overall healing experience (Lee & King, 2009). In addition, hot spring resorts also focus on the integration of cultural and regional characteristics to create healing spaces with local cultural flavor through unique design

and services (Chen et al., 2013).

2.2.2 Health Benefits of Hot Spring and Hot Spring Resorts

1) Health Benefits of Hot Spring

Hot springs have been known as a natural healing resource since ancient times, and the minerals and trace elements in their water have a variety of health benefits for the human body. Sulfur, calcium, magnesium, sodium, and chloride in hot spring water promote health through skin absorption and immersion (Erfurt-Cooper & Cooper, 2009). Specific health benefits include:

Relief of muscle and joint pain: the warming effect of spa water helps to relax muscles and reduce joint pain and inflammation, which is particularly suitable for people suffering from rheumatism and arthritis (Fioravanti et al., 2011).

Improvement of blood circulation: hot spring baths dilate blood vessels and improve blood circulation, thus enhancing metabolism and the body's ability to repair itself (Antonelli et al., 2001).

Improves skin conditions: The minerals in spa water have antibacterial and anti-inflammatory properties, which can treat skin conditions such as eczema and psoriasis, as well as making the skin smoother and healthier (Nasermoaddeli & Kagamimori, 2005).

Reducing stress and anxiety: the spa environment and its relaxing effects help to reduce psychological stress, relieve anxiety and depression, and improve mental health (Becker, 2010).

2) Health benefits of hot spring resorts

Spa resorts not only provide spa treatments, but also integrate a variety of health and leisure facilities to create a holistic wellness environment. The importance and health benefits of spa resorts are mainly in the following areas:

Integrated wellness experience: spa resorts combine a variety of wellness modalities such as spa baths, massages, exercise, and healthy eating to provide visitors with a holistic health-promoting experience (Smith & Puczkó, 2014). These integrated wellness services enhance visitors' physical health and psychological well-being (Voigt et al., 2011).

Healing effects of ecological environments: spa resorts are often located in scenic, airy natural environments, and these natural elements have significant healing

effects in their own right (Kaplan & Kaplan, 1989). Studies have shown that exposure to natural environments can reduce stress, elevate mood, and enhance concentration and cognitive function (Ulrich et al., 1991).

Social interactions and cultural experiences: Hot Spring resorts not only provide recreational services, but also incorporate local cultures and traditions, such as Japanese hot spring culture and Chinese herbal health care. These cultural experiences can enhance visitors' sense of cultural identity and social connection, and contribute to mental health (Chen et al., 2013).

Personalized health management: Modern spa resorts are increasingly introducing personalized health management services to help visitors maintain and improve their health more effectively through health assessments, customized regimens and continuous health monitoring (Voigt et al., 2011).

2.2.3 Studies on Hot Spring Resort

The development of hot springs in foreign countries originated in the Roman Empire, and at first the hot springs were mainly used for convalescence, but after the Renaissance in Europe in the 17th century, the hot springs landscape integrated convalescence and various leisure activities. In the middle of the 19th century, hot springs tourism ushered in a new opportunity for development, thanks to the research on hot springs conducted by experts from various fields (Hui, 2020). Today, the research results of hot spring tourism in the world are mainly concentrated in Japan, Europe and America. In addition, Japan is also the country with the best development of hot spring landscape in the world. Due to different climatic conditions and cultural differences, there are two main types of development of hot spring lands in the world:

One category consists of hot spring resorts with the theme of hot spring healing. Since Roman times, Hungary has built various styles of spas, has more medicinal spas that can cure various diseases than any other country, and medicinal spa bathing has become a trend in Hungary (Liang, 2015). Claude Kaspa of the International Association of Tourism Scientists discussed the development of spa tourism at its annual conference in Budapest, the spa capital of Hungary, and concluded that a pleasant natural environment, professional healthcare doctors, comfortable accommodation, and attentive food and beverage services are necessary conditions for a new style of

spa resort (Yamei 2017). Spa resorts in Germany, parts of France, Baltic countries, Central and Eastern Europe and Russia are mainly focused on spa medical care. Meanwhile Poland is considered a model for medical spa resorts (Dryglas et al. 2017). These spa resort lands initially served the purpose of spa treatment and were later used for health tourism, laying the foundation for the subsequent development of spa landscapes (Shi 2017).

The other category is the spa landscape land that focuses on the experience of natural scenery. European hot springs advocate the enjoyment of nature itself, and hot spring landscapes are usually located in places with beautiful and characteristic ecological environments; the bathing experience is only a small part of the tourism program, and people enjoy the ecological landscape environment around the hot spring resort more (Li 2005). Landscape design in modern French spa resorts also tries to learn from the natural gardens of the East, reducing the artificial traces of the traditional French botanical landscape, focusing on layers and color matching in the landscape collocation, and getting closer and closer to the natural state (Xiaomeng 2014). French spa resorts attract visitors by offering "spa + French food", low-fat meat, mushrooms and shrimp, scallops, sautéed vegetables, vanilla ice cream, and vegetables and fruits, which are warmly welcomed by spa and health vacationers. Switzerland is both one of the richest countries in the world and at the same time one of the most ecologically sound countries in the world (Cai 2014). The spa landscape blends perfectly into the natural beauty of the surrounding mountains, and the beautifully restorative atmosphere allows travelers in the middle of their trip to completely relax. From the initial bathing to ward off the cold, eliminate fatigue, cure diseases, and believe in the sacred, Japanese hot springs have gradually evolved into ceremonial tourism and sightseeing tourism, and further developed into bathing in hot springs, worshipping shrines, and hosting banquets (Konglian 2019). Shunji (1996) did a systematic study on the current development of hot springs in Japan, the types and characteristics of hot springs, factors influencing tourist satisfaction, and the tourism market, and concluded that tourist-oriented hot spring sites in Japan have become the mainstream of hot spring development, and that hot spring vacation destinations are gradually transforming from convalescent destinations to sightseeing destinations. Dona (2002) discussed the Saratoga Spa City in the *Journal of American History* In the

Journal of American History, Dona (2002) discusses the reasons for the success of Saratoga Springs and analyzes how spa resorts should be developed and designed from the perspective of visitor experience.

In conclusion, spa resorts around the world have different types of design directions depending on their focus. However, in Europe and the United States, the focus is more on the indoor spa experience. Undeniably, providing a unique spa environment experience is the focus of spa resorts, and the spa landscape environmental factors are also the most important part of influencing visitor satisfaction.

2.2.4 Studies on Hot Spring Resort in China

The history of the development of hot springs in China can be traced back to the Han Dynasty, when astronomers vividly depicted the grandeur of hot springs bathing of the ancient working people in the Hot Spring Fugue. In the Tang Dynasty, Emperor Taizong of Tang Dynasty established Huaqing Pond. At the beginning of the founding of New China, numerous hot springs sanatoriums were established in industrial-concentrated areas in Northeast China, which played a huge role in treating the wounded during the anti-American war against the Democratic People's Republic of Korea (Xinde & Yunbin 2017). Since 1990, as China's tourism industry has gradually transformed from sightseeing tourism to vacation tourism, hot springs resorts, with vacations as the main function, have sprung up all over the country. The development of hot spring health tourism first formed as a boom in southern China. With the steady increase in the income of Chinese residents in the new era, the gradual narrowing of the urban-rural gap, and the gradual improvement of the vacation system, China's hot spring tourism market will further show great advantages and enter the stage of mass consumption (Xiaonong 2019).

With the development of hot spring tourism, academic researchers have also embarked on the study of hot spring tourism. In the 1990s, the research mainly introduced the development and utilization value of hot springs as a tourism resource. At the beginning of the 21st century, the direction of the research was mainly focused on the sustainable development of hot spring tourism resources, a sounder tourism development model, and a more reasonable landscape configuration. By 2010 and

beyond, some scholars began to study the factors affecting the hot spring tourism experience. Wang Yahui (2011) extracted five factors affecting hot spring tourism experience by questionnaire survey method. Yanfei (2013) analyzed and studied the factors affecting tourists' experience: hot spring products, hot spring services, hot spring culture, landscape environment, and healing facilities. He believed that these factors have an important position in the development and operation of hot springs. Yi & Qing (2015) studied the main healing factors affecting the hot spring tourism experience and concluded that they point out the direction for the development path of experiential hot spring vacation.

At present, the research on hot spring landscape is mainly based on recreation, vacation and healing nature research design, and the research results are fragmented. Yunbo (2006) proposed five development modes of hot spring tourism, health care, tourism and entertainment, cultural experience and comprehensive development, and summarized the corresponding development strategies. Wei (2008) proposed a scientific and reasonable systematic planning method of hot spring resort by taking the planning and design of Henan Shangtang Hot Spring Resort as an example. Juan (2015) argued that shaping the characteristics of hot spring resorts is a new trend in the development of hot springs and studied how to shape the characteristics of hot spring resorts. Hui (2020) carried out a landscape design of hot spring resorts under the guidance of the concept of recreation and health care to meet the needs of contemporary people and to improve the comfort in people's hot spring landscapes. Dan (2021) combined modern landscape elements with traditional landscape elements to create a new Chinese style hot spring resort landscape through a variety of gardening techniques, visual color design, application of landscape cultural symbols and space creation design methods. And there is less research literature dedicated to experiential hot spring landscape design. According to Jiang Wei (2015), applying the experience of the senses to the landscape design of hot spring resorts can make the environment more relatable, attractive and sensual, which is highly desirable. Ziwei & Chengguang (2016) believe that improving the experiential nature of the landscape through the participation and interaction between people and the landscape is an inevitable trend in landscape design, and the recreational, vacation, and leisure nature of hot spring tourism venues makes hot spring landscapes more experiential.

To summarize, relevant studies in China are more concerned with the development and utilization of hot spring landscape and hot spring tourism development, and there are fewer empirical studies on the healing factor of hot spring resorts. The theory of hot spring landscape design is also not perfect. In this paper, we will investigate the importance and satisfaction of the healing factors in the outdoor areas of hot spring areas from the perspective of visitors. It will enrich the research results of hot springs healing landscape design, better optimize the design method of this kind of space and provide a better healing environment for the healing people.

2.2.5 Research Trends in Hot Spring Resort

Currently, research on hot spring resorts has expanded into multidisciplinary fields, including medicine, psychology, environmental science, and tourism management. The research status and trends mainly focus on the following aspects.

1) Research Status

Health benefits: a large number of studies have confirmed the therapeutic effects of hot spring water on musculoskeletal disorders, skin diseases, cardiovascular diseases, etc. (Fioravanti et al., 2011). Also, spa bathing has been shown to have significant effects on mental health, such as relieving stress, anxiety and depression (Becker, 2010).

Environment and Design: Researchers have focused on the environmental design of spa resorts, exploring how landscape planning and environmental creation can enhance healing (Smith & Puczko, 2014). This includes factors such as landscaping, water design, and air quality in spa areas (Lee & King, 2009).

Cultural and social impacts: the cultural and social impacts of spa resorts have also become a hot research topic. The impact of hot spring culture in different regions on visitors' experience and satisfaction, as well as the contribution of hot spring tourism to local economic and social development, are all important elements of research (Chen et al., 2013).

Economic benefits: hot spring resorts have an important impact on the development of the local economy, which can promote the development of tourism and drive related industries, such as hotels, restaurants and transportation (Erfurt-Cooper & Cooper, 2009; Smith & Puczko, 2014).

Satisfaction assessment of healing factors: in recent years, researchers have begun to pay attention to the assessment of tourists' satisfaction with the healing factors of spa resorts. Such studies collect data on tourists' satisfaction with healing factors such as spa water quality, environmental cleanliness, air quality, plant and vegetation quality, etc., through methods such as questionnaires and field interviews (Puczkó & Bachvarov, 2006). These studies not only help resort managers to improve service quality, but also provide an important basis for designing and improving healing facilities in spa resorts (Smith & Puczkó, 2014).

2) Research trends

Future research trends will be more diversified and in-depth, mainly in the following aspects:

Multidisciplinary integrated research: with the rise of health tourism, research on spa resorts will become more integrated, combining theories and methods from multiple disciplines, such as medicine, psychology, environmental science, and tourism management, in order to comprehensively understand the mechanisms and effects of spa therapies (Voigt et al., 2011).

Technological applications: modern technologies such as virtual reality (VR), wearable devices, and big data analytics will be used to simulate and evaluate the effects of spa therapies and provide personalized health management programs (White et al., 2018).

Sustainability: As environmental awareness increases, sustainable development of spa resorts will become a research priority. Researchers will explore how to maximize the benefits of using spa resources while protecting the environment (Cohen & Bodeker, 2008; Lund, 2000).

Globalization and localization: the research will focus on the development trend of spa tourism in the context of globalization, and at the same time pay attention to the localization practice of spa therapies in different cultures, to ensure that the services and management of spa resorts can meet the needs of different tourists (Erfurt-Cooper & Cooper, 2009; Smith & Puczkó, 2014).

Visitor experience and satisfaction: future research will pay more attention to visitor experience and satisfaction by assessing the various types of healing factors in spa resorts and their impact on visitors' overall health and satisfaction through a more

scientific and systematic approach (Chen et al., 2013).

2.2.6 Hot Spring Tourism Research

Hot spring vacation is a combination of hot spring healing and sightseeing. Hot spring environment is a tourism theme dominated by participation and experience, which is a collection of functions combining healing, leisure and culture. (Wu et al., 2022) believe that hot spring tourism is a special type of tourism. Visitors want to realize the goal of spa healing and leisure vacation through special experience and the cultural atmosphere of hot springs.

Regarding hot spring tourism, the different purposes of visitors to visit hot spring vacation resorts depend on the region where they live. One study shows that visitors in Asia often seek their own personal inner peace, so they are more interested in seeking a private, tranquil, and a soothing spatial experience. In Western countries, visitors are more concerned with the spa's flow-based spa services and social factors. There are also various types of services characterized between organizations to accommodate different client needs. According to Lee & King's research, in Asia, recreation in natural hot springs is a high-frequency choice for usual vacations and leisure, and people want to seek to connect with the ecosystem, experience cultural traditions, and seek spa healing and rehabilitation. At the same time, Asians have established different types of spa facilities based on their history and culture, with a greater focus on the wellness aspect of the service. For example, in China, spa resorts typically offer spa-related services such as massages, herbal treatments, hydrotherapy and other therapies; in Japan, most Japanese-style spas are mineral waters for bathing or recreation.

In the East, South and Southeast Asia, visitors usually emphasize the harmony between man and nature. They care not only about the natural hot springs themselves, but also about the natural environment surrounding them. Onsen tourism has gained significant academic interest as a combination of natural resources and recreational experiences. Early researchers focused on the physical treatment of hot spring resources. Medical scholars analyzed the medical functions and value of hot spring resources. Spa developers often relied on the medical sector to publicize medical functions and values in order to achieve their goal of attracting customers. In the case

of large-scale development, people are gradually focusing on the comprehensive evaluation of hot spring resource development. With the growing awareness of the therapeutic value of hot springs, people have begun to pay attention to the therapeutic value brought by hot springs and their surrounding environments. Many scholars have begun to pay attention to hot spring resorts and the group demand of hot spring vacation. Attention is paid to the behavioral and demand characteristics of visitors to hot spring resorts, their motivations for traveling, and their evaluation of the spa experience. In addition to focusing on the value of spa resources, researchers have begun to discuss the factors influencing the quality of spa environments, such as the spa's landscape environment, the spa's tourism brand, the coordinated development of the environment and economy around the spa resort and the macro-level ecological situation outside the spa. Other scholars focus on the services and activities of hot spring resorts, service quality and visitors' preferences in the form of case studies.

2.2.7 Research Concerning Hot Spring Visitors' Attitude

Visitors' satisfaction has always been a fundamental goal of hot spring resorts. This is because satisfied visitors have a high probability of repurchasing products or services and are more likely to develop loyalty to the resort. In addition, extensive literature has shown that satisfaction affects behavioral intentions. Visitors who are satisfied with a destination are likely to return or recommend other visitors. Existing literature suggests that visitor satisfaction relies on a range of elements that fall within the subjective domain of the visitor and the objective quality of the product or service experienced. The complexity of visitor satisfaction depends on its richness in terms of content.

The literature on visitor satisfaction can be categorized into two groups: (1) focusing attention on the components that influence satisfaction (customer perspective); and (2) focusing on the intrinsic characteristics of products and services and the quality of that service. In spa tourism, the primary literature has examined the relationship between service quality, affect, destination image, revisit intentions, and customer satisfaction. Most scholars have synthesized the effects of service quality and effect on customer satisfaction, shifting their influence to spa customers' perceived intentions and destination image.

While many researchers have questioned what visitor satisfaction in outdoor areas of spa resorts depends on, few studies have focused on visitors' overall satisfaction with the outdoor environment of a spa, and there are similarly fewer studies that have evaluated the importance of the healing factor of the outdoor spa area and evaluated satisfaction. Spa tourism integrates the functions of tourism, recreation, and healing into a more complex experiential tourism than other tourism components (Serbulea & Payyappallimana 2012). Therefore, it is essential to find those factors that may affect tourist satisfaction. For developers, it is possible to optimize the quality of integrated services. For designers, important user feedback can be obtained based on the importance of healing factors and related aspects of satisfaction, which can optimize future designs and improve existing ones. For the spa visitor, it is also the beneficiary of the final spa environment optimization. Therefore, conducting research on the importance and satisfaction of outdoor healing environments factors of from the visitor's perspective can result in a win-win situation for all parties.

By summarizing the literature on hot spring tourism research and visitor attitude research, there are at least three research situations. First, few studies have systematically analyzed the healing factors of the outdoor spa component of a spa resort at the micro level. Second, although researchers are increasingly recognizing the importance of key healing factors on visitor satisfaction, few studies have conducted multidimensional empirical research. Thirdly, the factors affecting visitor satisfaction identified in previous studies are considered to be isolated from each other, such as environmental quality, service quality, and product type, and the lack of strong internal linkages among the factors is not sufficiently instructive for the next step in optimizing the environment. In summary, the field of spa healing landscapes still needs to be analyzed systematically and comprehensively in both qualitative and quantitative terms, and researchers have seldom investigated the influential relationship between spa visitor satisfaction factors. Based on the analysis of the above situation, it is of great academic value and practical significance to study the visitor attitudes of healing factors of outdoor spa environments.

2.3 Outdoor Healing Landscape Factors

The ecological environment factor of an outdoor spa possesses a variety of components such as fresh air, sunlight, plants, and water features. In particular, the plant communities are capable of displaying a variety of colors, scents and different natural textures as the seasons change. There have been numerous empirical and environmental evaluative studies confirming that outdoor healing landscapes provide many positive benefits in terms of an individual's physical, mental, and emotional well-being (Marcus & Barnes 1999; Martin 2002; Nakamura 1992; Sternberg 2009; Ulrich 1981; Ulrich et al. 1991).

The majority of spa healing environments in China are dominated by outdoor spa environments, with indoor spas as an adjunct. Globally, outdoor hot springs in the East and indoor spa hydrotherapy in Europe are two important healing modalities, and both have received widespread attention and popularity. However, under the influence of geographical distribution and cultural background, China and Europe present significant differences in the built forms of spa environments, mainly in design concepts, functional layouts and service modes (Lihua, 2005; Xiaoqian, 2012). China is dominated by outdoor hot springs in mountain, water and forest environments, which are integrated with the natural environment of the surrounding slopes, forming a unique mountain, water and forest hot spring environment. Europe, on the other hand, prefers indoor spas (Chen et al. 2017; Liu & Li, 2015; Yu, 2022). These two differences are mainly caused by the geographic, cultural, and historical contexts behind them.

2.3.1 Outdoor Mountainous Hot Springs

1) Geographic factors: China has a vast territory and diverse topography and landscape, which provides unique conditions for the formation of mountain hot springs. Especially in Yunnan Province, due to the collision and extrusion of the Indian plate and the Eurasian plate, rich geothermal resources characterized by mountainous and sloping terrain have been formed, which provide abundant heat sources for the formation of hot springs (Wang, 2012; Zhao et al., 2014). Coupled with Yunnan's mild climate, with not particularly hot or cold seasons, the mountain, water and forest

environments of outdoor hot springs also characterize the hot spring environment in Yunnan Province.

(2) Cultural factors: Traditional Chinese culture advocates the philosophical idea of "the unity of heaven and mankind" and pursues the harmonious coexistence of man and nature (Xiaomeng, 2014; Xiaoqian, 2012). In this cultural context, outdoor hot springs have become an ideal way of healing and recreation. By visiting hot spring resorts, people can relax and immerse themselves in the natural environment, getting both physical and spiritual healing.

(3) Historical factors: China has a long history of hot spring bathing, and the tradition of hot spring bathing has existed since ancient times. In ancient times, hot springs were regarded as a sacred water source with the efficacy of curing diseases and prolonging life (Qi, 2013; Shaowu et al., 2020). As a result, many emperors and aristocrats used hot springs as special resting places, building numerous hot spring palaces and rich gardens (Shiyang, 2019). These historical sites still attract many tourists to visit and experience them. While people enjoy the hot spring environment, they can simultaneously enjoy the beautiful natural scenery and feel the healing of nature's ecological environment.

To summarize, most of China's hot spring resorts are based on outdoor hot spring environments, with indoor hot springs as a supplement. As a natural healing resource, outdoor landscape hot springs have significant benefits in promoting people's health. Many hot spring resorts also incorporate traditional Chinese medicine and modern health concepts to provide multiple benefits of physical and mental healing.

First, China's mountain hot springs are rich in a variety of minerals, such as sulfur, calcium, magnesium, and potassium, which are absorbed into the body through the skin and can regulate metabolism and enhance immunity. Sulfur hot springs have significant antibacterial and anti-inflammatory effects, which can help relieve symptoms of skin diseases, arthritis and rheumatism. Calcium and magnesium ions, on the other hand, help relax muscles, relieve fatigue and improve sleep quality. For people who have been under high pressure for a long time, the minerals in the hot spring water can play a role in soothing the nerves and improving the mood, helping to restore physical and mental balance. Secondly, mountain hot springs are often located in mountainous areas with beautiful natural environments, far from the hustle

and bustle and pollution of the city. Such environments not only provide pure air and a tranquil atmosphere, but also help people relax and reduce stress. Studies have shown that exposure to the natural environment can significantly lower blood pressure, heart rate, reduce anxiety and depression, and improve overall mental health. While enjoying the hot springs, people can also achieve total relaxation of body and mind by viewing the beauty of the landscape and listening to the sounds of nature. In addition, hot spring therapies are often combined with TCM health theories to form a unique healing system. According to Chinese medicine, hot springs can unclog meridians and channels, and have a good therapeutic effect on the cold body. Many hot spring resorts will provide professional Chinese massage, acupuncture, cupping and other services, these traditional therapies and hot spring baths complement each other, can more effectively promote blood circulation, enhance the body's self-repair ability. Finally, hot spring tourism also provides opportunities for socializing and family interaction. When family members or friends go on a spa vacation together, they can not only enhance their emotional connection with each other, but also improve their mental health through a shared relaxation experience. In hot spring resorts, people can enjoy a variety of leisure activities, such as yoga, Tai Chi, and hiking on nature trails, which help to improve physical flexibility and enhance cardiorespiratory fitness for all-around health enhancement.

Overall, China Landscape Spa offers comprehensive health benefits through its rich mineral content, beautiful natural environment, healing methods combined with TCM, and promotion of social interaction. Whether it is for physical disease management or psychological stress relief, hot springs therapy has shown unique and significant healing effects that are worth promoting and applying in modern healthcare.

2.3.2 Outdoor Healing Landscape Factors of Hot Spring

Hot springs healing landscape is an important category of rehabilitation landscape. In recent years, many domestic and foreign researchers have conducted multidimensional studies on healing landscapes and hot springs healing landscapes, such as planning and design, facilities of healing landscapes, and evaluation of healing environments. The boundary of content of this study focuses on the outdoor hot spring environment part of the comprehensive hot spring resort in Yunnan. The

outdoor hot spring area is an important part of the whole resort and the main place for people to have outdoor hot spring healing. This study first selects the most important healing factors in the outdoor hot spring area based on literature analysis, and then evaluates the importance and satisfaction of the healing factors in the outdoor hot spring area from the perspective of visitors. The results of the evaluation will help optimize the environmental quality and visitor experience of the outdoor hot spring area and provide a scientific basis for operation managers to promote the sustainable development of the hot spring area. In the following, based on the literature analysis, the most core elements of the outdoor hot spring environment will be selected, and the importance and satisfaction of the healing components will be investigated and evaluated.

In an integrated spa resort landscape, visitors' experiences come from multiple aspects (Kaung-Hwa Chen et al. 2012); Serbulea et al. 2012). There are seeing, smelling, hearing, and touching from the sensory aspect, as well as function, service, and security from the feeling emotion, and the feeling of using various environmental facilities. Through the summary of the literature, the factors affecting the environmental quality of hot spring vacation and the sense of experience of tourists are as follows four aspects:

- 1) Ecological environment elements (Marcus & Cooper, 2013). Healing and health care in comfortable climatic conditions can reduce the heat load of the human body and enhance physical fitness. Eco-environmental elements include climate comfort, hot spring water, and air quality (Marcus & Cooper, 2013). Comfortable forest environment can reduce the visual tension, while maintaining and repairing the physical and mental health of people, reducing the stress of life and work, etc. Topography and geomorphology are the inherent landscape resources of the hot spring area, and the species diversity of plant communities can reflect the ecological condition of the area, which is an important aspect to increase the sense of experience of tourists.

- 2) Spatial perception elements. Reasonable functional zoning can maximize the satisfaction of the needs of recreationists and is an important basis for landscape design evaluation. Recreational spa landscape zoning should include service reception functional area, health consultation functional area, hot spring recuperation functional

area, traditional Chinese medicine health care functional area, and recreation rest functional area (Gayle, 2014; Serbulea & Payyappallimana, 2012) based on the hot spring healing specificity, recuperators pay more attention and sensitivity to the definition of private space, and the reasonable arrangement of open, semi-open and private space can enable people to obtain sufficient security and comfort (Gayle, 2014), site accessibility broadly consists of space, time and emotion, and the reasonable arrangement of road transportation and attractions can enable people to stop and enhance the ephemeral experience, on the contrary, it makes people tired and bored; site scalability includes scale and proportion, rhythm and tempo, etc., a reasonable sense of scale of the site and landscape elements can give people a natural and comfortable feeling, and promote mutual communication and dialog.

3) Sensory experience elements (Marcus & Cooper, 2013). Vision is the primary source for people to obtain the degree of landscape aesthetics and landscape impact, and different landscape perspectives, landscape colors, and landscape forms can give people different psychological feelings, which stimulate people's mental senses and cause the human body to produce intuitive responses (Chen et al. 2012; Mi et al. 2019) the experience of acoustic landscapes stimulates the human brain, based on memories and thinking produce associations, and traditional gardens create rich mood beauty through acoustic landscapes; acoustic landscapes can affect the fluctuation of human inner emotions, and the auditory stimulation of many different sounds such as the environment, climate, plants, and music in landscape design can help patients to achieve physical and mental aspects of rehabilitation; odors transmitted to the brain through the olfactory nerves can enable people to directly access the emotions of happiness or sadness, and in addition, odors have an invigorating or calming effect (Jiang, 2013; Wang et al.2022), each landscape material has different texture, texture, shape, size, etc., touching the above will stimulate the senses and relieve stress, and it is theorized that the comfort generated by the contact can alleviate the psychological and mental stress and reduce tension and anxiety (Gayle, 2014). As the sense of taste comes from the leaves, flower buds, fruits and spa food of plants in the spa environment, enriching the choice of tourists in the resort.

4) Environmental facilities elements. Well-supported service facilities are an important symbol of the feasibility of carrying out recreational activities. Perfect service

system, sanitary facilities, lighting facilities and publicity facilities can provide security for recreation activities (Serbulea & Payyappallimana, 2012); leisure facilities are the carriers of all kinds of recreation activities, and excellent configuration of recreation facilities can provide a good basis for rest and recuperation activities with a reasonable layout, The leisure facilities with beautiful shape and comfortable use can not only improve the aesthetics of the landscape, but also directly affect the degree of use and frequency of use of the artificial landscape; Recreation facilities act on the human body directly from physiological and psychological aspects through the use of recreationists (Marcus & Cooper, 2013); The local cultural characteristics are the expression of the hot springs recuperation culture and characteristics, which can enhance the tourists' sense of identity of the landscape and the sense of sense of trust. As the hot springs healing activities are more purposeful, and the richness of the surrounding attractions plays some supplementary roles to the recuperation activities (Chen, et al. 2012; Serbulea, et al. 2012), lengthening the travel route of the hot springs vacation, and enriching the content of the tourists' vacation.

Among these healing components, hot spring water is the main material basis for the development and utilization of hot spring tourism destinations, one of the main factors of tourism attractions, and an objective necessary condition for determining the healing environment of hot springs (Zhang, 2023). The healing value of hot spring resources can be evaluated in terms of hot spring water quality, geothermal geomorphology, hydrogeology, plant environment and climate environment. Among them, the quality of hot spring water resources has the greatest weight and is in the most important position, which is the basis for attracting visitors. Next is the plant quality, involving the combination pattern of trees, shrubs and grasses, emphasizing the natural combination of imitation plants, and also reflecting the natural plant community and distribution structure. Lastly, the climatic environment, including temperature, air quality, relative humidity and other aspects (Zhang, 2023). A hierarchical formulation of the comprehensive assessment value for quantitative evaluation of outdoor hot springs' healing value (Xinlei, 2023), including 1) climatic conditions, 2) air quality, 3) water quality, 4) water temperature, 5) elevation, 6) spring flow, 7) topographic features, 8) tourist flow. The value of hot spring resources emphasizes the establishment of a multi-level and multi-species structure, thus

promoting a balanced and coordinated development and utilization among systems. Therefore, to assess the healing value of hot spring resources, the quality of hot spring water determines the healing function of hot springs, while the temperature and flow rate of hot springs affect the scale and sustainability of hot spring resorts (Chengshun, 2015; Zhang, 2023).

Through the analysis of the literature, it is summarized that there are two main dimensions for determining the healing factors of the outdoor environment of hot springs. The first dimension is from the physical environment perspective of healing environment design and construction, and the main factors of the healing environment are ecological factors and environmental facilities. The second dimension is the visitor's healing experience, and the main factors of the healing environment are the spatial function perception and sensory experience. The four types of factors have their own characteristics and contain different healing components, and the evaluation criteria are also different. Therefore, in this study, we focus on the ecological environment factor, which is the core resource element of hot spring resorts. Based on visitor characteristics and behaviors, the importance and satisfaction of the healing components encompassed by the ecological environment factor were investigated and analyzed. The importance of healing components according to the literature is shown in Table 2.1.

Table 2.1 Key Healing Elements of Outdoor Hot Spring Environments

Components	Definition
Hot spring water	Spa water contains a wide range of minerals and trace elements that have different healing effects on human health. Spa water is the most central element, including the mineral content and type of water, water temperature and flow rate.
Vegetation Quality	This refers to the cover and distribution structure of arborvitae in the outdoor spa area.
Plant Diversity	The richness of plant species, the aesthetics and reasonableness of the combination of layers, colors, flowering period and smell.
Climate Comfort	Involves temperature, humidity, elevation, etc.
Air Quality	No toxic or irritating odor gases, PM2.5 compliance.
Facilities	Refers to service, recreation and healing facilities in the environment. Includes signage systems, light fixtures, kiosks, seating, and spa healing equipment.
Environmental Cleanliness	It refers to the hygiene standard of the spa water and the cleanliness of the roads and resting places.
Terrain Slope	Is the magnitude and richness of elevation changes in the outdoor environment.

Table 2.1 Continued

Components	Definition
Hot spring water	Spa water contains a wide range of minerals and trace elements that have different healing effects on human health. Spa water is the most central element, including the mineral content and type of water, water temperature and flow rate.
Vegetation Quality	The cover and distribution structure of arborvitae in the outdoor spa area.
Plant Diversity	The richness of plant species, the aesthetics and reasonableness of the combination of layers, colors, flowering period and smell.
Climate Comfort	Involves temperature, humidity, elevation, etc.
Air Quality	No toxic or irritating odor gases, PM2.5 compliance.
Facilities	Service, recreation and healing facilities in the environment. Includes signage systems, light fixtures, kiosks, seating, and spa healing equipment.
Environmental Cleanliness	The hygiene standard of the spa water and the cleanliness of the roads and resting places.
Terrain Slope	The magnitude and richness of elevation changes in the outdoor environment.
Spatial Functional Perception	The visitor's feeling of using the functions needed for the outdoor spa area. Generally, it includes the functions of spa healing, resting function, exercise function, and entertainment.
Accessibility	The feeling of convenience for visitors to use the various spaces in the outdoor spa area to change transportation, including the main and secondary road networks, and the connection of various spaces.
Space Security and Enclosure	The needs of visitors for different spaces, from open public spaces to small spaces of enclosure and privacy.
Scale Comfort	The visitor's perception of the humanization, spatial scale and spatial aesthetics of various types of spatial design.
Five Senses Experience	The visitor's comprehensive experience of using the spa environment through several senses: sight, smell, touch, hearing and taste.

According to the literature analysis, the research mainly focuses on the natural environment, environmental facilities, spatial perception and sensory experience of visitors' experience in terms of design and project construction of hot spring environment, analyzing the importance of healing factors in hot spring environment according to the importance of hot spring environment, this research focuses on the natural environmental elements in hot spring environment, including Hot spring water, vegetation quality, plant diversity, climate comfort, air quality, environmental cleanliness, terrain slope,. A total of 7 environmental components.

Table 2.2 Summary of Components of Ecological Environment Factor

Components	Definition
Hot spring water	Spa water contains a wide range of minerals and trace elements that have different healing effects on human health. Spa water is the most central element, including the mineral content and type of water, water temperature and flow rate.
Vegetation Quality	The cover and distribution structure of arborvitae in the outdoor spa area.
Plant Diversity	The richness of plant species, the aesthetics and reasonableness of the combination of layers, colors, flowering period and smell.
Climate Comfort	Involves temperature, humidity, elevation, etc.
Air Quality	No toxic or irritating odor gases, PM2.5 compliance.
Environmental Cleanliness	The hygiene standard of the spa water and the cleanliness of the roads and resting places.
Terrain Slope	The magnitude and richness of elevation changes in the outdoor environment.

2.4 Previous Related Works

1) Research related to healing factors in outdoor spa areas

Taken together, most of the literature studies have focused on planning and design methods, as well as comprehensive environmental evaluations from the visitor's perspective. The evaluation indicators cover the natural environment, spa facilities, service quality, resort brand image, environmental quality around the resort, and transportation accessibility (Mi et al., 2019). However, there is less literature that

focuses the scope of research on the outdoor spa area of spa resorts and is based on the healing factors of the environment (Chen et al., 2020). The main relevant studies by previous researchers are shown in Table 2.3.

Table 2.3 Literature Sources of Components of Ecological Environmental Factor

Ecological Environment Components	Ecological Environment Component	Previous Research Literature	Main Points and Research Perspectives, Research Tools, Research Methods
Climate Comfort	Temperature, Humidity, Wind Speed	Becker (2010)	Research Perspective: Influence of climate on human health; Research Tools: Questionnaire survey; Research Methods: Statistical analysis
		Spagnoli et al. (2018)	Research Perspective: Impact of climate comfort on psychological well-being; Research Tools: Psychological health questionnaire; Research Methods: Factor analysis
		Nakamura et al. (2008)	Research Perspective: Influence of climate on tourist satisfaction; Research Tools: Interviews; Research Methods: Qualitative analysis
Hot Spring Water	Mineral Composition, Water Temperature	Fioravanti et al. (2011)	Research Perspective: Therapeutic effects of hot spring water on arthritis; Research Tools: Clinical experiments; Research Methods: Experimental control
		Nakamura et al. (2004)	Research Perspective: Effects of hot spring mineral composition on skin diseases; Research Tools: Skin testing; Research Methods: Experimental study
		Matsumoto & Kawai (2000)	Research Perspective: Influence of hot spring water temperature on blood pressure; Research Tools: Blood pressure monitoring; Research Methods: Experimental research
Air Quality	Negative Ion Concentration, Pollution Level	Lee & King (2009)	Research Perspective: Impact of air quality on visitor satisfaction; Research Tools: Field measurements; Research Methods: Questionnaire survey and data analysis

Table 2.3 Continued

Ecological Environment Components	Ecological Environment Component	Previous Research Literature	Main Points and Research Perspectives, Research Tools, Research Methods
Air Quality	Negative Ion Concentration, Pollution Level	Wang et al. (2011)	Research Perspective: Effect of air pollution on therapeutic outcomes of hot springs; Research Tools: Air quality monitoring; Research Methods: Regression analysis
		Chen et al. (2015)	Research Perspective: Influence of negative ions on psychological relaxation; Research Tools: Psychological health questionnaire; Research Methods: Experimental research
Plant and Vegetation Quality	Vegetation Coverage, Plant Health	Smith & Puczko (2014)	Research Perspective: Impact of greenery on psychological health; Research Tools: Psychological health questionnaire; Research Methods: Correlation analysis
		Ulrich (1984)	Research Perspective: Effects of plant landscapes on psychological restoration; Research Tools: Visual simulation; Research Methods: Experimental design
		Kaplan & Kaplan (1989)	Research Perspective: Natural environment and recovery from mental fatigue; Research Tools: Questionnaire survey; Research Methods: Statistical analysis
Topographic Feature	Altitude, Slope	Lund (2000)	Research Perspective: Influence of terrain features on therapeutic effects; Research Tools: Terrain analyzer; Research Methods: Geographic Information System (GIS) analysis
		Rundle et al. (2007)	Research Perspective: Urban terrain and its impact on health; Research Tools: Terrain data; Research Methods: Regression analysis
		Fry et al. (2005)	Research Perspective: Role of natural terrain in promoting outdoor activities; Research Tools: Field observations; Research Methods: Qualitative analysis

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Table 2.3 Continued

Ecological Environment Components	Ecological Environment Component	Previous Research Literature	Main Points and Research Perspectives, Research Tools, Research Methods
Plant Species Diversity	Number of Plant Species, Ecosystem Diversity	Erfurt-Cooper & Cooper (2009)	Research Perspective: Influence of plant diversity on ecological environment; Research Tools: Ecological survey; Research Methods: Biodiversity index calculation
		Tilman et al. (2001)	Research Perspective: Effects of plant diversity on ecosystem stability; Research Tools: Experimental sites; Research Methods: Long-term experiments
		Díaz et al. (2007)	Research Perspective: Biodiversity and ecosystem function; Research Tools: Ecological models; Research Methods: Model simulation
Environmental Cleanliness	Water Cleanliness, Waste Management	Chen et al. (2013)	Research Perspective: Influence of environmental cleanliness on visitor satisfaction; Research Tools: Visitor satisfaction questionnaire; Research Methods: Regression analysis
		Vujic et al. (2010)	Research Perspective: Impact of environmental cleanliness on public health; Research Tools: Environmental monitoring; Research Methods: Data analysis
		Sutton & Gyuris (2015)	Research Perspective: Effect of environmental cleanliness on visitor behavior; Research Tools: Visitor survey; Research Methods: Statistical analysis

2) Research related to environmental evaluation of outdoor hot spring areas

In recent years, there has been an increasing number of studies on user experience and satisfaction in hot spring tourism. The results of many studies have shown that the satisfaction of health tourists directly affects their behavioral intentions and that these behavioral intentions have a positive impact on the competitiveness of an organization. Therefore, understanding and satisfying customers' needs is the key to

the success of any spa tourism organization. The main relevant previous studies are shown in Table 2.4.

Table 2.4 Previous Research Related to the Study

Reference and Year	Independent Variable	Dependent Variable	Perspectives	Tool	Context
Becker (2010)	Human Health	Climate Comfort	Influence of climate on human health	Questionnaire Survey	Aquatic therapy environments
Spagnoli et al. (2018)	Psychological Well-being	Climate Comfort	Impact of climate comfort on psychological health	Psychological Health Questionnaire	Work environments in Northern and Southern Europe
Nakamura et al. (2008)	Tourist Satisfaction	Climate Comfort	Influence of climate on tourist satisfaction	Interviews	Japanese hot spring resort
Fioravanti et al. (2011)	Arthritis Treatment Effectiveness	Hot Spring Water Composition	Therapeutic effects of hot spring water on arthritis	Clinical Experiments	Rheumatic disease treatments
Nakamura et al. (2004)	Skin Disease	Mineral Composition of Hot Spring Water	Effects of hot spring minerals on skin diseases	Skin Testing	Dermatological treatments
Matsumoto & Kawai (2000)	Blood Pressure	Water Temperature	Influence of hot spring water temperature on blood pressure	Blood Pressure Monitoring	Hypertension therapy
Lee & King (2009)	Visitor Satisfaction	Air Quality	Impact of air quality on visitor satisfaction	Field Measurements	Taiwanese hot spring resorts

Table 2.4 Continued

Reference and Year	Independent Variable	Dependent Variable	Perspectives	Tool	Context
Wang et al. (2011)	Therapeutic Outcomes	Air Pollution	Effect of air pollution on therapeutic outcomes of hot springs	Air Quality Monitoring	Chinese hot spring areas
Chen et al. (2015)	Psychological Relaxation	Negative Ion Concentration	Influence of negative ions on psychological relaxation	Psychological Health Questionnaire	Hot spring environments in China
Smith & Puczko (2014)	Psychological Health	Vegetation Quality	Impact of greenery on psychological health	Psychological Health Questionnaire	Hot spring resorts
Ulrich (1984)	Psychological Restoration	Plant Landscapes	Effects of plant landscapes on psychological restoration	Visual Simulation	General natural environments
Kaplan & Kaplan (1989)	Recovery from Mental Fatigue	Natural Environment	Natural environment and recovery from mental fatigue	Questionnaire Survey	Various natural settings
Lund (2000)	Therapeutic Effects	Terrain Features	Influence of terrain features on therapeutic effects	Terrain Analyzer	Balneological sites in the USA
Rundle et al. (2007)	Resident Health	Urban Terrain	Urban terrain and its impact on health	Terrain Data	Urban areas in New York City
Fry et al. (2005)	Outdoor Activity Promotion	Natural Terrain	Role of natural terrain in promoting outdoor activities	Field Observations	Various outdoor environments

Table 2.4 Continued

Reference and Year	Independent Variable	Dependent Variable	Perspectives	Tool	Context
Erfurt-Cooper & Cooper (2009)	Ecological Environment	Plant Species Diversity	Influence of plant diversity on ecological environment	Ecological Survey	Hot spring environments
Tilman et al. (2001)	Ecosystem Stability	Plant Species Diversity	Effects of plant diversity on ecosystem stability	Experimental Sites	Various ecological systems
Díaz et al. (2007)	Ecosystem Function	Biodiversity	Biodiversity and ecosystem function	Ecological Models	Global ecological systems
Chen et al. (2013)	Visitor Satisfaction	Environmental Cleanliness	Influence of environmental cleanliness on visitor satisfaction	Visitor Satisfaction Questionnaire	Chinese hot spring resorts
Vujic et al. (2010)	Public Health	Environmental Cleanliness	Impact of environmental cleanliness on public health	Environmental Monitoring	Various public environments
Sutton & Gyuris (2015)	Visitor Behavior	Environmental Cleanliness	Effect of environmental cleanliness on visitor behavior	Visitor Survey	Great Barrier Reef Marine Park
Kim et al. (2021)	Stress Reduction	Hot Spring Experience	Psychological benefits of hot spring bathing	Physiological and psychological measurements	Korean hot spring resorts
Wang et al. (2022)	Visitor Health	Water Quality	Effects of water quality on visitor health	Water quality testing and health surveys	Hot spring resorts in China
Lee & Chen (2020)	Visitor Experience	Thermal Comfort	Thermal comfort and satisfaction of visitors	Thermal comfort assessments	Taiwanese hot spring areas

Table 2.4 Continued

Reference and Year	Independent Variable	Dependent Variable	Perspectives	Tool	Context
Zhang et al. (2023)	Well-being	Biodiversity	Impact of biodiversity on visitor well-being	Biodiversity assessments and surveys	Hot spring resort environments in Japan

Based on the literature, the innovation of this study is to refine the components of the healing factors in the ecological environment category and evaluate these factors in detail on the dual dimensions of importance and satisfaction. By comparing the universality of outdoor spa environments with case-specific satisfaction, this study is able to propose more targeted spa environment optimization strategies to enhance the overall experience and healing effect of spa resorts. This will help to improve visitors' overall satisfaction and intention to revisit, enhance the market competitiveness and brand value of hot spring resorts, and promote the sustainable development of hot spring tourism.

Chapter 3

RESEARCH METHOD

3.1 Steps of the Study

The design of this study is based on the positivist research paradigm. Positivist research is due to the ontology of objectivism. The approach emphasizes that the world is real and observable. People need to know the world by objectively analyzing quantitative data. Human society has objective regularities just like nature. The design of environmental space is a cross-discipline involving natural and social sciences. On the one hand, when doing the design of spatial environment, it is necessary to follow the relevant requirements of technical implementation in natural science. On the other hand, the construction of the spatial environment and is for the service of human beings, need to understand the characteristics of human beings, behavioral laws, interaction needs and other aspects of social life. There are specific characteristics and regularities based on human activities and spatial needs in spa environments. These needs and laws can be observed and scientifically verified, relying on scientific verification to draw more objective research conclusions.

In the research path, the deductive research method is used. The deductive method is a research method based on logical reasoning and deductive inference. Its basic idea is to verify the correctness of hypotheses through logical reasoning and deductive inference. In the research process, the researcher first puts forward a hypothesis and then verifies whether this hypothesis is valid through logical reasoning and deductive inference. If the results of the verification are consistent with the hypothesis, the hypothesis is valid; if the results of the verification are inconsistent with the hypothesis, the hypothesis is not valid. Deduction is characterized by its logical nature, clear reasoning process, and accurate conclusions. Deduction draws conclusions through logical reasoning and deductive inference, characterized by strict logic and a clear reasoning process, which can lead to accurate conclusions. At the same time, the research method of deduction is also characterized by reproducibility and verifiability, which enables the results of the study to be widely recognized and applied.

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In terms of the strategy of the research, this study adopts quantitative research method. Quantitative research is scientific research that determines the quantitative prescriptive nature of a certain aspect of a thing, and it is a research method and process that expresses problems and phenomena in terms of variable relationships, and then goes on to analyze, validate, and interpret them in order to obtain meaningful conclusions. Quantitative is based on digital symbols to measure, through the characteristics of the object of study, according to some kind of standard quantitative comparison to determine the characteristics of the object value, to show the law of change of the number of certain factors.

In summary, this study is a quantitative study of the research object under the positivist research paradigm, using a deductive approach. The specific steps of the study are as follows:

Step 1: After selecting the research topic, a large amount of high-level literature was collected in this field. Next, the literature was analyzed read and a literature review was conducted. Through the literature review, the main healing factors and core components affecting the outdoor spa area of the spa resort were identified, thus determining the ecological environmental factors and seven healing components as dependent variables in the quantitative study.

Step 2: Analyze the characteristics of visitors and the behavioral characteristics of visitors based on the characteristics of the outdoor hot spring environment. Characteristics of visitors and visitors' behaviors in the study were identified as independent variables.

Step 3: Obtain research data using the survey method in quantitative research. A structured questionnaire is designed based on the characteristics and content of the variables and independent variables, while drawing on survey experiences in the literature.

Step 4: The questionnaire was synthesized and analyzed using statistical analysis. SPSS statistical software R26 was used to analyze the data collected from Lee's questionnaire. The analysis process follows the following steps: 1) Data cleaning and processing: the collected data are cleaned and processed, including checking and correcting errors and outliers in the data. 2) Reliability and validity test: the data were tested for reliability and validity to ensure that the questionnaire had reliability and

validity, and the methods used included KMO coefficient, Bartlett's Test, and Cronbach Alpha analysis. 3) Descriptive statistical analysis. Descriptive statistical analysis was used to describe the basic situation of the sample, including the number of people, age, gender, occupation, income and other factors. This helps to understand the basic characteristics of the sample and provides basic data for subsequent analysis. 4) Correlation analysis. *t*-test and ANOVA are mainly used in data analysis for correlation analysis.

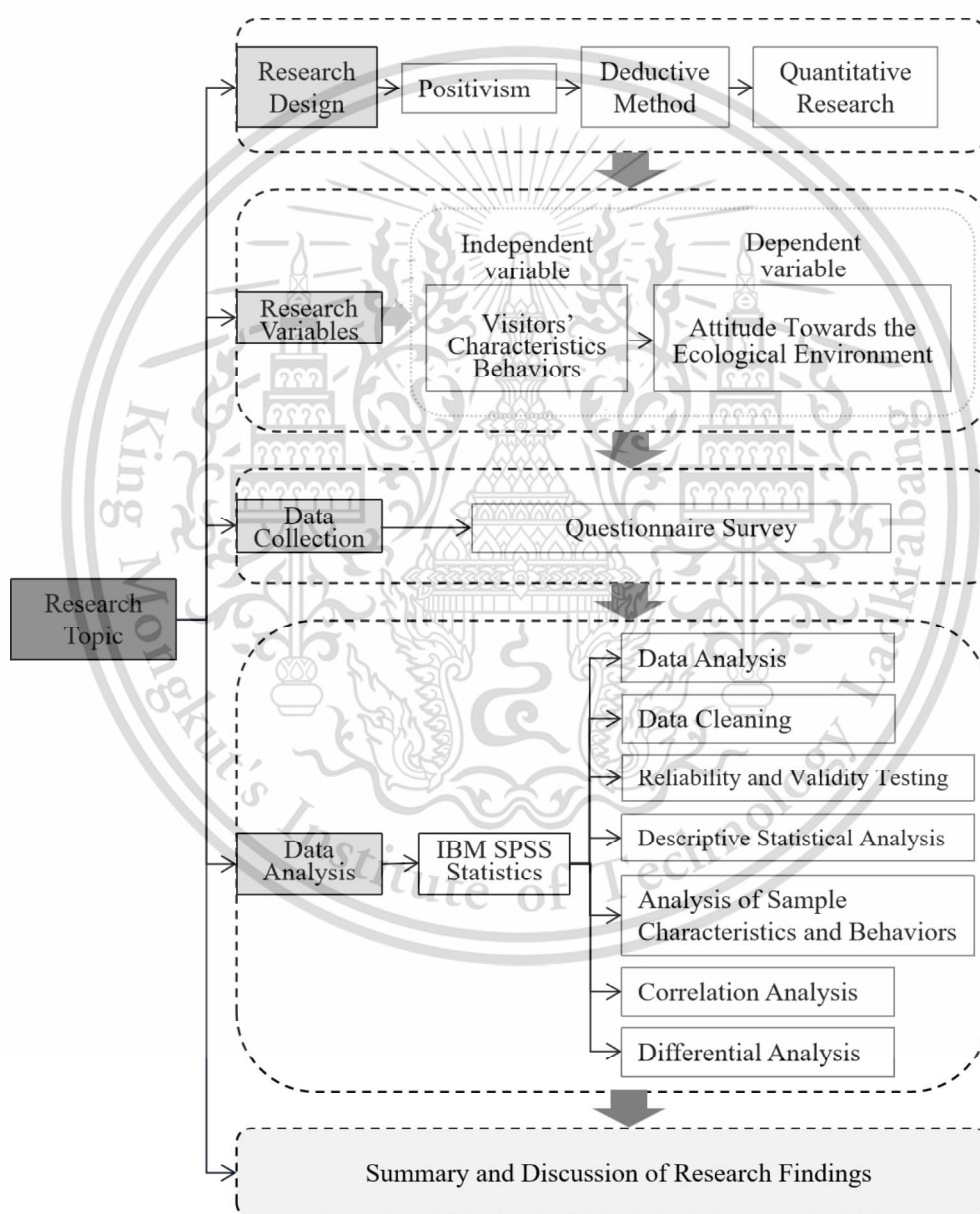


Figure 3.1 Conceptual and Operational Research Framework

Correlation analysis is used to study the correlation between independent variables and dependent variables. For example, the correlation between the dependent variable score and the independent variable factors such as age, gender and income. Analysis of variance: in the analysis of Likert scales, analysis of variance can be used to study the differences in the scores of different sample groups in terms of total scores or individual topics.

Step 5: Categorize and interpret the results of the statistical analysis.

Step 6: Summarize and discuss the results of the research on the attitudes of visitors to the outdoor spa area.

The research conceptual diagram is shown in Figure 3.1

3.2 Population and Samples

3.2.1 Hot Spring Resorts in Yunnan

The general context of this study is Yunnan Province, China. Yunnan is the most geologically complex and neo-tectonically active region in China and is situated at the conjunction of the collision of the Eurasian and Indian plates. Yunnan Province is the only recent volcanic and high-temperature geothermal hot springs area on the Chinese mainland, harboring rich high-temperature geothermal resources, with 1,026 hot springs sites, accounting for one-third of the total number of hot springs in the country (Yunnan Provincial Tourism Resources Report, 2021). The hot springs contain calcium, strontium, sulfur, and many other healthful trace elements and chemical components. Yunnan Province tops the country in terms of the total number of hot springs and the richness of geothermal resources (Yunnan Province Tourism Resources Report, 2021). There are 1,007 hot spring enterprises and 35 comprehensive hot spring resorts in Yunnan. 27,337,800 people were received by hot spring tourism in 2021, and the income from hot spring tourism amounted to 6.508 billion yuan. According to the statistics of the industry development report, the average number of employees in the upper-scale enterprises is 145, and the number of employees in Yunnan hot spring enterprises is about 145,000 (Yunnan Tourism Resource Report, 2021). The number of hot springs enterprises in Yunnan is about 1,000,000 (Yunnan Tourism Resource Report,

2021).

Before proceeding with the selection of the study cases, the researcher conducted a comparative study of 35 integrated hot spring resorts in Yunnan Province, as integrated hot spring resorts usually set up larger outdoor hot spring areas, and these areas have good ecological environment and healing value. The comparative study culminated in the selection of 28 for further detailed comparisons based on criteria such as spa type, functional layout, number of facilities, and outdoor spa area. Including operation history, functional area, facilities, number of pools, etc. The comparison of Hot Spring Resorts in Yunnan Province is shown in Appendix B.

3.2.2 Hot Spring Resort Visitors

The case of this study was chosen as Anning Jinfang Hot Spring because this hot spring is one of the very representative hot springs among the hot spring resorts in Yunnan Province. Firstly, Anning Jinfang Hot Spring has a long history of excellent hot spring resources and has been in operation for 23 years; secondly, Anning Jinfang Hot Spring covers an area of more than 60 acres with 37 hot spring pools, which encompasses the natural environmental factors involved in this study and the seven healing components such as Hot spring water, plants and vegetation, and topographical features; lastly, the outdoor hot spring area of Anning Jinfang Hot Spring includes various healing supportive spaces such as hot spring soaking space, activity space, functional pool, children's pool, hot spring exercise pool, etc., which is a good example for this study. The outdoor hot spring area of Anning Jinfang Hot Spring includes various healing supportive spaces such as hot spring bathing space, activity space, functional pool, children's pool, and hot spring sports pool, which is very representative of hot spring resorts in Yunnan. For these reasons, Anning Jinfang Hot Spring was chosen as the research sample for this study, which helps to control and comprehensively present the variables in the study and obtain valuable research results.

The purpose of this study is to investigate the importance attitude and satisfaction of visitors to the integrated hot spring resort towards the healing components of the ecological environment category. The total population is the entire group of visitors to the integrated hot spring resort, while the sample is a representative

portion selected from it.

When deciding the sample size, statistical sample size estimation methods such as efficacy analysis or sample size formula are usually used. Sample size. In this study, on the one hand, the literature data of related studies are referred to, and at the same time, the sample size calculation formula in statistics is referred to, the formula is:

$$n = N / [1 + N (e^2)] \quad (1)$$

where n is the required sample size

N is the whole population that is under study

e is the sampling error which is usually 0.05

A sample size of 399.40 was calculated using Yamane's formula (1967). Therefore, a sample size of 420 respondents out of the population of 270,500 visitors would be an acceptable number of responses to maintain a 95% confidence level. The recorded data of visitors per day classified by type of day, shown in Table 3.2, makes the quota sampling technique possible. Then, volunteer and accidental sampling technique were used to collect data at Anning Jinfang Hot Spring Resort.

Table 3.1 Collected Sample Size Categorized by Weekday, Weekend, and Holiday

Year	Number of	Visitor per	Visitor per	Percentage	Quota
2019	Day in a year	day	year	of Visitor (%)	Sample Size
Weekday	225	300	67,500	24.95	105
Weekend	92	1,500	138,000	51.02	214
Holiday	12	2,500	30,000	24.03	101
Big Holiday	14	3,500	35,000		
Total			270,500	100	420

3.3 Data Collection

Prior to data collection, the researcher attended and passed a course on "Ethical Issues in Research". During the data collection process, the privacy of visitors and confidentiality of personal data will be ensured. All visitors participating in the survey will be provided with a detailed description of the survey and will be made aware that their participation is voluntary and will not have any adverse effects on them.

3.3.1 Questionnaire Design

The questionnaire was divided into four parts. The first part is the visitor's characteristics including gender, age, occupation, monthly income, and education level; the second part is the visitor's behaviors in the outdoor spa area including the visit style and purpose of the visit. The third part is a Likert scale scoring method in which visitors were asked to score the importance of the seven healing components encompassed by the ecological and environmental factors of the outdoor spa area. The seven components are climate comfort, spa water, air quality, plant and vegetation quality, topographic features, community species diversity and environmental cleanliness. According to the principle of Likert scale, the scores are categorized into very important, important, average, unimportant, and very unimportant, 5 levels, and visitors assign scores of 5, 4, 3, 2, and 1 to the 7 evaluation indicators. In the fourth part, the Likert scale scoring method was used to allow visitors to score their satisfaction with the 7 healing components of Anning Jinfang Hot Spring Resort. Depending on the experience, visitors assign scores to specific 7 indicators. The 5-level evaluation scale created using the Likert scale included two evaluation dimensions, importance and satisfaction, and ensured that the evaluation scale was consistent within each statement to maintain the internal consistency of the scale.

3.3.2 Data Collection Process

Prior to the formal implementation of the spa environment survey, the researcher conducted a pre-test of the questionnaire. A small portion of the target audience was selected for the pre-testing of the questionnaire. Feedback from the respondents was collected through the pre-testing process in order to adjust the questions, statements, or evaluation ratings in the scale and to ensure the clarity and comprehensibility of the questionnaire.

The data collection was conducted using online and onsite questionnaire survey in the fall season, which has the greatest numbers of visitors. The questionnaires were distributed on October 5th and 6th, 2023, to extract data from public-holiday visitors; on November 3rd and 6th, 2023; and on November 4th and 5th, 2023, in order to obtain data from weekday and weekend visitors, respectively. Volunteer and convenience

sampling technique were practically applied in areas around the entrance point, outdoor resting platforms, and children's play areas where visitors are more concentrated.



Figure 3.2 Questionnaire Survey on Weekdays



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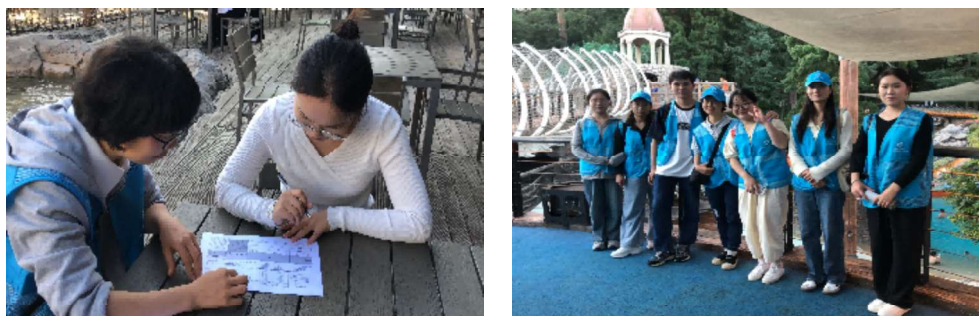


Figure 3.3 Questionnaire Survey on Weekends



Figure 3.4 Questionnaire Survey on Holidays

The electronic questionnaire was uploaded on the *Wenjuanxing* application, which makes it convenient for visitors to obtain the survey information and can complete the survey when they are convenient. The number of data collected is shown in Table 3.2.

Table 3.2 Summary of The Number of Onsite and Online Questionnaires

Type of Day	Onsite Questionnaire	Online Questionnaire	Total
Weekdays	69	96	165
Weekends	98	128	226
Holidays	120	60	180
Total	287	284	571

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3.3.3 Validity Test of the Questionnaire

The validity study is used to analyze whether the research items are reasonable and meaningful or not, the validity analysis uses factor analysis as a data analysis method to conduct the study, respectively, through the KMO value, the common degree, the variance explained rate value, the factor loading coefficient value and other indexes to comprehensively analyze, in order to verify the validity level of the data. the KMO value is used to judge the suitability of the information extraction level, the common degree is used to exclude the unreasonable research item, the variance The KMO value is used to determine the suitability of information extraction, the commonality value is used to exclude unreasonable research items, the variance value is used to indicate the level of information extraction, and the factor loading coefficient is used to measure the correspondence between the factors (dimensions) and the question items. The validity was verified using KMO and Bartlett's test, as can be seen from the above table: the KMO value is 0.786, which is between 0.7 ~ 0.8, and the research data reflects good validity.

Table 3.3 Validity Test of the Questionnaire

Item	Factor Loading		Communalities
	Environmental Group Factor	Plant Group Factor	
Climate Comfort (C ₁)	0.764	0.140	0.603
Hot Spring Water (C ₂)	0.822	0.022	0.676
Air Quality (C ₃)	0.625	0.364	0.523
Environmental Cleanliness (C ₇)	0.750	0.137	0.581
Plants And Vegetation Quality (C ₄)	0.182	0.719	0.550
Topographic Features (C ₅)	0.044	0.775	0.603
Plant Species Diversity (C ₆)	0.195	0.788	0.659
Eigenvalues (Initial)	2.893	1.302	-
% of Variance (Initial)	41.332%	18.598%	-
% of Cum. Variance (Initial)	41.332%	59.930%	-
Eigenvalues (Rotated)	2.285	1.910	-
% of Variance (Rotated)	32.648%	27.282%	-
% of Cum. Variance (Rotated)	32.648%	59.930%	-

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Item	Factor Loading		Communalities
	Environmental Group Factor	Plant Group Factor	
KMO	0.786		-
Bartlett's Test of Sphericity (Chi-Square)	676.988		-
<i>df</i>	21		-
<i>p</i> value	0.000		-

Note. Grey cells indicate the absolute value of loading that is greater than 0.4

From the above table, it can be seen that: all the research items correspond to a commonality value higher than 0.4, which indicates that the information of the research items can be extracted effectively. In addition, the KMO value is 0.786, which is greater than 0.6, and the data can be effectively extracted information. In addition, the variance explained values of the 2 factors are 32.648%,27.282% respectively, and the cumulative variance explained after rotation is 59.930%>50%. It means that the informativeness of the research items can be extracted effectively. Finally, the factor loading coefficients are combined to confirm the factor and research item correspondence. The absolute value of factor loading coefficient is greater than 0.4, which means that there is a correspondence between the option and the factor.

3.3.4 Reliability Test of the Questionnaire

Reliability analysis aims to assess the stability and consistency of a questionnaire over time, in different environments, or across different samples. Through reliability analysis, the precision of the questionnaire in measuring the target variable can be determined to ensure the reliability of the data obtained. Reliability analysis also helps to improve the quality of the questionnaire by identifying weaknesses and deficiencies in the questionnaire so that revisions and improvements can be made to improve the quality of the questionnaire. A high reliability questionnaire can increase the credibility and persuasiveness of the research results. The principle of reliability analysis is to assess the degree of consistency between the items in the questionnaire. Commonly used methods include Cronbach's alpha coefficient measurement. The reliability analysis of the questionnaire in this study is shown in Table 3.5.

From Table 3.5, it can be seen that the value of the reliability coefficient is 0.754, which is greater than 0.7, thus indicating that the quality of the reliability of the research data is very good. There is no significant increase in the reliability coefficient when any question item is deleted during the testing process, thus indicating that the question item should not be deleted for processing. In conclusion, the research data reliability coefficient value is higher than 0.7, which comprehensively indicates that the data reliability quality is high and can be used for further analysis.

Table 3.4 Reliability Test of the Questionnaire

Item	Corrected Item-total Correlation (CITC)	Cronbach α if Item Deleted	Cronbach's α
Climate comfort (C ₁)	0.503	0.717	0.754
Hot Spring Water (C ₂)	0.471	0.725	
Air Quality (C ₃)	0.544	0.710	
Plants and Vegetation Quality (C ₄)	0.444	0.730	
Topographic Features (C ₅)	0.374	0.752	
Plant Species Diversity (C ₆)	0.508	0.716	
Environmental Cleanliness (C ₇)	0.487	0.721	
Cronbach's α (Standardized)	0.761		

From the above table, it can be seen that the value of the reliability coefficient is 0.754, which is greater than 0.7, thus indicating that the quality of the reliability of the research data is very good. There is no significant increase in the reliability coefficient when any question item is deleted during the testing process, thus indicating that the question item should not be deleted for processing. In conclusion, the research data reliability coefficient value is higher than 0.7, which comprehensively indicates that the data reliability quality is high and can be used for further analysis.

3.4 Conceptual and Operational Variables

In this study, the independent variables have 2 conceptual variables, which are visitor characteristics and visitor behavior. Visitor characteristics include 5 operational variables including: gender, age, occupation, monthly income, and education level. Visitor behavior includes 2 operational variables including: form of visit, purpose of visit. The dependent variable has 1 conceptual variable, which is the ecological factor, including 7 operational variables including: climate comfort, hot spring water, plant and vegetation quality, topographic features, plant specialty diversity, and environmental cleanliness. The conceptual variables, operational variables, indicators, measurement levels and descriptive statistics are shown in Tables 3.5.

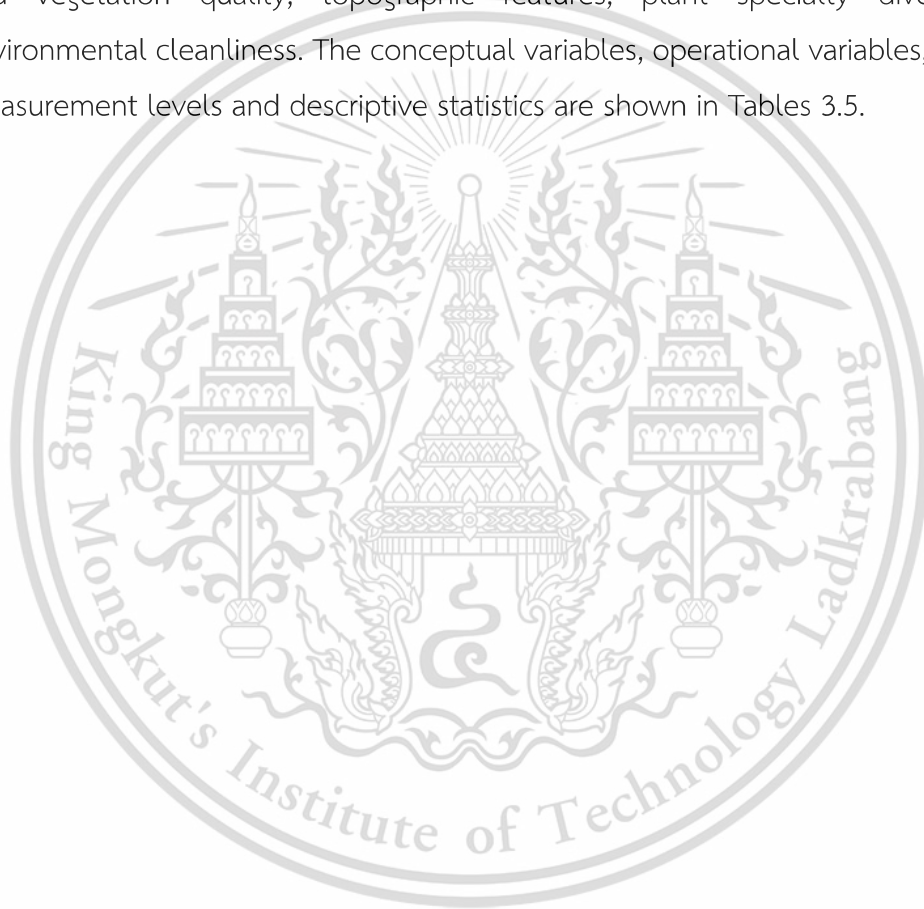


Table 3.5 Conceptual and Operational Variables of the Study

Code	Conceptual & Operational Variable	Indicator
X₁	Visitor's Characteristics (Independent Variable)	
X ₁₋₁	Gender	Male Female
X ₁₋₂	Age	Juvenile (<18 years) Youth (18-44 years) Adult (44-59 years) Elder >59 years
X ₁₋₃	Occupation	Student Worker Freelance No occupation
X ₁₋₄	Monthly Income	Low income (<¥ 3,000) Middle income (¥ 3,000-¥ 7,000) High income (>¥ 7,000)
X ₁₋₅	Educational Level	High school or under Bachelor's degree Master's degree or higher
X₂	Visitor's Behaviors (Independent Variable)	
X ₂₋₁	Visiting Style	Alone Family Group
X ₂₋₂	Visiting Purpose	Healing Non-healing
	Measurement Scale: Nominal and Descriptive Statistics: Percentage	
Y₁	Attitude Towards Ecological Environment (Dependent Variable)	
Y ₁₋₁	Climate Comfort	Likert Scale
Y ₁₋₂	Hot Spring Water	Likert Scale
Y ₁₋₃	Air Quality	Likert Scale
Y ₁₋₄	Plants And Vegetation Quality	Likert Scale
Y ₁₋₅	Topographic Features	Likert Scale
Y ₁₋₆	Plant Species Diversity	Likert Scale
Y ₁₋₇	Environmental Cleanliness	Likert Scale
	Measurement Scale: Nominal and Descriptive Statistics: Mean	

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3.5 Statistical Analysis Methods

Two inferential statistics—the t -test and the ANOVA—were applied in investigating the relationship between the independent and dependent variables of this study. Two independent variables, gender and visiting purpose, were classified into two groups of indicators; therefore, the t -test was applied. While the rest were tested by using the ANOVA (Table 3.6). The normality tests and homogeneity of variance tests are displayed in Appendix C and D.

Table 3.6 Statistical Analysis Tools for Testing Relationship between Independent Variable and the Attitude Towards Ecological Environment (Y_1)

Independent Variable	Measurement Scale	Inferential Statistics
Gender (X_{1-1})	Nominal	t -test
Age (X_{1-2})	Nominal	ANOVA
Occupation (X_{1-3})	Nominal	ANOVA
Monthly Income (X_{1-4})	Nominal	ANOVA
Educational Level (X_{1-5})	Nominal	ANOVA
Visiting Style (X_{2-1})	Nominal	ANOVA
Visiting Purpose (X_{2-2})	Nominal	t -test

Chapter 4

CASE STUDY

Anning Jinfang Hot Spring is in the northwest of Anning City, Yunnan Province, China. The hot springs here have been always loved by people since they were developed during the Eastern Han Dynasty. In the Ming Dynasty, the hot springs were honored by intellectuals as "the first soup in the world" (Yunnan Hot Spring Tourism Association, 2013). The Hot Spring water here contains potassium, sodium, zinc, strontium and other trace elements, making it a rare and precious spring. The Anning Jinfang Hot Spring Resort is 7 kilometers away from the main city and 42 kilometers away from the provincial capital city of Kunming, which is on the golden tourism line of "Kunming - Dali - Lijiang". Therefore, in 2007, the local government authorities constructed the Anning Jinfang Hot Spring as an important healing tourism project to promote the development of the hot spring industry (Li, 2010).

Covering an area of 5.4 hectares, Anning Jinfang Hot Spring has 37 hot spring baths, 13 groups of forest huts, a standard swimming pool, a hot spring play pool, a restaurant, a teahouse, a hot spring healing pavilion, a healing therapy center, a parking lot, an open-air rest pavilion, and other facilities (Wang, 2015; Zhang, 2018).

Healing function: Anning Jinfang Hot Spring has built a hot spring healing center with healing function for rheumatoid arthritis and skin pain by utilizing dozens of minerals and trace elements such as carbon, calcium, magnesium, potassium, phosphorus, etc., which have healing function in the Hot Spring water (Wang, 2015; Zhang, 2018). On the other hand, the full strive to utilize the ecological environment of the outdoor hot spring area for forest healing. By combining the hot spring pools with the surrounding flora and setting up comfortable and natural forest paths, visitors can enjoy hot spring healing while admiring the beautiful natural environment, thus combining natural healing with hot spring healing.

Hot Spring Healing: The hot spring shower method involves washing your body with a cleansing solution in an indoor bathroom before entering the hot spring pool to feel the natural healing from the Hot Spring water. Anning Jinfang Hot Spring has hot spring pools with mint, milk, flowers, and lemon, which can have the effect of nourishing and moisturizing the skin (Li, 2010). The medicine function area also has a

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lilac pool, red wine pool, and Chinese medicine pool, which can be experienced as a beauty bath (Li, 2010).

Thirteen groups of forest huts are named after 13 kinds of famous flowers such as camellias, cherry blossoms and azaleas, and the courtyard landscape of the huts is also constructed according to different thematic plants. 13 court characters are embellished by these 13 kinds of famous flowers, and the landscapes are rich and distinctive. Each hut has an open-air hot spring pool, which is shaded by bamboo ogonori, and is fully equipped with indoor facilities. There are suites, standard rooms, and triple rooms in the huts to meet the needs of different visitors. The forest huts are quiet, fragrant and cozy, with large outdoor hot spring pools and small indoor hot spring pools. Anning Jinfang Hot Spring also has a heated swimming pool and a large hot spring play pool. The swimming pool is of high standard, good water quality, and complete facilities, and there is a recreation, physical therapy, and health massage building next to it for Chinese, Japanese, and Korean spa. There are 2 multi-storey parking lots built in the resort area, with about 600 parking spaces (Wang, 2015).

The functional settings of Anning Jinfang Hot Spring are comprehensive and rich, and visitors to the resort can choose different types of vacation products according to their needs. The location and outdoor hot spring area of Anning Jinfang Hot Spring are shown in Figure 4.1 and 4.2.

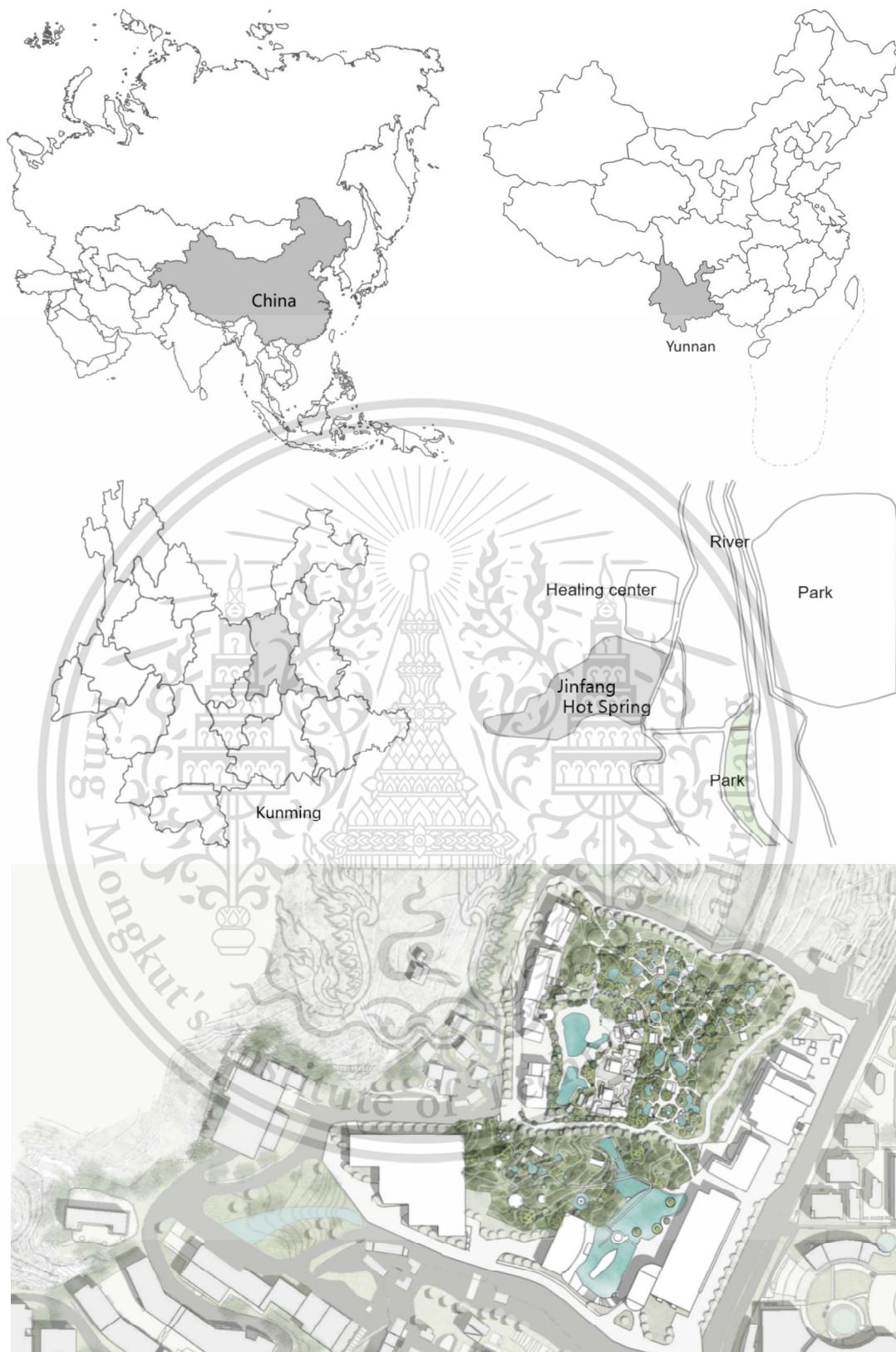


Figure 4.1 Location of Anning Jinfang Hot Spring Resort in Relation to Kunming City, Yunnan Province, and China

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Figure 4.2 The Outdoor Area of Anning Jinfang Hot Spring Resort

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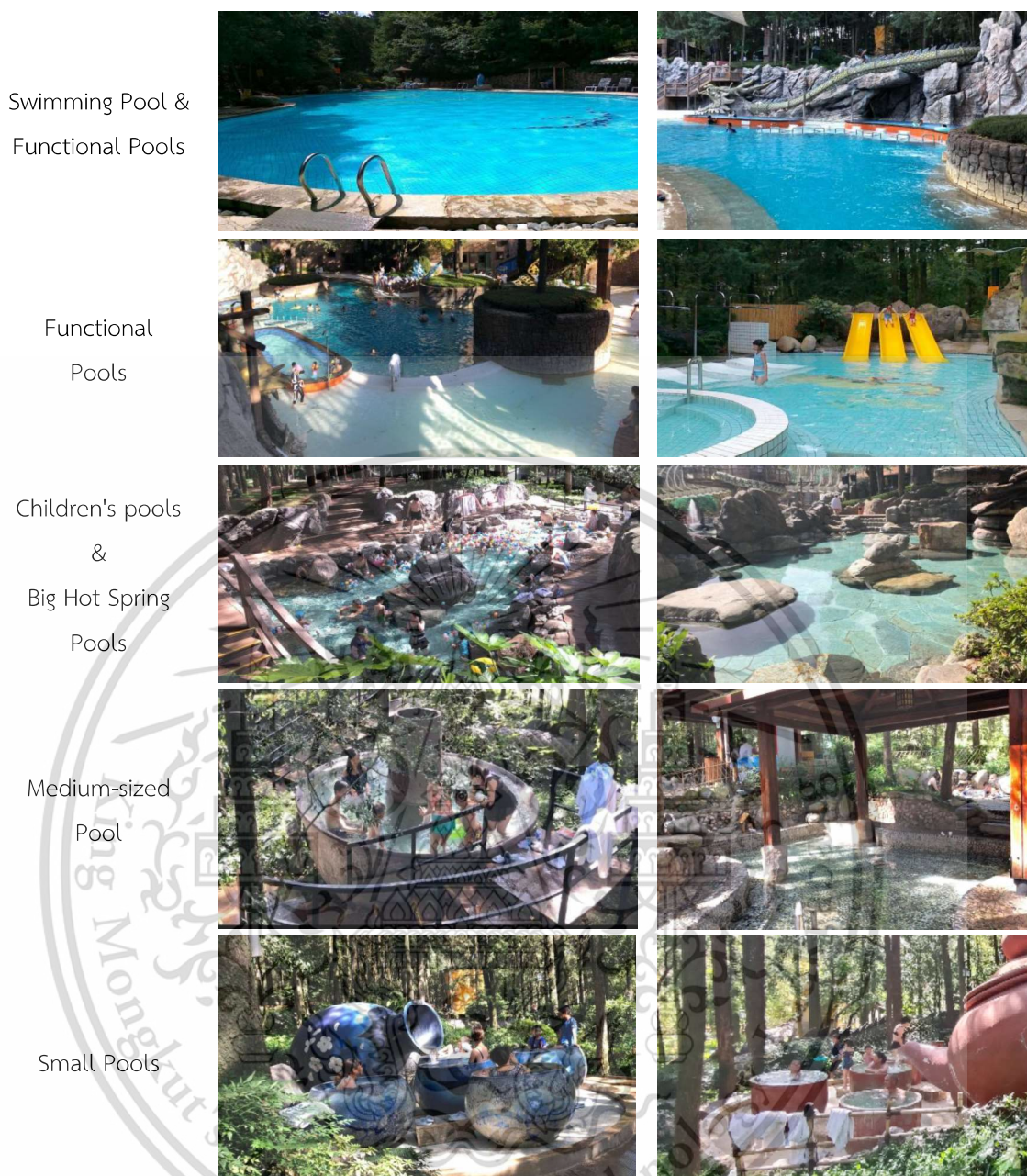


Figure 4.3 The Outdoor Hot Spring Pools at Anning Jinfang Hot Spring Resort

As a form of tourism that combines natural landscape and health healing function, hot spring resort has received extensive attention and in-depth research in recent years (Liu, 2018). Hot spring resorts not only provide a unique tourism experience, but also have significant health healing effects, attracting a large number of tourists (Zhang, 2020). The following is an overview of the research on hot spring resorts from several aspects, including Hot Spring water quality, environmental factors, facility improvement, and tourist satisfaction.

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Hot spring water quality is one of the core areas of hot spring resort research. Hot spring water is rich in minerals and trace elements, such as sulfur, calcium, magnesium, and sodium, which have different therapeutic effects. For example, sulfur hot springs have significant healing effects on skin diseases and arthritis. Bicarbonate hot springs, on the other hand, help improve blood circulation and cardiovascular health (Wang, 2017). Studies have shown that there are differences in the composition of hot spring water quality in different regions, and these differences directly affect the healing effects of hot springs. Therefore, the analysis of the composition of hot spring water quality and the study of healing effect is an important part of the research on hot spring resorts (Li, 2019).

Research on environmental factors: environmental factors of hot spring resorts include vegetation quality, plant diversity, climate comfort, air quality, and healing facilities (Chen, 2021). It was found that high-quality vegetation cover and rich plant diversity not only beautify the environment, but also improve air quality and increase the negative ion content in the air, which has a positive effect on human health. In addition, spa resorts are usually located in areas with pleasant climates, where suitable temperatures and humidity can enhance the healing effects of the spa and provide a comfortable healing environment. Air quality is also a key factor, with good air quality enhancing visitors' respiratory health and overall satisfaction (Zhao, 2020).

Research on visitor satisfaction in hot spring resorts: visitor satisfaction is an important indicator to assess the success of hot spring resorts. Previous studies have typically used questionnaires and field interviews to understand various aspects of tourists' experiences with hot spring resorts, including water quality, environment, facilities, and services (Sun, 2016). The results of the study show that there are various factors affecting tourists' satisfaction, among which water quality and natural environment factors are the most critical. High-quality hot spring water and beautiful natural environment can significantly enhance visitor satisfaction. In addition, reasonable layout of facilities and high standard of service quality are also important factors to improve visitor satisfaction (Wu, 2018).

To summarize, the research on hot spring resorts covers many aspects such as water quality, environment, facilities, and visitor satisfaction, and gradually expands to comprehensive recreation functions (Liu, 2018). These studies not only provide a

scientific basis for the planning and management of hot spring resorts, but also provide specific references for improving visitors' experience and satisfaction (Zhang, 2020). In the current study, the healing factors of hot spring environments are divided as a whole, and there are few refined and more instructive empirical studies. In future research, the specific roles of each healing factor and their interrelationships should be further explored in depth to form valuable guidance for enterprises and designers, with a view to comprehensively enhancing the healing function and market competitiveness of hot spring resorts (Chen, 2021).



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Chapter 5

RESULTS

5.1 Participant Characteristics

In surveying the attitudes of the Hot Spring visitors towards the ecological environment factor of the outdoor healing landscape, firstly, the samples' characteristics and behaviors are summarized in Table 5.1.

Table 5.1 Summary of Participant Characteristics

Variable	Indicator	N	Percent (%)
Visitor's Characteristics (X₁)			
Gender (X ₁₋₁)	Male	183	43.57
	Female	237	56.43
Age (X ₁₋₂)	Juvenile (<18 years)	15	3.57
	Youth (18-44 years)	239	56.90
	Adult (44-59 years)	61	14.52
	Elder >59 years	105	25.00
Occupation (X ₁₋₃)	Student	53	12.62
	Working	189	45.00
	Freelance	73	17.38
	No occupation	105	25.00
Monthly Income (X ₁₋₄)	Low income (< ¥3,000)	64	15.24
	Middle income (¥3,000-¥7,000)	219	52.14
	High income (> ¥7,000)	137	32.62
Educational Level (X ₁₋₅)	High school or under	72	17.14
	Bachelor's degree	274	65.24
	Master's degree or higher	74	17.62
Visitor's Behaviors (X₂)			
Visiting Style (X ₂₋₁)	Alone	69	16.43
	Family	265	63.10
	Group	86	20.48
Visiting Purpose (X ₂₋₂)	Healing	245	58.33
	Non-healing	175	41.67

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From the above Table 5.1, the demographic characterization of the surveyed population of this study can be described.

Gender: 183 males (43.57% of the total) and 237 females (56.43% of the total) were found in the surveyed population. The proportion of females was slightly higher than that of males.

Age: Among the surveyed population, there were 15 adolescents under the age of 18, accounting for 3.57%; 239 youths aged 18-44, accounting for 56.90%, which was the main age group in the surveyed population; 61 middle-aged people aged 45-59, accounting for 14.52%; and 105 elderly people aged 60 and above, accounting for 25.00%.

Occupation: In terms of occupation, there were 53 students, accounting for 12.62%; 189 persons, accounting for 45.00%, were working; 73 persons, accounting for 17.38%, were freelancers; and 105 persons, accounting for 25.00%, were unworking.

Monthly income: 64 people, or 15.24%, were low-income earners with a monthly income of less than 3,000 yuan; 219 people, or 52.14%, were middle-income earners with a monthly income of between 3,000 and 7,000 yuan; and 137 people, or 32.62%, were high-income earners with a monthly income of more than 7,000 yuan.

Education level: As for education level, there are 72 people with high school education or below, accounting for 17.14%; 274 people with bachelor's degree, accounting for 65.24%; and 74 people with bachelor's degree or above, accounting for 17.62%.

Visiting Style: 69 visitors (16.43%) came alone; 265 visitors (63.10%) came with their families; 86 visitors (20.48%) came as a group.

Visiting Purpose of visit: 245 visitors (58.33%) came for healing purpose; 175 visitors (41.67%) came for non-healing purpose.

Overall, the main characteristics of the surveyed population are that most of them are young people, a larger proportion of them are working, their monthly incomes are concentrated in the range of 3,000 to 7,000 yuan, they mainly have bachelor's degree, they mainly come to the outdoor hot springs area with their families and most of them visit the area with the purpose of healing.

5.2 Visitors' Characteristics vs. Attitudes Towards the Ecological Environment Factor

Based on the results of the normality test of the questionnaire data (see Appendix C), most of the data in the data set did not conform to the normal distribution, but the sample size data of the survey was 420, which is a large sample size, the t -test and ANOVA analysis can be performed when the sample size is over 50.

Then, in case of ANOVA, we carried out the homogeneity of variance test (see Appendix D). In the case of equal variance, p -value is larger than 0.05, the F -test will be applied to investigate the relationship between variables, while the Welch test is used when unequal variance between variables occurs (Table 5.2).

Table 5.2 Selection of ANOVA Methods Based on The Results of Homogeneity of Variances

Dependent Variable (Y_1)	ANOVA (Independent Variable)									
	Age		Occupation		Monthly Income		Educational Level		Visiting Style	
	F	W	F	W	F	W	F	W	F	W
Climate Comfort (Y_{1-1})	*		*		*		*		*	
Hot Spring Water (Y_{1-2})		*		*		*		*		*
Air Quality (Y_{1-3})		*		*	*		*		*	
Plants and Vegetation Quality (Y_{1-4})		*		*	*		*			*
Topographic Features (Y_{1-5})		*	*		*		*		*	
Plant Species Diversity (Y_{1-6})		*		*		*		*		*
Environmental Cleanliness (Y_{1-7})		*		*	*		*		*	

Note. F refers to F -test and W refers to Welch test.

5.2.1 Genders

The researcher conducted an independent samples t -test to examine the effect of gender on the ratings of the seven components of the ecological environment factor. The independent variable was gender (male and female), and the dependent variable was the score visitors rated for each of the seven components of the ecological environment factor (Table 5.3).

Table 5.3 Independent Samples *t*-test Results Comparing Males and Females on the Attitudes Towards the Components of Ecological Environment

Components	Gender (<i>M</i> ± <i>SD</i>)		<i>t</i>	<i>p</i>
	Males (<i>n</i> =183)	Females (<i>n</i> =237)		
Y ₁₋₁ Climate Comfort (C ₁)	4.20±0.77	4.21±0.77	-0.188	.851
Y ₁₋₂ Hot Spring Water (C ₂)	4.55±0.72	4.55±0.70	-0.012	.990
Y ₁₋₃ Air Quality (C ₃)	4.43±0.70	4.39±0.71	0.486	.627
Y ₁₋₄ Plants and Vegetation Quality (C ₄)	3.95±0.80	4.14±0.71	-2.570	.011*
Y ₁₋₅ Topographic Features (C ₅)	3.58±0.99	3.65±0.90	-0.754	.451
Y ₁₋₆ Plant Species Diversity (C ₆)	3.91±0.84	4.00±0.67	-1.165	.245
Y ₁₋₇ Environmental Cleanliness (C ₇)	4.26±0.82	4.46±0.76	-2.619	.009**

Note. **p*<.05, ***p*<.01.

There was a difference in the scores for attitudes towards the component of plants and vegetation quality (C₄) among visitors (*t* = 2.57, *p* = .011). The results also indicates that female visitors exhibit greater differences in attitude towards the component of environment cleanliness (C₇) compared to male visitors (*t* = -2.619, *p* = .009). However, no statistically significant relationships were found between gender and other components of the ecological environment factor.

5.2.2 Ages

We applied Welch analysis of variance or Welch ANOVA to examine the effect of different age groups on the scores of six components of the ecological environment factor. The independent variable was categorized into four different age groups to test the relationship between the component of hot spring water (C₂), air quality (C₃), plants and vegetation quality (C₄), topographic features (C₅), plant species diversity (C₆), and environmental cleanliness (C₇) (Table 5.4).

Table 5.4 Welch Test in ANOVA for Ages on the Attitudes Towards the Components of Ecological Environment Factor

Components	Age ($M \pm SD$)				Welch	p -value
	Juveniles	Youths	Adults	Elders		
Y ₁₋₂ Hot Spring Water (C ₂)	4.73±0.46	4.49±0.76	4.48±0.83	4.72±0.47	5.013	0.004**
Y ₁₋₃ Air Quality (C ₃)	4.13±0.35	4.45±0.76	4.54±0.74	4.28±0.56	5.020	0.003**
Y ₁₋₄ Plants and Vegetation Quality (C ₄)	4.00±0.53	4.06±0.83	4.13±0.76	3.99±0.60	0.607	0.613
Y ₁₋₅ Topographic Features (C ₅)	4.60±0.51	3.78±0.88	3.66±0.98	3.10±0.85	33.364	0.000***
Y ₁₋₆ Plant Species Diversity (C ₆)	4.27±0.46	3.95±0.84	4.13±0.78	3.84±0.50	5.089	0.003**
Y ₁₋₇ Environmental Cleanliness (C ₇)	3.93±0.59	4.47±0.83	4.44±0.89	4.18±0.57	7.126	0.000***

Note. ** $p < .01$, *** $p < .001$.

From Table 5.4, different age groups did not show significance for plants and vegetation quality (C₄), which means that all the different age samples show consistency for all plants and vegetation quality (C₄), and there were no differences. In addition, different age groups showed significance relationship between hot spring water (C₂), air quality (C₃), topographic features (C₅), plant species diversity (C₆), and environmental cleanliness (C₇) implying that different age groups had different effects on hot spring water (C₂), air quality (C₃), topographic features (C₅), plant species diversity (C₆), and environmental cleanliness (C₇).

The F -test was applied to examine the effect of different age groups on scores of a component of the ecological environment factor. Table 5.5 shows that the one-way ANOVA was used to investigate the variability of age for a total of one item of climate comfort (C₁), and it can be seen from the table above: none of the different age samples showed significance relationship for all of the different samples for climate comfort (C₁), meaning that all of the different age samples for climate comfort (C₁) will show consistency and there is no difference.

Table 5.5 F -test in ANOVA for Ages on the Attitudes Towards the Component of Ecological Environment Factor

Components	Age ($M \pm SD$)				F	p -value
	Juveniles	Youths	Adults	Elders		
Y ₁₋₁ Climate Comfort (C ₁)	4.13±0.64	4.18±0.81	4.30±0.80	4.22±0.68	0.416	0.742

5.2.3 Occupations

The Welch analysis of variance or Welch ANOVA was applied to examine the effect of different groups of occupations on the scores of five components of the ecological environment factor. The independent variable was categorized into three groups of occupations to test the relationship between the component of hot spring water (C_2), air quality (C_3), plants and vegetation quality (C_4), plant species diversity (C_6), and environmental cleanliness (C_7) (Table 5.6).

Table 5.6 Welch Test in ANOVA for Occupations on the Attitudes Towards the Components of Ecological Environment Factor

Components	Occupation ($M \pm SD$)				Welch	p -value
	Students	Workers	Freelance	Jobless		
Y ₁₋₂ Hot Spring Water (C_2)	4.40±0.77	4.44±0.78	4.70±0.66	4.72±0.47	6.633	0.000***
Y ₁₋₃ Air Quality (C_3)	4.13±0.73	4.54±0.70	4.45±0.82	4.28±0.56	6.606	0.000***
Y ₁₋₄ Plants and Vegetation Quality (C_4)	4.00±0.73	4.10±0.78	4.05±0.90	3.99±0.60	0.671	0.571
Y ₁₋₆ Plant Species Diversity (C_6)	3.98±0.72	3.99±0.82	4.01±0.87	3.84±0.50	1.841	0.142
Y ₁₋₇ Environmental Cleanliness (C_7)	4.15±0.91	4.47±0.82	4.58±0.80	4.18±0.57	7.164	0.000***

Note. *** $p < .001$.

From Table 5.6, different occupation groups did not show significance for plants and vegetation quality (C_4) and plant species diversity (C_6), which means that the different groups of occupations samples show consistency for all plants and vegetation quality (C_4) and plant species diversity (C_6), and there were no differences. Different occupation groups showed significance relationship between hot spring water (C_2), air quality (C_3), and environmental cleanliness (C_7) implying that different occupation groups had different effects on hot spring water (C_2), air quality (C_3), and environmental cleanliness (C_7).

Table 5.7 F -test in ANOVA for Occupations on the Attitudes Towards the Components of Ecological Environment Factor

Components	Occupation ($M \pm SD$)				F	p -value
	Students	Workers	Freelance	Jobless		
Y ₁₋₁ Climate Comfort (C_1)	4.08±0.76	4.20±0.82	4.29±0.77	4.22±0.68	0.793	0.498
Y ₁₋₅ Topographic Features (C_5)	3.98±0.80	3.75±0.91	3.77±0.95	3.10±0.85	17.172	0.000***

Note. *** $p < .001$.

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The *F*-test was applied to examine the effect of different occupation groups on scores of two components of the ecological environment factor. Table 5.7 shows that the one-way ANOVA was used to investigate the variability of occupation for climate comfort (C_1) and topographic features (C_5). The results showed that different occupation groups showed significance relationship with only topographic features (C_5).

5.2.4 Monthly Incomes

The Welch ANOVA was used to investigate the relationships different between groups of monthly incomes on the scores of two components of the ecological environment factor. The independent variable was categorized into three groups of monthly incomes to test the relationship between the component of hot spring water (C_2), and plant species diversity (C_6) (Table 5.8).

Table 5.8 Welch Test in ANOVA for Monthly Incomes on the Attitudes Towards the Components of Ecological Environment Factor

Components	Monthly Income ($M \pm SD$)			Welch	p -value
	Low	Middle	High		
Y ₁₋₂ Hot Spring Water (C_2)	4.45±0.75	4.62±0.60	4.49±0.81	2.215	0.113
Y ₁₋₆ Plant Species Diversity (C_6)	4.08±0.57	3.99±0.70	3.85±0.89	2.494	0.085

From Table 5.8, different groups of incomes did not show significance for hot spring water (C_2) and plant species diversity (C_6), which means that the different groups of monthly incomes show consistency for all hot spring water (C_2) and plant species diversity (C_6), and there were no differences.

Table 5.9 *F*-test in ANOVA for Occupations on the Attitudes Towards the Components of Ecological Environment Factor

Components	Monthly Income ($M \pm SD$)			<i>F</i>	p -value
	Low	Middle	High		
Y ₁₋₁ Climate Comfort (C_1)	4.14±0.73	4.25±0.75	4.16±0.82	0.844	0.431
Y ₁₋₃ Air Quality (C_3)	4.20±0.72	4.43±0.66	4.46±0.76	3.236	0.040*
Y ₁₋₄ Plants and Vegetation Quality (C_4)	4.02±0.72	4.10±0.73	4.00±0.80	0.768	0.464
Y ₁₋₅ Topographic Features (C_5)	3.84±0.89	3.63±0.93	3.50±0.96	2.901	0.056
Y ₁₋₇ Environmental Cleanliness (C_7)	4.23±0.87	4.40±0.73	4.40±0.84	1.222	0.296

Note. * $p < .05$.

The F-test was applied to examine the effect of different groups of incomes on scores of five components of the ecological environment factor. Table 5.9 shows that the one-way ANOVA was used to investigate the variability of incomes for climate comfort (C_1), air quality (C_3), plants and vegetation quality (C_4), topographic features (C_5), and environmental cleanliness (C_7). The results showed that different incomes groups showed significance relationship with only air quality (C_3).

5.2.5 Education Levels

The Welch ANOVA was used to investigate the relationships different between groups of educational levels on the scores of a component of the ecological environment factor. The independent variable was categorized into three groups of educational levels to test the relationship between the component of hot spring water (C_2) (Table 5.10).

Table 5.10 Welch Test in ANOVA for Educational Levels on the Attitudes Towards the Component of Ecological Environment Factor

Components	Educational Levels ($M \pm SD$)			Welch	p -value
	High School or Below	Bachelor's degree	Above bachelor's degree		
Y ₁₋₂ Hot Spring Water (C_2)	4.81±0.46	4.55±0.71	4.32±0.81	11.993	0.000***

Note. *** $p < .001$.

From Table 5.10, different groups of educational levels show significance for hot spring water (C_2), which identifies the relationship between the groups of educational levels and the component of hot spring water (C_2).

The F-test was applied to examine the effect of different groups of educational levels on scores of six components of the ecological environment factor. Table 5.11 shows that the one-way ANOVA was utilized to explore the variability of educational levels for climate comfort (C_1), air quality (C_3), plants and vegetation quality (C_4), topographic features (C_5), plant species diversity (C_6), and environmental cleanliness (C_7). The results showed that different groups of educational levels showed significance relationship with only air quality (C_3).

Table 5.11 *F*-test in ANOVA for Educational Levels on the Attitudes Towards the Components of Ecological Environment Factor

Components	Educational Levels ($M \pm SD$)			<i>F</i>	<i>p</i> -value
	High School or Below	Bachelor's degree	Above bachelor's degree		
Y ₁₋₁ Climate Comfort (C ₁)	4.36±0.70	4.19±0.78	4.09±0.80	2.286	0.103
Y ₁₋₃ Air Quality (C ₃)	4.44±0.63	4.45±0.67	4.20±0.86	3.811	0.023*
Y ₁₋₄ Plants and Vegetation Quality (C ₄)	4.01±0.76	4.03±0.76	4.18±0.73	1.211	0.299
Y ₁₋₅ Topographic Features (C ₅)	3.67±1.06	3.59±0.92	3.68±0.89	0.347	0.707
Y ₁₋₆ Plant Species Diversity (C ₆)	4.08±0.69	3.95±0.74	3.88±0.86	1.455	0.235
Y ₁₋₇ Environmental Cleanliness (C ₇)	4.46±0.67	4.39±0.78	4.23±0.91	1.744	0.176

Note. * $p < .05$.

5.3 Visitors' Behaviors vs. Attitudes Towards the Ecological Environment Factor

5.3.1 Visiting Styles

The Welch ANOVA was used to investigate the relationships different between visiting styles on the scores of two components of the ecological environment factor. The independent variable was categorized into three groups of visiting styles to test the relationship between the component of hot spring water (C₂) and plants and vegetation quality (C₄) (Table 5.12).

Table 5.12 Welch Test in ANOVA for Visiting Styles on the Attitudes Towards the Component of Ecological Environment Factor

Components	Visiting Style ($M \pm SD$)			Welch	<i>p</i> -value
	Alone	Family	Group		
Y ₁₋₂ Hot Spring Water (C ₂)	4.45±0.76	4.63±0.66	4.41±0.77	3.741	0.026*
Y ₁₋₄ Plants and Vegetation Quality (C ₄)	4.13±0.77	4.00±0.73	4.15±0.80	1.667	0.193

Note. * $p < .05$.

The *F*-test was applied to examine the effect of visiting styles on scores of five components of the ecological environment factor. Table 5.13 shows that the one-way ANOVA was utilized to explore the variability of visiting styles for climate comfort (C₁),

air quality (C₃), topographic features (C₅), plant species diversity (C₆), and environmental cleanliness (C₇). The results showed that different groups of educational levels showed significance relationship with topographic features (C₅) and environmental cleanliness (C₇).

Table 5.13 *F*-test in ANOVA for Visiting Styles on the Attitudes Towards the Components of Ecological Environment Factor

Components	Visiting Style (<i>M</i> ± <i>SD</i>)			<i>F</i>	<i>p</i> -value
	Alone	Family	Group		
Y ₁₋₁ Climate Comfort (C ₁)	4.30±0.77	4.22±0.77	4.09±0.78	1.510	0.222
Y ₁₋₃ Air Quality (C ₃)	4.41±0.73	4.42±0.70	4.36±0.70	0.250	0.779
Y ₁₋₅ Topographic Features (C ₅)	3.74±0.93	3.51±0.94	3.86±0.90	5.325	0.005**
Y ₁₋₆ Plant Species Diversity (C ₆)	4.04±0.74	3.92±0.74	4.01±0.79	1.057	0.348
Y ₁₋₇ Environmental Cleanliness (C ₇)	4.35±0.74	4.47±0.72	4.10±0.95	7.300	0.001***

Note. ***p*<.01, ****p*<.001.

5.3.2 Visiting Purposes

We conducted an independent samples *t*-test to examine the effect of gender on the ratings of the seven components of the ecological environment factor. The independent variable was visiting purposes (healing and non-healing), and the dependent variable was the score visitors rated for each of the seven components of the ecological environment factor (Table 5.14).

Table 5.14 Independent Samples *t*-test Results Comparing different visiting purposes on the Attitudes Towards the Components of Ecological Environment

Components	Visiting Style (<i>M</i> ± <i>SD</i>)		<i>t</i>	<i>p</i>
	Healing (<i>n</i> =245)	Non-healing (<i>n</i> =175)		
Y ₁₋₁ Climate Comfort (C ₁)	4.19±0.78	4.23±0.75	0.286	0.593
Y ₁₋₂ Hot Spring Water (C ₂)	4.52±0.73	4.59±0.66	1.062	0.303
Y ₁₋₃ Air Quality (C ₃)	4.43±0.72	4.38±0.69	0.540	0.463
Y ₁₋₄ Plants and Vegetation Quality (C ₄)	4.08±0.74	4.02±0.78	0.653	0.420
Y ₁₋₅ Topographic Features (C ₅)	3.64±0.92	3.58±0.97	0.446	0.505
Y ₁₋₆ Plant Species Diversity (C ₆)	3.97±0.74	3.94±0.77	0.212	0.646
Y ₁₋₇ Environmental Cleanliness (C ₇)	4.38±0.79	4.37±0.78	0.011	0.917

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Results from Table 5.14 demonstrated that there were no statistically significant relationships found between visiting styles and any components of the ecological environment factor.

5.4 Comparison of Attitudes and Satisfaction with the Ecological Environment Factor

Table 5.15 displays the difference between hot spring visitors' attitudes towards the components of the ecological environment factor and satisfaction with those components of Anning Jinfang Hot Spring Resort. This analysis can help identify needs for improvement in certain outdoor healing landscape components at the resort.

Table 5.15 Analysis of the Difference between Importance and Satisfaction with the Components of the Ecological Environment Factor Spring Areas

Components	Importance (Y ₁) M±SD	Satisfaction (Y ₂) M±SD	Difference
Climate Comfort (C ₁)	4.205±0.770	4.429±0.596	-0.224
Hot Spring Water (C ₂)	4.552±0.704	4.138±0.721	0.414
Air Quality (C ₃)	4.407±0.707	4.402±0.657	0.005
Plants and Vegetation Quality (C ₄)	4.052±0.755	3.774±1.154	0.278
Topographic Features (C ₅)	3.619±0.938	3.926±0.850	-0.307
Plant Species Diversity (C ₆)	3.957±0.752	3.555±1.088	0.402
Environmental Cleanliness (C ₇)	4.376±0.789	4.167±0.599	0.209
<i>n</i> = 420			

From the Table 5.15, it can be seen that the satisfaction ratings of hot spring water (0.414), vegetation quality (0.278) and plant species diversity (0.402) are significantly lower than their importance ratings, indicating that these factors are important in the minds of visitors, but the actual experience has not yet lived up to expectations. Therefore, the resort needs to improve and optimize these aspects. On the contrary, the satisfaction ratings of Climate Comfort (-0.224) and Terrain Features (-0.307) are higher than their importance ratings, indicating that visitors' actual experience of these two factors exceeds expectations. In addition, the satisfaction

ratings for air quality (0.005) and environmental cleanliness (0.209) were similar to their importance ratings, indicating that the experience of these aspects largely met visitors' expectations.

Importance-Satisfaction Matrix Analysis (IPA): the average importance and satisfaction of the healing components were plotted on an IPA matrix using the IPA matrix evaluation principle. Divide the factors into four quadrants (Strengths Maintenance, Secondary Concerns, Primary Improvement, and Low Priority) and analyze the location and meaning of each factor. Corresponding management recommendations were made, such as prioritizing the improvement of factors with lower satisfaction but higher importance.

The derivation of Likert scale's class interval, which is listed below, assists in interpretation the scores rated by Hot Spring visitors in relation with the topic of attitudes towards the components of the ecological environment factor and satisfaction with those components of Anning Jinfang Hot Spring Resort as follows:

score between 1.00 and 1.80 means very low,
 score between 1.81 and 2.60 means low,
 score between 2.61 and 3.40 means moderate,
 score between 3.41 and 4.20 means high, and
 score between 4.21 and 5.00 means very high.

Using the IPA matrix to evaluate the quadrant diagram, the quadrant located in Zone I is a dominant feature area with relatively high importance-satisfaction values, and the components are items C_1 and C_3 ; the quadrant in Zone II is a primary improvement area with relatively high importance-satisfaction values and relatively low satisfaction values, and the components are C_2 and C_7 ; the quadrant in Zone III is an area of secondary concern, and there are no components located in these quadrants; and the quadrant in Zone IV is a low-priority area with relatively low importance-satisfaction values, which can weaken the level of investment in secondary items, and the components are C_4 , C_5 , and C_6 . The quadrant IV is a low priority area, where importance-satisfaction are at relatively low values, and the degree of commitment to secondary items can be reduced, and the components are items C_4 , C_5 and C_6 . The evaluation results are shown in Figure 5.1.

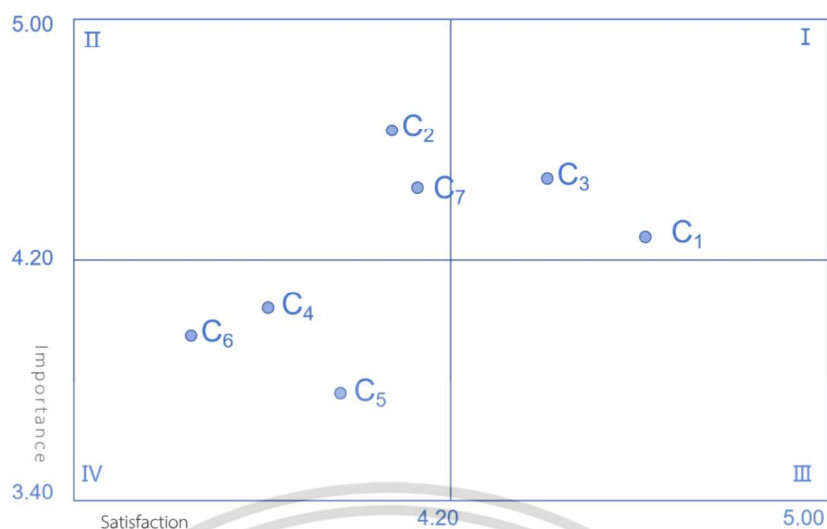


Figure 5.1 IPA Matrix of Importance and Satisfaction of Seven Components of the Ecological Environment Factor

In summary, visitors' importance ratings were generally high across all healing groups, especially for spa water and air quality. In terms of satisfaction, visitors rated climate comfort and air quality highly, which is generally consistent with their importance ratings. It is a characteristic and strength item of Anning Jinfang Hot Spring Resort. It is important to note that the differences in importance and satisfaction ratings for plant and vegetation quality, topographic features, plant species diversity and environmental cleanliness indicate that there is room for improvement in these areas, especially the relatively low satisfaction ratings for plant species diversity and plant and vegetation quality.

Chapter 6

SUMMARY AND DISCUSSION

The purpose of this study was to examine the characteristics and behaviors of spa resort visitors and their attitudes and satisfaction with the importance of ecosystem-based healing factors. The literature review provided a theoretical framework for understanding the concept of healing factors in hot spring areas. It emphasized the importance of factors such as climatic comfort, air environment, spa water quality, and plant diversity in contributing to visitors' sense of healing and relaxation. These factors were further validated by an expert assessment that identified and clarified the key components of the ecological category of healing landscape factors in outdoor hot spring areas. The research questions included exploring the main components of healing factors in outdoor spa areas, visitors' attitudes towards these factors, and their satisfaction.

The questionnaire survey was conducted among visitors to the outdoor hot spring area of Anning Jinfang Hot Spring, a relatively representative comprehensive hot spring resort. A scale-type questionnaire was used to collect information on visitor characteristics, preferences, behaviors, and levels of importance-satisfaction with the identified healing factors. The collected data were synthesized through descriptive statistics, variance correlation analysis and IPA (Importance-Satisfaction Analysis) modeling to gain insights into visitors' perspectives and identify areas for improvement.

The results of the study indicate that visitors place great importance on the natural environment of the outdoor hot spring area and its healing factors. Specifically, visitors paid high attention to factors such as spa water quality, plant and vegetation quality, and air quality as important contributors to overall satisfaction and experience. Next in importance were plant species diversity and environmental cleanliness, and lastly, climate comfort and terrain features. In addition, the evaluation of satisfaction with the ecological category of healing factors presents the discrepancy between visitors' expectations and their actual experience, pointing out areas where the resort can be improved in order to enhance visitor satisfaction.

6.1 Key Findings and Implications

The key findings of this study are as follows:

1) Identification of key healing factors in the ecological environment category

In this study, seven key healing factors in the ecological environment category were identified in the outdoor hot spring area, including climatic comfort, hot spring environment, air quality, plant and vegetation quality, topographic features, plant species diversity, and environmental cleanliness. Among them, hot spring water quality and plant/vegetation quality emerged as the most important factors, with visitors rating them highly in terms of overall satisfaction and importance.

2) Correlation of Ecosystem-based Healing Factors with Visitor Characteristics and Visitor Behavior

Significant correlations were found between tourist characteristics and healing factors such as gender, age, occupation, education level and income. Age and occupation were the visitor characteristics that had the greatest influence on the correlation of the healing factors. Secondly, gender, education level are the visitor characteristics that have medium influence on the correlation of healing factors. Lastly, the level of influence of income level. Among the visitor behaviors, visitor's visiting style has the greatest influence on the correlation of the healing factor. The different purposes of visitors' visits had no significant effect on the correlation of the healing factor. After post hoc multiple testing, older tourists tended to place more importance on healing factors related to climate comfort and environmental cleanliness, while younger tourists placed more importance on factors such as plant species diversity and terrain features. Similarly, tourists' behavior, especially tourists' travel styles (solo travel, family travel, and group travel), was associated with the importance of three healing factors, namely hot spring water, terrain features, and environmental cleanliness.

3) Satisfaction Level of Healing Factors in Ecological Environment Category

Overall, tourists expressed a high level of satisfaction with the healing factors in the outdoor hot spring area of Anning Jinfang Hot Spring. Climate comfort and air quality can also maintain the current good satisfaction level. However, there are still some discrepancies between visitors' expectations and actual experiences. Specifically,

the satisfaction ratings for the hot spring water, vegetation quality and plant species diversity, and topographic features factors are lower than their importance ratings. This suggests that although visitors place a high value on these factors, their experience may not be at the expected level, suggesting that there is more room for improvement in these areas. The implications of these findings are critical for both environmental designers and spa resort management. Firstly, resorts should prioritize investment in improving the quality of their spa water, plant/vegetation and species diversity, as these factors are seen as most important by visitors. This may involve measures such as enhancing spa water treatment processes, introducing native plant and tree species and levels of planting, as well as consideration of seasonal plant landscapes and plant odors, and creating and protecting plant diversity. Second, resorts should segment their services and products based on visitor characteristics and behavior to meet the specific needs and preferences of different visitor groups. By segmenting visitors based on their characteristics and behaviors, resorts can develop targeted strategies to enhance visitor satisfaction and loyalty. For example, resorts can enhance promotions and campaigns for older tourists on weekdays to spread the environmental pressure on holidays. Another example is that young people are more concerned about topographical factors in the natural environment, and the attractiveness of topographical changes and landscape environment can be strengthened in some functional areas where young people have frequent activities.

4) Integration of Importance-Satisfaction Levels with IPA Evaluation Matrix Modeling

Through the IPA model, it can be clearly seen which factors need to be maintained, improved and optimized, providing scientific guidance for the management and design of hot spring resorts. Comprehensive evaluation through the IPA matrix model reveals that the hot spring water, vegetation quality and diversity of plant species in Anning Jinfang outdoor hot spring environment need to be improved and optimized. Climate comfort, environmental cleanliness and air quality can be maintained in the current good condition. The terrain feature aspect is not a great concern for tourists and can be appropriately reduced in design and business management.

6.2 Recommendations

6.2.1 Recommendations for Hot Spring Resort Management

1) Healing Factors to Be Maintained

Climate comfort: Based on the results of the study, Jinfang Spa Enterprises can continue to maintain the existing design and management strategies to ensure climate comfort in different seasons. Air quality and environmental cleanliness: Maintaining high quality air and a clean environment ensures that visitors enjoy fresh air and a clean resort environment.

It is important to note in the research results that in the case study of Jinfang Spa, climate comfort was not correlated with either visitor characteristics or behavior. It is interesting to note that human power is difficult to control for this healing factor, and coincidentally, the results of the study were such that there was no need to control for this. However, in the overall score of importance, visitors assessed its importance on the scale of important-very important (4.205 ± 0.770). Based on this situation, we infer that the case under investigation is located in a mild climate area with good climate comfort and air quality in all seasons, which has led to the fact that most of the tourists in the spa resort have adapted to this situation without taking into account its specificity. On the other hand, we also recommend that the location of spa resorts should be prioritized to the areas with the best healing climate, with mild temperature (20-25 degrees), moderate humidity (relative humidity 40%-60%), and fresh air (AQI=0-50).

2) Healing Factors to Be Improved

Hot spring water: Strengthen water quality management and maintenance, check water quality regularly to ensure cleanliness and natural beauty of the water. Vegetation quality: improve the greening design, increase the coverage rate of trees, optimize the distribution structure of plants, increase the varieties of ornamental and adaptable plants, increase the planting level of plants, consider the seasonal landscape changes of plants, and enhance the comprehensive quality of greening landscape. Diversity of plant species: increase plant species, provide diverse ecological and visual experiences, and improve visitor satisfaction.

3) Healing Factors to Be Optimized

Terrain features: Optimize the existing terrain design and add landscape facilities that interact with the terrain, such as observation decks and walkways, to enrich visitor experience. Comprehensive landscape design: Consider climate, terrain, vegetation and other factors to optimize the overall landscape design and create a multi-level, multi-dimensional healing environment.

4) Customized Services According to Visitor Groups

The resort should be segmented according to the characteristics and behavior of tourists and customize its services and products to meet the specific needs and preferences of major groups. For example, older groups pay more attention to hot spring water activities (e.g., hot spring spa treatments and outdoor wellness trails) and botanical environments (e.g., botanical scents and botanical seasonal landscapes). Spa companies can offer promotions for seniors on weekdays with seasonal botanical landscapes (cherry blossoms in the spring, osmanthus blossoms and red-leafed trees in the fall), such as a buy-three-get-one-free admission for seniors aged 60 or older, so the outdoor spa area can be fully utilized, the Balance the number of visitors on weekdays and holidays to enhance the visitor experience. On weekends and holidays, the attraction factor for family-oriented tourists is strengthened, such as optimizing the outdoor large hot spring pool area, hot spring swimming pool area, and adding water toys and water activity programs to attract different groups of tourists.

5) Regular Assessment and Improvement

Resorts should regularly assess visitor satisfaction using the IPA model and other relevant tools. This will help them identify areas for improvement. The resort should also seek feedback from visitors through surveys, reviews and social media channels to gain insight into their experience and identify opportunities for improvement.

6) Promote Ecological Sustainability

The resort should promote ecological sustainability by protecting and enhancing its natural environment. This may involve measures such as reducing waste and pollution of spa water, conserving energy and spa water resources, and continually optimizing plant factors, water factors, etc. By promoting sustainability, the visitor experience is enhanced on the one hand, and the long-term development of the business is ensured on the other.

6.2.2 Recommendations for Landscape Designers

According to the results of this study there are the following specific recommendations for outdoor hot spring area landscape design:

- 1) Strengthen the design and optimization of hot spring thermal water.

Hot spring enterprises should ensure the cleanliness of hot spring water and regularly test the water quality to prevent pollution. Introduce a highly efficient filtration and circulation system for hot spring water to ensure that the water quality of hot spring water is safe and recycled. On the other hand, it is necessary to optimize the design of the pool of hot spring water in the design, account for the number and area of the pool according to the number of visitors, and reasonably configure the proportion of the number of large pools, medium pools and small pools. According to different age groups, different visiting styles, visitors' needs and quantity ratio, design pools with different depths and sizes, and provide small pools with a large number and better privacy and medium and large pools suitable for families.

- 2) Improve the quality of plants and vegetation in the outdoor spa area.

The quality of vegetation involves the percentage of vegetation cover and the distribution structure of plants. Plant more native plants in the spa area to increase the vegetation cover and provide more shade and natural beauty. The distribution structure of plants is as balanced as possible according to the different activity areas. In the structure of distribution, the thematic features of plants should also be considered, so that for different functional areas, there are several different thematic features of plants to increase the richness of the plant landscape.

The selection of plant species should consider seasonal changes and plant odors, introduce diverse plant species, improve biodiversity, and enhance the ornamental and ecological value of the landscape. Weather-resistant and low-maintenance plants should be selected to adapt to the changes of different seasons.

Regarding the location of plant planting, plants that are prone to dropping a lot of leaves, or a lot of fruits are not planted around the spa pool, so as not to affect the cleanliness of the pool. Plant planting safety, plant species selection does not choose plants that have flotsam in the spring, or plants that have thorns on their trunks, branches, and leaves. Plants by the pool are selected with fewer falling leaves and a wide diameter of the crown, which can block the sunlight in summer and increase the

comfort of the hot spring bath.

3) Construction of green belts and windbreaks along the outer edge of the resort area to optimize air quality.

Planting windbreaks and green belts around the spa area helps improve air quality and reduce dust and noise pollution. Introducing aromatic plants and planting plants with aromatic scents, such as lavender and mint, not only improves air quality, but also provides aroma therapy and enhances visitors' relaxation experience.

4) Reasonable design of outdoor spa area terrain.

Utilize the natural terrain for terrain design. Make full use of the existing natural terrain and avoid large-scale artificial remodeling. Design natural health trails and viewing platforms that follow changes in the terrain to provide a diverse terrain experience. Utilize a combination of natural and created terrain to create multi-layered landscapes. Design multi-level landscape space, such as stepped gardens, waterfalls, gentle slopes, etc., to enhance the sense of hierarchy and interest in the landscape.

5) Optimize the design of environmental facilities to enhance environmental cleanliness.

Formulate a detailed environmental cleaning plan and regularly clean and maintain the spa area to ensure that the public facilities and landscape areas are neat and clean. Provide adequate garbage collection and disposal facilities. Provide sufficient garbage collection bins and sorting and recycling facilities in the spa area for the convenience of visitors and to keep the environment tidy. For small hot spring pools, 1 towel rack and 1 slipper rack should be set up at the entrance, and for medium and large hot spring pools, at least 2-6 towel racks and slipper racks should be set up in different directions at the entrance, and at least 1 garbage collection box should be set up to ensure cleanliness of the towels, slippers and environment.

6) Comprehensively consider the seasonal landscape feature changes of the outdoor hot spring landscape.

The outdoor hot spring area should consider four-season landscape design. According to the characteristics of different seasons, design a landscape that adapts to the changes of the four seasons. For example, enjoy flowers in spring, foliage in summer, leaves and fruits in fall, and snow in winter. Combined with the seasonal changes in landscape features, plan corresponding activities and festivals to attract

visitors in different seasons and enhance the attractiveness of the spa area.

The above suggestions can optimize the landscape design of the outdoor hot spring area, improve the overall experience of visitors, meet the needs of different groups, and thus enhance the competitiveness and sustainable development of the hot spring resort.

6.3 Discussion

Theoretical and methodological dimensions: Previous research has drawn heavily on various theoretical frameworks such as tourism, restorative landscape theory, restorative environmental design theory and biophilic theory. These theories emphasize the psychological and physiological benefits of natural environments and the role of promoting healing and wellness through design principles. In recent years, researchers have further developed these theories to emphasize the application of ecopsychology and environmental psychology in rehabilitation design (Li et al., 2020; Wang & Qin, 2019).

In terms of methodology and content, previous studies have made extensive use of IPA (Importance-Performance Analysis) modeling, cluster analysis, factor analysis, ISM (Interpretive Structural Modeling) causality analysis, principal component analysis, rootedness theory, geography of tourism, spatial support theory, evidence-based design of rehabilitation environments, and multisensory environmental therapy (Zhao et al., 2021; Chen & Xu, 2020). In addition, terrain therapy in Japan and hydrotherapy research in Germany have informed the development of quantitative evaluation models for the exploitable value of spa landscape resources and the therapeutic effects of spa minerals (Tanaka et al., 2019; Muller et al., 2020). Other studies have explored customer satisfaction, corporate image, affective response, service quality, and factors that influence theme park visitors' perceived service quality, satisfaction, and behavioral intentions (Zhang et al., 2020; Liu & Wang, 2021).

In addition, studies have focused on the relationship between perceived sensory dimensions and stress recovery in urban green spaces, the use of 3D roaming technology in ecological landscape design, evaluation and design criteria for healing gardens, and physical environment factors affecting users (Wang et al., 2020; Huang &

Liu, 2021). These studies emphasize the importance of considering various healing components in landscape design, such as plant species diversity, water features, and environmental cleanliness.

Population Focus: Previous studies have focused on specific populations, including the elderly, patients in medical spaces, nursing home residents, patients with special diseases, and depressed children (Yang et al., 2019; Chen & Li, 2020). In contrast, relatively few studies have focused on outdoor environments of spas and their corresponding visitor groups.

Hot spring landscape design dimension: fewer studies have focused on the outdoor spatial component of hot spring healing environments from a landscape design perspective. Given the uniqueness of Chinese hot springs, outdoor mountain hot spring water occupies an important position in hot spring resort environments, and thus relatively few studies have been conducted on outdoor hot spring areas, with the majority of studies focusing on the indoor hot spring spa portion (Liu et al., 2020). Therefore, it is of great theoretical and practical significance to identify the important healing factors of outdoor hot springs and guide the optimization of landscape environment design in the design dimension. From the perspective of spa business management, this study can also help spa companies to identify which healing factors visitors pay more attention to, so that they can effectively allocate resources to enhance the strengths of these dimensions and build their core competitiveness. Through the use of IPA importance-satisfaction surveys and matrix evaluations, spa companies can better identify areas of strength, areas that need improvement, areas that are overpaid and of little value, and areas that should be weakened. This strategic approach allows companies to plan and prioritize their work effectively based on a four-quadrant diagram (Zhao et al., 2021).

Detailed attention to environmental factors: Previous studies have usually studied and evaluated tourism products and services in terms of their dimensions, with a very general delineation of environmental factors, such as spa products, natural environment, spa water, spa facilities, and service quality (Li et al., 2020). This generalization of large elements is difficult to specifically guide to the design of the landscape environment at a later stage and to guide the action plan of the enterprise in details. Instead, this study, from the perspective of landscape design, started from

the broad category of ecological environmental factors of outdoor spa environments for healing only, and then subdivided into seven components under the natural category of environmental factors. For example, the plant and vegetation environment is subdivided into plant cover, plant distribution structure, and plant species diversity. Spa water is refined to water cleanliness, type and number of pools, water temperature and mineral content, pool size and privacy. This detailed approach ensures that the research results will effectively guide future outdoor spa landscape design and business operations.

6.4 Future Research

This study provides valuable insights into understanding visitor attitudes and satisfaction with healing factors in outdoor spa areas. The identified key healing factors and their correlations with visitor characteristics and behaviors provide efficient guidance for spa resort management and designers. However, there are still many opportunities for future research to extend the current research area.

1) Expanding the scope of the study: Expanding the study to different types and geographic locations of spa resorts can be considered in future studies to validate the generalizability of the findings. Future research could consider expanding the sample to include visitors from different geographic areas and cultural backgrounds. This would allow for a more comprehensive understanding of visitor preferences and experiences in different contexts. In addition, future research could explore other types of healing factors not covered in this study, such as: amenity-based factors, sensory healing factors, cultural and social factors, etc. This will further reveal how resorts can create a holistic healing experience for visitors.

2) Seasonal influences: Conducting surveys in different seasons to compare the effects of different seasons on visitor satisfaction increases the comprehensiveness and reliability of the study. Future research could collect data in different seasons and weather conditions to examine how these factors affect visitor experience and satisfaction. This will allow resorts to develop strategies that respond to seasonal changes and ensure that a consistent, high-quality visitor experience is provided throughout the year.

3) Refinement of research factors: Further refinement of the research factors will be conducted to explore in depth the impact of the facility-based healing factors, the visitor perception-based healing factors, and the five visitor senses-based healing factors. Through these studies, the management and design of hot spring resorts can be further improved to provide visitors with a better experience.

4) Post-hoc Analysis: In the future research, after the ANOVA analysis, the post-hoc analysis can be further carried out, and this step of the research can further explore the more specific correlation between different subgroups of visitor characteristics and visitor behaviors and the healing components, so that the results of the research can have more in-depth details and more specific directionality.

5) Increase the research on the healing benefits of hot spring environments based on the length of the study. Due to the special nature of the healing environment of hot springs, the effects and feelings of healing are much more than just the momentary feelings of the tourists in the questionnaire survey, so in the future research, we can consider extending the research on the benefits of healing for specific groups of people. For example, we can track the healing effects of the hot spring environment for specific groups of people in terms of months and years, so as to understand the association between the hot spring environment and the healing experience of tourists.

In summary, this study makes a useful contribution to understanding visitor attitudes and satisfaction with healing factors in outdoor hot spring areas. The findings will provide valuable insights and recommendations for spa healing landscape design practitioners and spa resort management to help enhance the visitor experience and maintain their competitive advantage in today's increasingly competitive tourism market.

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Evaluation Form for Outdoor Environmental Conditions of Hot Spring Resort

This questionnaire survey is a part of the doctoral dissertation which relates to educational research rather than commercial purposes. The obtained personal information and attitudes about the outdoor landscape of a hot spring resort will be used strictly for academic research and kept confidential at all times. The respondent can stop at any time if they feel uncomfortable with any questions.

The purpose of this survey is to investigate the outdoor environment usage behavior, user evaluation of the importance, and satisfaction of healing landscape factors and components of hot spring resorts. Only with the help and support of the respondents can this study obtain the most direct, authentic, and effective user evaluations, providing a reliable research foundation for later data analysis.

I Basic information (please type in the selection box)

1. Gender: Male Female
2. Age: years old
3. Occupation: Student Government officer Public institution Enterprises and companies Freelance Farmer Other occupations
4. Monthly income : Below ¥3,000 RMB ¥3,000-5,000 RMB ¥5,001-7,000 RMB ¥7,001-9,000 RMB ¥9,001-11,000 RMB Above ¥11,000 RMB
5. Education level: Below primary school Primary school Middle school High school Bachelor degree Master degree PhD
6. You **usually** visit a hot spring resort alone with my family as a group
with the purpose of healing non-healing

II Visitor Behavior of hot spring environment (Please write down your answer or place a check in the selection box.)

7. How long do you **usually** stay at a hot spring resort? Days
8. How many times do you **usually** visit hot spring resorts **in a year**? Times
9. What season do you like the **most** to visit hot spring resorts? Spring Summer Autumn Winter
10. **What time period** do you prefer to engage in outdoor activities at hot spring resorts? Morning Noon Afternoon Evening

11. The most frequently used outdoor area (you can make more than one choice)	12. Select the preferred type of space according to the most frequently used outdoor area you selected in question no.11				
	1. A small space with privacy	2. A quiet enclosed space	3. A large open space	4. A space close to the service point	5. Other types of space (Please specify)
<input type="checkbox"/> Large hot spring pool					
<input type="checkbox"/> Small hot spring theme pool					
<input type="checkbox"/> Hot spring swimming pool					
<input type="checkbox"/> Sports pool with physical therapy functions and equipment					
<input type="checkbox"/> Other spaces (please specify)					

III Attitudes towards outdoor healing landscape factors and components of hot spring resort.

Please make a 'O' (circle mark) to cover the score corresponding to your attitude.

Please rate each outdoor healing landscape component of the hot spring resort in relation to the given evaluation criteria explained in the 3rd column. A five-point scale is used to measure your importance level towards each component: very important (score of 5), important (score of 4), moderate (score of 3), unimportant (score of 2), and very unimportant (score of 1). Likewise, a five-point scale is used to measure your satisfaction level towards each component of **Jinfang Hot Spring Resort**: very satisfied (score of 5), satisfied (score of 4), moderate (score of 3), unsatisfied (score of 2), and very unsatisfied (score of 1).

Factor	Component	Evaluation Criteria for Outdoor Landscapes	Importance					Satisfaction (Jinfang Hot Spring Resort)					
			Very Unimportant	Unimportant	Moderate	important	Very Important	Very Unsatisfied	Unsatisfied	Moderate	Satisfied	Very Satisfied	
1. Ecological Environment	1.1 Climate Comfort	The comfort level in terms of air temperature, humidity, etc.	1.1.1 Internal	1	2	3	4	5	1	2	3	4	5
			1.1.2 External	1	2	3	4	5	1	2	3	4	5
	1.2 Hot Spring Water Environment	The quality and cleanliness of hot spring water.	1.2.1 Internal	1	2	3	4	5	1	2	3	4	5
			1.2.2 External	1	2	3	4	5	1	2	3	4	5
	1.3 Air Quality	The freshness of the air.	1.3.1 Internal	1	2	3	4	5	1	2	3	4	5
			1.3.2 External	1	2	3	4	5	1	2	3	4	5
	1.4 Plants and Vegetation Quality	- Ration of green area - Harmony with different shapes, forms, colors, heights, and layers of vegetation	1.4.1 Internal	1	2	3	4	5	1	2	3	4	5
			1.4.2 External	1	2	3	4	5	1	2	3	4	5
	1.5 Topographic Features	The rich terrain undulates, presenting a landscape environment with different heights and rich levels.	1.5.1 Internal	1	2	3	4	5	1	2	3	4	5
			1.5.2 External	1	2	3	4	5	1	2	3	4	5
	1.6 Plant Species Diversity	- The number of plant species and their relative abundance within a defined area. - Fit with seasonal variation and local context.	1.6.1 Internal	1	2	3	4	5	1	2	3	4	5
			1.6.2 External	1	2	3	4	5	1	2	3	4	5
	1.7 Environmental Cleanliness	The environment of each space is clean, tidy, and well-ordered.	1.7.1 Internal	1	2	3	4	5	1	2	3	4	5
			1.7.2 External	1	2	3	4	5	1	2	3	4	5

Please specify other factors that mostly affect your experience when using the outdoor space of a hot spring resort.....

.....

THANK YOU FOR YOUR TIME AND KINDNESS.



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Factors	Components	Name of Hot Spring Resort																													
		Anningjiefang	Fuminingshiyuan	Shiboselin	Xundansingle	Shilinxiлиндугуануан	Huashiqi	Caidun	Yuyiyingshejiao	Yuxichangke	Milhequan	Qijinqin	Shuifanchudaxuogu	Dalishengquan	Dalidizhao	Dalputuoquan	Dalifengqi	Xinaggetianhengqiao	Baoshangjinghua	Tengchongchai	Tengchonghehua	Tengchongmayugu	Tengchongyongle	Ruijiangchengdihai	Linghejintewenquan	Longhuangnashang	Jingxuehangyunshe	Puerheyuan	Xishuangbanannajiumyulin		
1	Basic Information	1.1 Resort History	22	4	3	8	6	9	7	26	2	15	13	6	3	9	11	10	7	2	34	32	12	9	23	7	13	6	2	3	
		1.2 Location(near the city , Within 100 kilometers)	√	√	√			√	√	√		√	√									√		√						√	√
		1.3 Tourist reception volume	27	16	13	9	11	17	26	32	8.5	36	6.4	9.6	26	13	9	6	8.6	7.2	47	56	8.7	9	12	51	7.4	6.2	12	9.7	
	1.4 Functional Diversity	1.4.1 Big Pool	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		1.4.2 Small Pool	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		1.4.3 Children's hot Spring Area	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		1.4.4 Swimming and Sports Pools	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
1.4.5 Hot Spring Hotel		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
1.4.6 Healing Facilities		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
2	Natural Environment	2.1 Plant and Vegetation Quality	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
		2.2 Landscape Diversity and Beauty	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
3	Facilities	3.1 Service Facilities (For example, signage systems, lighting fixtures, trash cans, towel racks, shoe racks, drinking water points, public toilets, etc.)	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
		3.2 Leisure Facilities	Pavilions and landscape corridors	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
			Benches, lounge chairs, tables and stools	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√



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1. Gender

Gender	Kolmogorov-Smirnov ^a			Shapiro-Wilk			
	Statistic	df	Sig.	Statistic	df	Sig.	
Y ₁₋₁ Climate Comfort (C ₁)	Male	0.249	183	0.000	0.811	183	0.000
	Female	0.249	237	0.000	0.804	237	0.000
Y ₁₋₂ Hot Spring Water (C ₂)	Male	0.396	183	0.000	0.654	183	0.000
	Female	0.394	237	0.000	0.662	237	0.000
Y ₁₋₃ Air Quality (C ₃)	Male	0.319	183	0.000	0.728	183	0.000
	Female	0.313	237	0.000	0.751	237	0.000
Y ₁₋₄ Plants and Vegetation Quality (C ₄)	Male	0.281	183	0.000	0.832	183	0.000
	Female	0.264	237	0.000	0.810	237	0.000
Y ₁₋₅ Topographic Features (C ₅)	Male	0.207	183	0.000	0.886	183	0.000
	Female	0.226	237	0.000	0.883	237	0.000
Y ₁₋₆ Plant Species Diversity (C ₆)	Male	0.320	183	0.000	0.814	183	0.000
	Female	0.317	237	0.000	0.798	237	0.000
Y ₁₋₇ Environmental Cleanliness (C ₇)	Male	0.287	183	0.000	0.789	183	0.000
	Female	0.351	237	0.000	0.702	237	0.000

a. Lilliefors Significance Correction

2. Age

Age	Kolmogorov-Smirnov ^a			Shapiro-Wilk			
	Statistic	df	Sig.	Statistic	df	Sig.	
Y ₁₋₁ Climate Comfort (C ₁)	>18 Juvenile	0.316	15	0.000	0.790	15	0.003
	18-44 Youth	0.247	239	0.000	0.813	239	0.000
	45-59 Middle	0.302	61	0.000	0.780	61	0.000
	Age						
Y ₁₋₂ Hot Spring Water (C ₂)	60≤ Elderly	0.265	105	0.000	0.789	105	0.000
	>18 Juvenile	0.453	15	0.000	0.561	15	0.000
	18-44 Youth	0.371	239	0.000	0.691	239	0.000
	45-59 Middle	0.392	61	0.000	0.670	61	0.000
Y ₁₋₃ Air Quality (C ₃)	Age						
	60≤ Elderly	0.455	105	0.000	0.574	105	0.000
	>18 Juvenile	0.514	15	0.000	0.413	15	0.000
	18-44 Youth	0.352	239	0.000	0.714	239	0.000
Y ₁₋₄ Plants and Vegetation Quality (C ₄)	45-59 Middle	0.387	61	0.000	0.649	61	0.000
	Age						
	60≤ Elderly	0.355	105	0.000	0.728	105	0.000
	>18 Juvenile	0.367	15	0.000	0.716	15	0.000

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	18-44 Youth	0.244	239	0.000	0.832	239	0.000
	45-59 Middle Age	0.235	61	0.000	0.824	61	0.000
	60≤ Elderly	0.364	105	0.000	0.733	105	0.000
Y ₁₋₅ Topographic Features (C ₅)	>18 Juvenile	0.385	15	0.000	0.630	15	0.000
	18-44 Youth	0.219	239	0.000	0.872	239	0.000
	45-59 Middle Age	0.223	61	0.000	0.869	61	0.000
	60≤ Elderly	0.211	105	0.000	0.879	105	0.000
Y ₁₋₆ Plant Species Diversity (C ₆)	>18 Juvenile	0.453	15	0.000	0.561	15	0.000
	18-44 Youth	0.304	239	0.000	0.823	239	0.000
	45-59 Middle Age	0.286	61	0.000	0.796	61	0.000
	60≤ Elderly	0.407	105	0.000	0.673	105	0.000
Y ₁₋₇ Environmental Cleanliness (C ₇)	>18 Juvenile	0.345	15	0.000	0.763	15	0.001
	18-44 Youth	0.393	239	0.000	0.669	239	0.000
	45-59 Middle Age	0.375	61	0.000	0.664	61	0.000
	60≤ Elderly	0.358	105	0.000	0.736	105	0.000

a. Lilliefors Significance Correction

3. Occupation

Occupation	Kolmogorov-Smirnov ^a			Shapiro-Wilk			
	Statistic	df	Sig.	Statistic	df	Sig.	
Y ₁₋₁ Climate Comfort (C ₁)	Student	0.253	53	0.000	0.831	53	0.000
	Working	0.264	189	0.000	0.804	189	0.000
	Freelance	0.274	73	0.000	0.784	73	0.000
	No Occupation	0.265	105	0.000	0.789	105	0.000
Y ₁₋₂ Hot Spring Water (C ₂)	Student	0.331	53	0.000	0.747	53	0.000
	Working	0.359	189	0.000	0.710	189	0.000
	Freelance	0.457	73	0.000	0.515	73	0.000
	No Occupation	0.455	105	0.000	0.574	105	0.000
Y ₁₋₃ Air Quality (C ₃)	Student	0.297	53	0.000	0.788	53	0.000
	Working	0.386	189	0.000	0.673	189	0.000
	Freelance	0.365	73	0.000	0.691	73	0.000
	No Occupation	0.355	105	0.000	0.728	105	0.000
Y ₁₋₄ Plants and Vegetation Quality (C ₄)	Student	0.311	53	0.000	0.811	53	0.000

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	Working	0.232	189	0.000	0.829	189	0.000
	Freelance	0.243	73	0.000	0.810	73	0.000
	No	0.364	105	0.000	0.733	105	0.000
	Occupation						
Y ₁₋₅ Topographic Features (C ₅)	Student	0.226	53	0.000	0.842	53	0.000
	Working	0.203	189	0.000	0.869	189	0.000
	Freelance	0.213	73	0.000	0.879	73	0.000
	No	0.211	105	0.000	0.879	105	0.000
Y ₁₋₆ Plant Species Diversity (C ₆)	Student	0.378	53	0.000	0.701	53	0.000
	Working	0.291	189	0.000	0.825	189	0.000
	Freelance	0.288	73	0.000	0.804	73	0.000
	No	0.407	105	0.000	0.673	105	0.000
Y ₁₋₇ Environmental Cleanliness (C ₇)	Student	0.240	53	0.000	0.806	53	0.000
	Working	0.391	189	0.000	0.673	189	0.000
	Freelance	0.429	73	0.000	0.591	73	0.000
	No	0.358	105	0.000	0.736	105	0.000
	Occupation						

a. Lilliefors Significance Correction

4. Monthly Income

Monthly Income	Kolmogorov-Smirnov ^a			Shapiro-Wilk			
	Statistic	df	Sig.	Statistic	df	Sig.	
Y ₁₋₁ Climate Comfort (C ₁)	¥3,000< Low-income	0.252	64	0.000	0.817	64	0.000
	¥3,000—7,000 Middle-income	0.267	219	0.000	0.797	219	0.000
	>¥7,000 High-income	0.240	137	0.000	0.815	137	0.000
	¥3,000< Low-income	0.359	64	0.000	0.717	64	0.000
Y ₁₋₂ Hot Spring Water (C ₂)	¥3,000—7,000 Middle-income	0.415	219	0.000	0.640	219	0.000
	>¥7,000 High-income	0.384	137	0.000	0.661	137	0.000
	¥3,000< Low-income	0.252	64	0.000	0.804	64	0.000
Y ₁₋₃ Air Quality (C ₃)	¥3,000—7,000 Middle-income	0.324	219	0.000	0.739	219	0.000
	>¥7,000 High-income	0.346	137	0.000	0.695	137	0.000
	¥3,000< Low-income	0.304	64	0.000	0.813	64	0.000
Y ₁₋₄ Plants and Vegetation Quality (C ₄)	¥3,000< Low-income	0.304	64	0.000	0.813	64	0.000

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	¥3,000—7,000 Middle-income	0.261	219	0.000	0.821	219	0.000
	>¥7,000 High-income	0.281	137	0.000	0.820	137	0.000
Y ₁₋₅ Topographic Features (C ₅)	¥3,000< Low-income	0.210	64	0.000	0.864	64	0.000
	¥3,000—7,000 Middle-income	0.228	219	0.000	0.887	219	0.000
	>¥7,000 High-income	0.232	137	0.000	0.887	137	0.000
	¥3,000< Low-income	0.367	64	0.000	0.707	64	0.000
Y ₁₋₆ Plant Species Diversity (C ₆)	¥3,000—7,000 Middle-income	0.309	219	0.000	0.804	219	0.000
	>¥7,000 High-income	0.306	137	0.000	0.838	137	0.000
	¥3,000< Low-income	0.264	64	0.000	0.784	64	0.000
	¥3,000—7,000 Middle-income	0.323	219	0.000	0.746	219	0.000
Y ₁₋₇ Environmental Cleanliness (C ₇)	>¥7,000 High-income	0.354	137	0.000	0.717	137	0.000

a. Lilliefors Significance Correction

5. Education level

Education Level	Kolmogorov-Smirnov ^a			Shapiro-Wilk			
	Statistic	df	Sig.	Statistic	df	Sig.	
Y ₁₋₁ Climate Comfort (C ₁)	High school or Below	0.292	72	0.000	0.765	72	0.000
	Bachelor degree	0.245	274	0.000	0.810	274	0.000
	Above Bachelor degree	0.223	74	0.000	0.827	74	0.000
Y ₁₋₂ Hot Spring Water (C ₂)	High school or Below	0.496	72	0.000	0.466	72	0.000
	Bachelor degree	0.389	274	0.000	0.660	274	0.000
	Above Bachelor degree	0.311	74	0.000	0.768	74	0.000
Y ₁₋₃ Air Quality (C ₃)	High school or Below	0.327	72	0.000	0.735	72	0.000
	Bachelor degree	0.336	274	0.000	0.730	274	0.000

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	Above Bachelor degree	0.258	74	0.000	0.778	74	0.000
Y ₁₋₄ Plants and Vegetation Quality (C ₄)	High school or Below	0.270	72	0.000	0.834	72	0.000
	Bachelor degree	0.277	274	0.000	0.822	274	0.000
	Above Bachelor degree	0.270	74	0.000	0.798	74	0.000
Y ₁₋₅ Topographic Features (C ₅)	High school or Below	0.221	72	0.000	0.872	72	0.000
	Bachelor degree	0.227	274	0.000	0.888	274	0.000
	Above Bachelor degree	0.221	74	0.000	0.871	74	0.000
Y ₁₋₆ Plant Species Diversity (C ₆)	High school or Below	0.313	72	0.000	0.784	72	0.000
	Bachelor degree	0.318	274	0.000	0.807	274	0.000
	Above Bachelor degree	0.327	74	0.000	0.817	74	0.000
Y ₁₋₇ Environmental Cleanliness (C ₇)	High school or Below	0.332	72	0.000	0.726	72	0.000
	Bachelor degree	0.333	274	0.000	0.740	274	0.000
	Above Bachelor degree	0.287	74	0.000	0.783	74	0.000

a. Lilliefors Significance Correction

6. Visiting Style

Visiting style		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Y ₁₋₁ Climate Comfort (C ₁)	Alone	0.265	69	0.000	0.754	69	0.000
	Family	0.262	265	0.000	0.802	265	0.000
	Group	0.266	86	0.000	0.822	86	0.000
Y ₁₋₂ Hot Spring Water (C ₂)	Alone	0.346	69	0.000	0.713	69	0.000
	Family	0.421	265	0.000	0.606	265	0.000
	Group	0.348	86	0.000	0.734	86	0.000

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Y ₁₋₃ Air Quality (C ₃)	Alone	0.313	69	0.000	0.733	69	0.000
	Family	0.326	265	0.000	0.740	265	0.000
	Group	0.284	86	0.000	0.750	86	0.000
Y ₁₋₄ Plants and Vegetation Quality (C ₄)	Alone	0.258	69	0.000	0.818	69	0.000
	Family	0.292	265	0.000	0.813	265	0.000
	Group	0.239	86	0.000	0.818	86	0.000
Y ₁₋₅ Topographic Features (C ₅)	Alone	0.219	69	0.000	0.874	69	0.000
	Family	0.209	265	0.000	0.893	265	0.000
	Group	0.215	86	0.000	0.851	86	0.000
Y ₁₋₆ Plant Species Diversity (C ₆)	Alone	0.317	69	0.000	0.793	69	0.000
	Family	0.326	265	0.000	0.799	265	0.000
	Group	0.308	86	0.000	0.809	86	0.000
Y ₁₋₇ Environmental Cleanliness (C ₇)	Alone	0.302	69	0.000	0.771	69	0.000
	Family	0.360	265	0.000	0.712	265	0.000
	Group	0.235	86	0.000	0.817	86	0.000

a. Lilliefors Significance Correction

7. Visiting Purpose

Purpose	Kolmogorov-Smirnov ^a			Shapiro-Wilk			
	Statistic	df	Sig.	Statistic	df	Sig.	
Y ₁₋₁ Climate Comfort (C ₁)	healing	0.238	245	0.000	0.810	245	0.000
	non-healing	0.264	175	0.000	0.799	175	0.000
Y ₁₋₂ Hot Spring Water (C ₂)	healing	0.383	245	0.000	0.670	245	0.000
	non-healing	0.410	175	0.000	0.641	175	0.000
Y ₁₋₃ Air Quality (C ₃)	healing	0.330	245	0.000	0.732	245	0.000
	non-healing	0.296	175	0.000	0.752	175	0.000
Y ₁₋₄ Plants and Vegetation Quality (C ₄)	healing	0.283	245	0.000	0.813	245	0.000
	non-healing	0.263	175	0.000	0.833	175	0.000
Y ₁₋₅ Topographic Features (C ₅)	healing	0.220	245	0.000	0.879	245	0.000
	non-healing	0.227	175	0.000	0.891	175	0.000
Y ₁₋₆ Plant Species Diversity (C ₆)	healing	0.319	245	0.000	0.807	245	0.000
	non-healing	0.321	175	0.000	0.804	175	0.000
Y ₁₋₇ Environmental Cleanliness (C ₇)	healing	0.326	245	0.000	0.744	245	0.000
	non-healing	0.320	175	0.000	0.749	175	0.000

a. Lilliefors Significance Correction

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1. Gender

Analysis of Homogeneity of Variances for Gender Group				
Components	Gender		F	p
	Male (n=183)	Female (n=237)		
Y ₁₋₁ Climate Comfort (C ₁)	0.77	0.77	0.038	0.845
Y ₁₋₂ Hot Spring Water (C ₂)	0.72	0.7	0.039	0.843
Y ₁₋₃ Air Quality (C ₃)	0.7	0.71	0.283	0.595
Y ₁₋₄ Plants and Vegetation Quality (C ₄)	0.8	0.71	0.058	0.809
Y ₁₋₅ Topographic Features (C ₅)	0.99	0.9	4.591	0.033
Y ₁₋₆ Plant Species Diversity (C ₆)	0.84	0.67	7.931	0.005
Y ₁₋₇ Environmental Cleanliness (C ₇)	0.82	0.76	2.137	0.145

2. Age

Analysis of Homogeneity of Variances for Age Group						
Components	Age				F	p
	Juvenile (n=15)	Youth (n=239)	Adult (n=61)	Elder (n=105)		
Y ₁₋₁ Climate Comfort (C ₁)	0.64	0.81	0.8	0.68	2.317	0.075
Y ₁₋₂ Hot Spring Water (C ₂)	0.46	0.76	0.83	0.47	12.682	0.000
Y ₁₋₃ Air Quality (C ₃)	0.35	0.76	0.74	0.56	9.442	0.000
Y ₁₋₄ Plants and Vegetation Quality (C ₄)	0.53	0.83	0.76	0.6	9.048	0.000
Y ₁₋₅ Topographic Features (C ₅)	0.51	0.88	0.98	0.85	3.23	0.022
Y ₁₋₆ Plant Species Diversity (C ₆)	0.46	0.84	0.78	0.5	3.683	0.012
Y ₁₋₇ Environmental Cleanliness (C ₇)	0.59	0.83	0.89	0.57	10.35	0.000

3. Occupation

Analysis of Homogeneity of Variances for Occupation Group						
Components	Occupation				F	p
	Student (n=53)	Working (n=189)	Freelance (n=73)	No Occupation (n=105)		
Y ₁₋₁ Climate Comfort (C ₁)	0.76	0.82	0.77	0.68	2.3	0.077
Y ₁₋₂ Hot Spring Water (C ₂)	0.77	0.78	0.66	0.47	13.192	0.000
Y ₁₋₃ Air Quality (C ₃)	0.73	0.7	0.82	0.56	4.016	0.008
Y ₁₋₄ Plants and Vegetation Quality (C ₄)	0.73	0.78	0.9	0.6	8.498	0.000
Y ₁₋₅ Topographic Features (C ₅)	0.8	0.91	0.95	0.85	2.562	0.054
Y ₁₋₆ Plant Species Diversity (C ₆)	0.72	0.82	0.87	0.5	3.509	0.015
Y ₁₋₇ Environmental Cleanliness (C ₇)	0.91	0.82	0.8	0.57	7.763	0.000

4. Monthly Income

Analysis of Homogeneity of Variances for Monthly Income Group					
Components	Monthly Income			F	p
	Low-income (n=64)	Middle-income (n=219)	High-income (n=137)		
Y ₁₋₁ Climate Comfort (C ₁)	0.73	0.75	0.82	1.116	0.328
Y ₁₋₂ Hot Spring Water (C ₂)	0.75	0.6	0.81	7.534	0.001
Y ₁₋₃ Air Quality (C ₃)	0.72	0.66	0.76	0.771	0.463
Y ₁₋₄ Plants and Vegetation Quality (C ₄)	0.72	0.73	0.8	0.593	0.553
Y ₁₋₅ Topographic Features (C ₅)	0.89	0.93	0.96	0.894	0.41
Y ₁₋₆ Plant Species Diversity (C ₆)	0.57	0.7	0.89	8.957	0.000
Y ₁₋₇ Environmental Cleanliness (C ₇)	0.87	0.73	0.84	1.504	0.223

5. Education level

Analysis of Homogeneity of Variances for Education Level Group					
Components	Education Level			F	p
	High school or Below (n=72)	Bachelor's degree (n=274)	Above Bachelor's degree (n=74)		
Y ₁₋₁ Climate Comfort (C ₁)	0.7	0.78	0.8	0.167	0.846
Y ₁₋₂ Hot Spring Water (C ₂)	0.46	0.71	0.81	18.828	0.000
Y ₁₋₃ Air Quality (C ₃)	0.63	0.67	0.86	1.612	0.201
Y ₁₋₄ Plants and Vegetation Quality (C ₄)	0.76	0.76	0.73	0.16	0.852
Y ₁₋₅ Topographic Features (C ₅)	1.06	0.92	0.89	2.864	0.058
Y ₁₋₆ Plant Species Diversity (C ₆)	0.69	0.74	0.86	1.368	0.256
Y ₁₋₇ Environmental Cleanliness (C ₇)	0.67	0.78	0.91	2.881	0.057

6. Visiting Style

Analysis of Homogeneity of Variances for Visiting Style Group					
Components	Visiting style (Standard Deviation)			F	p
	Alone (n=69)	Family (n=265)	Group (n=86)		
Y ₁₋₁ Climate Comfort (C ₁)	0.77	0.77	0.78	1.159	0.315
Y ₁₋₂ Hot Spring Water (C ₂)	0.76	0.66	0.77	5.831	0.003
Y ₁₋₃ Air Quality (C ₃)	0.73	0.7	0.7	0.124	0.884
Y ₁₋₄ Plants and Vegetation Quality (C ₄)	0.77	0.73	0.8	3.501	0.031
Y ₁₋₅ Topographic Features (C ₅)	0.93	0.94	0.9	0.33	0.719
Y ₁₋₆ Plant Species Diversity (C ₆)	0.74	0.74	0.79	0.07	0.932
Y ₁₋₇ Environmental Cleanliness (C ₇)	0.74	0.72	0.95	1.952	0.143

7. Visiting Style

Analysis of Homogeneity of Variances for Visiting Purpose Group				
Components	Purpose		F	p
	Healing (n=245)	Non-healing (n=175)		
Y ₁₋₁ Climate Comfort (C ₁)	0.78	0.75	0.102	0.75
Y ₁₋₂ Hot Spring Water (C ₂)	0.73	0.66	2.49	0.115
Y ₁₋₃ Air Quality (C ₃)	0.72	0.69	0.412	0.521
Y ₁₋₄ Plants and Vegetation Quality (C ₄)	0.74	0.78	0.135	0.714
Y ₁₋₅ Topographic Features (C ₅)	0.92	0.97	0.413	0.521
Y ₁₋₆ Plant Species Diversity (C ₆)	0.74	0.77	0.252	0.616
Y ₁₋₇ Environmental Cleanliness (C ₇)	0.79	0.78	0.018	0.893



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