

Article

Analysis of Narrative Space in the Chinese Classical Garden Based on Narratology and Space Syntax—Taking the Humble Administrator’s Garden as an Example

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Abstract: Using the theory of Narratology and the analysis method of Space Syntax, the complex structure and plot of space in Chinese Classical Gardens (CCGs) are described and analysed, taking the Humble Administrator’s Garden as an example. The three elements of the garden’s spatial system (nodes, boundaries, and linkages) constitute the complexity and similarity of the garden’s spatial structure. Plaques, couplets, poems, and paintings serve as the narrative vocabulary of the gardens, bringing out the theme and sublimating space. The garden owner uses the garden’s physical space as a carrier, combining the text of the “stories within a story” with the spatial structure of the “gardens in a garden”. By visiting the garden over time, visitors complete the narrative of the garden’s plot space and receive the garden owner’s aspiration of “Reclusive”. The introduction of narrative theory and space syntax into the analysis of Chinese Classical Gardens (CCGs) not only provides a new means of insight into the space of CCGs, but also provides designers with an idea of how to create rich spatial variations and emotional experiences in architectural practice by skilfully using limited spatial resources

Keywords: narrative space; visibility graph analysis (VGA); isovist analysis; Chinese classical garden (CCG); Humble Administrator’s Garden; reclusive



Citation: Chen, H.; Yang, L. Analysis of Narrative Space in the Chinese Classical Garden Based on Narratology and Space Syntax—Taking the Humble Administrator’s Garden as an Example. *Sustainability* **2023**, *15*, 12232. <https://doi.org/10.3390/su151612232>

Academic Editor: Dušan Katunský

Received: 27 June 2023

Revised: 31 July 2023

Accepted: 5 August 2023

Published: 10 August 2023



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1. Introduction

As a unique spatial typology, Chinese Classical Gardens (CCGs) have long captivated scholars and designers with their rich cultural connotations, labyrinthine spatial experiences, and refined gatherings for intellectual discourse [1,2]. Unlike official architecture—which strictly adhered to the feudal rituals—and residential architecture—which gathered the wisdom of the labouring people—classical gardens were mainly intended for the highly cultured and disillusioned literati. They built their gardens to escape from the real world for a short period and be inspired by the scenery, even in the city and the chaotic official-dom [3,4].

As a unique piece of cultural heritage, scholars have studied CCGs covering various aspects such as history and culture [3–7], space and landscape [1,2,8,9], materials and techniques [10,11], design and conservation [12–14] etc. In recent years, scholars have combined various advanced technological tools and concepts to expand the research dimension of CCGs. Some scholars have used laser scanning, digital drone technology, etc., to record and preserve the garden space [15–17]. Some scholars have used intelligent technological tools to analyse garden images and paintings in booklets to study garden spaces [18–20]. In today’s society, with the harsh global climate environment, how to improve the sustainability and conservation of ancient architectural heritage through scientific means is also the focus of many scholars [21–24]. Some scholars have analysed the transformation of CCGs to modern urban public green spaces from the perspective of urban parks and sustainable

landscapes [25–28]. Some scholars have also used numerical simulation techniques to analyse CCGs and ancient architectural spaces to improve the microclimatic environment of buildings and make reasonable suggestions for their conservation and utilization [29–34].

Narrative theory significantly influenced architecture after the modernist era of the 20th century. Bernard Tschumi and Nigel Coates were among the earliest to apply narrative as a design method in architectural design [35,36]. Rem Koolhaas, Steven Holl, and others also embraced narrative theory in their designs, resulting in exceptional architectural works [37,38]. In theoretical research, Sophia Psarra explores how space and cultural meaning are constructed in architecture and how they are conveyed to observers through compelling narrative-driven examples in her book [39]. The application of narrative theory in architectural studies has been primarily focused on integrating space and storytelling in typical architectural types, such as cultural exhibition buildings, religious architecture, classical gardens, and urban public spaces [40–42]. Chinese classical private gardens, for instance, use literary works as the thematic foundation, guiding spatial organization and expressing cultural aesthetics, with some likening them to autobiographical landscapes created by gardeners or owners [43]. Professor Andong Lu employed narrative theory to analyse and recreate the earliest spatial forms of gardens based on preserved garden atlases [44,45]. Shaoming Lu and others delved into the narrative structure of classical gardens by studying traditional Chinese concepts of space and time [46,47]. In her book “Architecture and Narrative,” Psarra adopts spatial syntax analysis to capture the experiential aspects of vision and movement within architectural spaces. Furthermore, there has been a growing trend of combining narrative theory with spatial syntax in recent years. For instance, Ulrich Thaler used spatial syntax analysis to examine the Palace of Pylos, studying the narrative of economic decline during the Late Bronze Age in Greece [48]. Shatha Malhis applied spatial syntax analysis to 14 Mamluk buildings to discern their spatial narrative principles [49]. In the context of classical gardens, Professor Shaoming Lu used spatial syntax in conjunction with spatial plot analysis to investigate the spatial narrative of Yu Garden [50]. However, there needs to be more research addressing the temporal-spatial narratives along garden paths. Rongrong Yu and others employed isovist analysis to study gardens’ complex visual fields and path systems, extracting design elements to create new garden architecture [51–53]. Nevertheless, their research needed to be integrated with narrative theory. Therefore, this paper builds upon previous studies of gardens, and combines narrative theory with spatial syntax, to analyse the narrative structure and plot of classical garden spaces, exploring their textual content, spatial organization, and narrative elements.

The selection of the research object in this study, the Humble Administrator’s Garden, was driven by several factors. Firstly, the garden is prominent as one of the most renowned classical gardens that still exists today. As a result, a wealth of research material, survey drawings, and data are available, which provides a strong theoretical foundation and support for this study. Secondly, encompassing an area of 4.1 hectares (with the central Humble Administrator’s Garden covering 1.2 hectares), the garden can be considered a large- to medium-sized garden. Consequently, extensive research literature covers various aspects of the Humble Administrator’s Garden, such as culture, visitor experiences, sight-line compensation, spatial structure, and botanical landscapes [54–58]. However, until now, previous research has yet to combine architectural narratology and spatial syntax to study the narrative spatial structure and plot of the Humble Administrator’s Garden.

2. Materials and Methods

2.1. Description of the Case Study

The Humble Administrator’s Garden (HAG) was built between the fourth and eighth years of Ming Zhengde (1509–1513), after Wang Xianchen—the imperial historian at the time—resigned from his post and retired to Suzhou. The specific spatial form of Wang’s HAG is now unavailable. Later studies of Wang’s HAG are mainly based on Wen Zhengming’s “Ode to the Humble Administrator’s Garden”, which he wrote for Wang Xianchen in 1533 [59] (Figure 1).

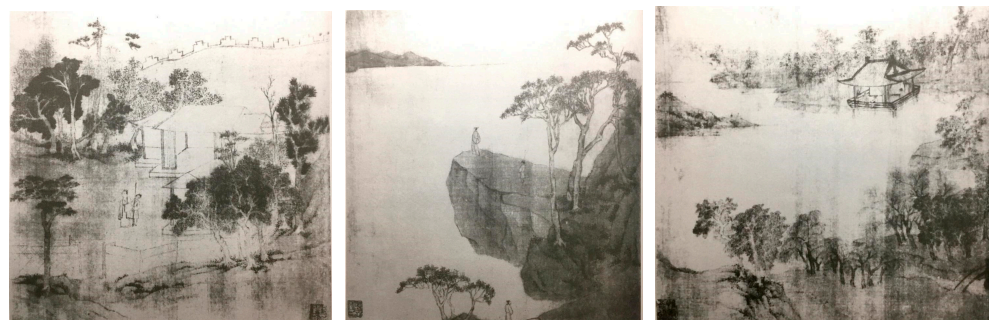


Figure 1. A booklet of Ruoshu Hall, Yiyuantai, and Xiaocanglang in Wen Zhengming’s “Thirty-one Views of the Humble Administrator’s Garden” (The figure was quoted from the book “*Humble Administrator’s Garden Map*” Comments; by Wen Zhengming, 2012 [44]).

The name “Humble Administrator” is taken from the words of Pan Yue’s “Xian Ju Fu” of the Jin dynasty, which means “To cultivate gardens and sell vegetables to provide daily meals, this is also the way of governance for the humble”. [60].

After Wang Xianchen’s death, the HAG went through the prosperity and decline of Suzhou garden culture [61]. The present HAG mainly consists of three parts: the HAG in the central part, the Complementary Garden in the western part, and the Returning Garden in the eastern part. The layout of the HAG in the central part is considered to be the garden that retains the legacy of the Ming Dynasty and continues the design intention of Wang’s HAG, which is the focus of this paper’s analysis (Figure 2).



1. Waist-shaped Entrance Gate; 2. Yellowstone Rockery; 3. Yuanming Hall; 4. Yiyu Pavilion; 5. Xiangshou Ship-shaped Pavilion; 6. Yulan Hall; 7. Jinsan Two-story Pavilion; 8. Hefengshimin Pavilion; 9. Xiaoxiang Pavilion; 10. Daishang Pavilion; 11. Leyi Pavilion; 12. Wuyang Pavilion; 13. Yibang Pavilion; 14. Xiang Pavilion; 15. Hailangchun Pavilion; 16. Linglong Pavilion; 17. Tingyu Pavilion; 18. Jishi Pavilion; 19. Xiaofeng Bridge; 20. Songfeng Pavilion; 21. Small Canglang Pavilion; 22. Zhiangyuan Pavilion; 23. Jingshen Pavilion; 24. Daochen Pavilion; 25. Biyou Pavilion; 26. Liyinjiao Corridor; 27. Yiyu Pavilion; 28. Sanyang Pavilion; 29. Shihuan Pavilion; 30. Taying Pavilion; 31. Liting Pavilion; 32. Fuci Pavilion; 33. Yu Pavilion; 34. Daoying Two-story Pavilion

Figure 2. The layout and aircscape of the Humble Administrator’s Garden are in the central part. And inside the red dotted line is the scope of this research paper (The author drew the figure, and the base map was adapted according to Liu Dunzhen’s drawing).

The HAG analysis is based on the plan mapped by Dr Liu Dunzhen around 1960 [7]. The layout of the central part of the HAG we see today remains the same as that of Liu Dunzhen’s time. However, the entrance from the residence in the south is now closed, and visitors can only enter the central part of the present HAG through the Returning Garden in the east.

2.2. Research Theory and Methodology

The narrative space of CCGs, in other words, perceives the garden as a three-dimensional narrative text enriched with spatial elements. In the realm of narrative art, the form of its narrative structure plays a pivotal role in showcasing the artistic allure of the work. The narrative text structure encompasses two levels of content: not only the presenter’s

expressive structure, but also the viewer's appreciative structure. The latter can be understood as a temporal structure incorporating time elements, representing the unfolding narrative plot. Narratology analyses the structure and poetic essence of gardens from the perspective of narrative texts. Additionally, spatial syntax, as a method for studying the 'combination relationships between different spaces,' offers a quantitative analytical approach to interpreting garden spaces through computer analysis software. This article combines narratology with spatial syntax to analyse the narrative spatial system of classical gardens from the perspectives of narrative text and spatial relationships.

2.2.1. Narrative Structure and Plot in CCGs

The narrative structure of CCGs finds its roots in the traditional textual structure system of storytelling in ancient China. Unlike Western classical narratives emphasizing a temporal framework of 'beginning, middle, and end,' Chinese traditional narratives adopt a spatial approach. Representative of this style is episodic novels, where each chapter or episode is an independent and complete story within a larger framework. These stories consist of standardized narrative units that interconnect to form an orderly and cohesive structure. This 'concatenated' structure is embodied in classical gardens through spatially organized groups of 'gardens within gardens' and labyrinthine pathway systems.

The spatial narrative structure of gardens gives rise to a non-linear plot narrative system. As visitors explore the garden, their choice of different pathways leads to various narrative experiences. Despite the diversity of narrative plots along these pathways, they all ultimately converge and direct attention toward the central theme of the garden.

- Narrative Structure in CCGs

The present HAG was not created in one go, but is a continuous reproduction and repair of the original version, Wang's HAG. From Jiang's time onward, the central part of the HAG has been created, reproduced, and built by different users or owners in different eras according to similar gardening rules to become the central part of the present HAG. In creating the garden, the outer courtyard wall first defines the outline and domain of the garden and is the first guarantee to escape and revel in the landscape. Next, the location of the main courtyard and landscape is of utmost importance, followed by establishing a subtle relationship between the main landscape and the entrance courtyard. Then, the users of the garden, while pursuing the previous versions and cultural archetypes of the scene, kept incorporating specific functions and contexts, reproducing, subdividing, and reorganizing the space in this scene with garden elements of the same nature and in an isomorphic way. Today's HAG is based on Jiang Kai's Restoration Garden [61] (Figure 3a).

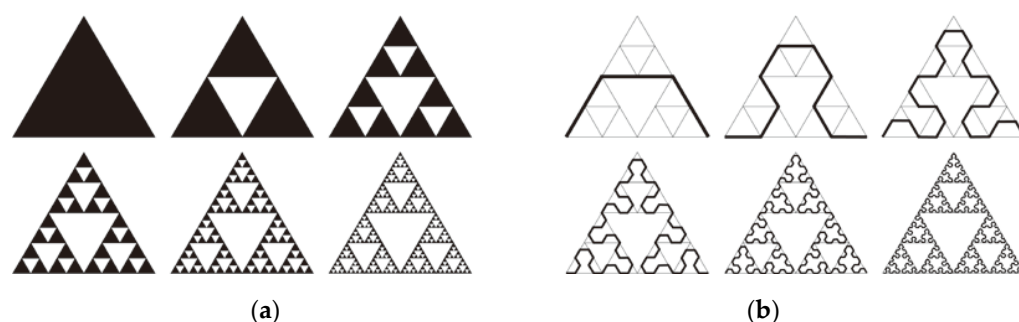


Figure 3. Schematic diagram of the topological fractal structure of the garden space (a) and path (b).

The path system of the garden corresponding to the "gardens within a garden" space is like a bifurcated tree branch, with the main path as the backbone, which is extended and divided homogeneously, constituting a labyrinth-like pathfinding experience in the garden [62] (Figure 3b).

- Plot in CCGs

The term “plot” was placed at the top of the six elements of tragedy as early as Aristotle’s time, who noted that “surprising changes of sequence, the progressive unravelling of the mystery, balance and completeness of events, and tragic emotions are the elements of plot” [63]. The narrative work has a plot, which makes the narrative an activity of the narrative subject to realize its intentions in practice and construct the text’s value through the plot.

As M. Merleau-Ponty’s “Phenomenology of Perception” refers to the “unfolding bodily field in time”, when the visitor walks in the garden, it is like the reader reads the book [64]. The visitor chooses a route through the garden and perceives different spatial forms from different points of view as time passes along the route. This transient process of walking leads to the occurrence of spatial episodes.

On the one hand, the complex path system in the garden connects the spatial structure of the “gardens within a garden”; on the other hand, the numerous crossroads and turning points on the path system give visitors various choices and rich path experiences. Thus, as visitors stroll through the garden, different series of story messages flash and bifurcate along the paths, culminating in the appearance of thematic buildings and their poems. These storylines do not have a clear and complete sequence and structure from the beginning to the climax, and to the end; they overlap, nest, and occur in parallel, forming a nonlinear plot structure in the garden [65].

The garden maker effectively constructs and integrates space in the narrative of the plot space by constantly setting up suspenseful baggage and gradually unpacking it. In *Poetics*, Aristotle clearly defines the “tying” and “untying” of a literary narrative; “tying” refers to the scene from the beginning of the story to the imminent plot shift, and “untying” refers to the scene in which the plot is about to change [63]. Through narrative vocabularies such as plaques and couplets, the garden maker completes the plot narrative of the garden space through the process of visitors visiting the garden over time and constantly completing the spatial plot from “tying” to “untying”.

2.2.2. Space Syntax

Space syntax is used to analyse gardens to present the spatial connotation of gardens, which can only be understood but not expressed in a more intuitive spatial structure. At the same time, space syntax provides a theoretical and analytical method for describing spatial characteristics from the observer’s perspective [66].

Space, serving as the vehicle for garden narratives, is comparable to words in novels or images in films. This article utilizes two analysis methods from spatial syntax: VGA (Visual Graph Analysis) and isovist analysis. VGA is employed to examine the overall spatial structure of gardens, and when combined with the narrative system of ‘gardens within gardens’, provides a more visual representation of the relationships between the sub-gardens and the main garden, as well as the connections among the various components within each sub-garden [67]. On the other hand, isovists are used to analyse the visual changes in spatial perception experienced by visitors along pathways. When integrated with the non-linear plot narrative, isovists offers a more intuitive understanding of how gardens employ spatial organization to achieve narrative objectives [68]. The following is an overview of the isovist and VGA methods, and an explanation of the conceptual parameters used in the analysis.

- Visibility Graph Analysis (VGA)

Visibility Graph Analysis (VGA) is a global spatial analysis method based on the theory of space syntax, which is a superposition of visual information at the local level. When building spaces are analysed using the VGA method, the final representation is often a colourized graph to distinguish the values of the variables of interest to make the results more intuitive and readable at a glance. As shown in Figure 4, the graph shows the distribution of variable values from high to low by red, yellow, and blue (or colour scale) to express the visibility analysis [69].

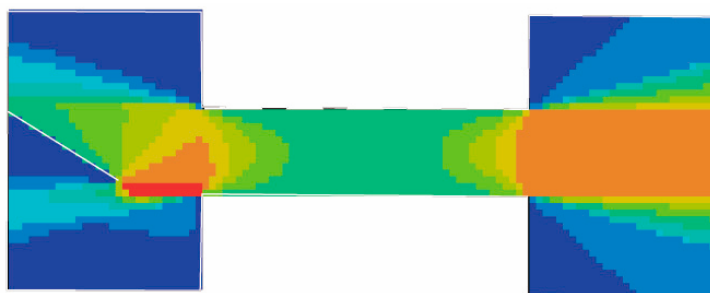


Figure 4. VGA analysis of numerical variables.

In this paper, two variables were selected to examine the visual relationship between the garden space and the space in the visibility analysis of the HAG:

Integration: Integration expresses how easy it is for the view to reach.

Connectivity: Connectivity expresses the number of elements within the line of sight.

- Isovist Analysis

Isovist analysis, one of the theoretical foundations of VGA, is a static and local method of analysing the qualities of space by parametrically calculating the instantaneously perceived area of a single viewpoint. The field of view is the visual area seen from a point in space. This polygonal plane with the viewpoint as the core and free shape is called an isovist (Figure 5). The quantitative analysis of this viewpoint's field of view polygon is called isovist analysis. Suppose the observer starts moving from point A, after which each point on the motion path produces a specific isovist. The fields of view on the path are superimposed, thus constituting the observer's overall perception of space [70].

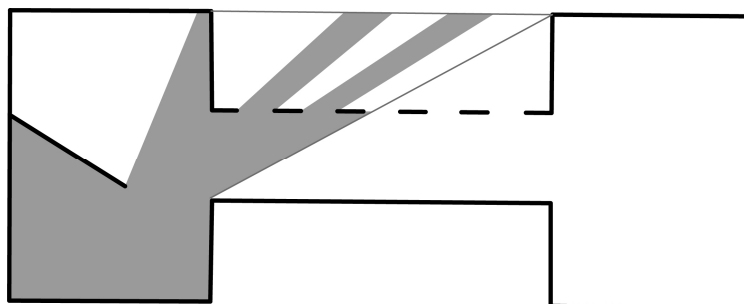


Figure 5. The concept of the isovist polygon. And the gray areas indicate view polygons at the point of view.

Since many parameter variables exist for view polygons, this paper only analyses four commonly used ones.

Isovist area: The area of the viewpoint polygon. The larger the area of the view polygon, the more open the spatial perception of the viewpoint.

Isovist occlusivity: Occluding length is a part of the perimeter of the view field; it represents the hidden part of the building on the boundary of the view field, i.e., the higher the value of occlusivity, the more mysterious the view field of this viewpoint is.

Isovist drift magnitude: The distance between the viewpoint and the centre of the view field polygon. This covariate describes the strength of the visual pull. The higher its value, the stronger the visual pull, and the greater the force that forces the viewer to move.

Isovist max radial: The maximum diameter of the visual field. It is the longest of all straight lines from the viewpoint to the boundary of the visual field polygon and represents the human perception of the maximum depth of space.

- The model setting of the HAG

One distinctive feature distinguishing garden spaces from architectural and urban spaces is that what can be seen in a garden is not necessarily directly accessible. Therefore,

when analysing the garden plan, it is divided into two levels: Visibility and Accessibility (Figure 6).



Figure 6. Visibility (a) and Accessibility (b) of the Humble Administrator's Garden.

Visibility is the range of all visible visual fields on the level of human sight height. Referring to the average height of adults in China, the sight height is set at 1.6 m to judge the visibility of sight. When drawing the visibility layer, the view-blocking rockery is equated to the building wall, the windows and doors in the garden are made transparent, and the indoor furniture and trees are not taken into account to simplify the plane.

Accessibility refers to the range of all areas that visitors can freely reach on foot. The water that visitors cannot cross, and areas closed to visitors for a long time or that are fenced off by physical means are treated as equivalent to building walls.

After vectorizing the floor plans, the layers of visibility and accessibility were imported into DepthMap software. The VGA was analysed separately for the planes of visibility and accessibility. Considering the human scale and step length, the grid of VGA analysis is $0.6\text{ m} \times 0.6\text{ m}$. When filling the analysis range of the two layers, the number of elements involved in calculating the visibility layer is larger than that of the accessibility layer. The difference lies mainly in that some grass and flower beds in the garden can be reached by sight, but visitors cannot cross them. The water surface in the garden, although it is an area that the line of sight can traverse, is too large to affect the calculation results, so it is not taken into account when filling the analysis range [71].

2.2.3. Analysis of the Narrative Space in CCGs

The process of narrative communication involves three main elements: the information sender, the narrative medium, and the information receiver. In the context of classical gardens, these elements correspond to the garden owner (sender), the garden space (medium), and the garden visitors (receivers). The spatial narrative structure of the garden from a synchronic perspective is formed by the spatial arrangement of 'gardens within gardens' and the narrative structure of 'stories within stories'. VGA, a quantitative computer analysis method, examines the overall visual-spatial relationships within the garden and the connections between visibility and accessibility. The intertwining and overlapping narrative lines along pathways, combined with changes in the visual field, create the diachronic narrative spatial system of the garden. The spatial narrative structure, together with the plot, constitutes a complete classical garden narrative spatial system. To sum up, the analysis framework is shown in Figure 7.

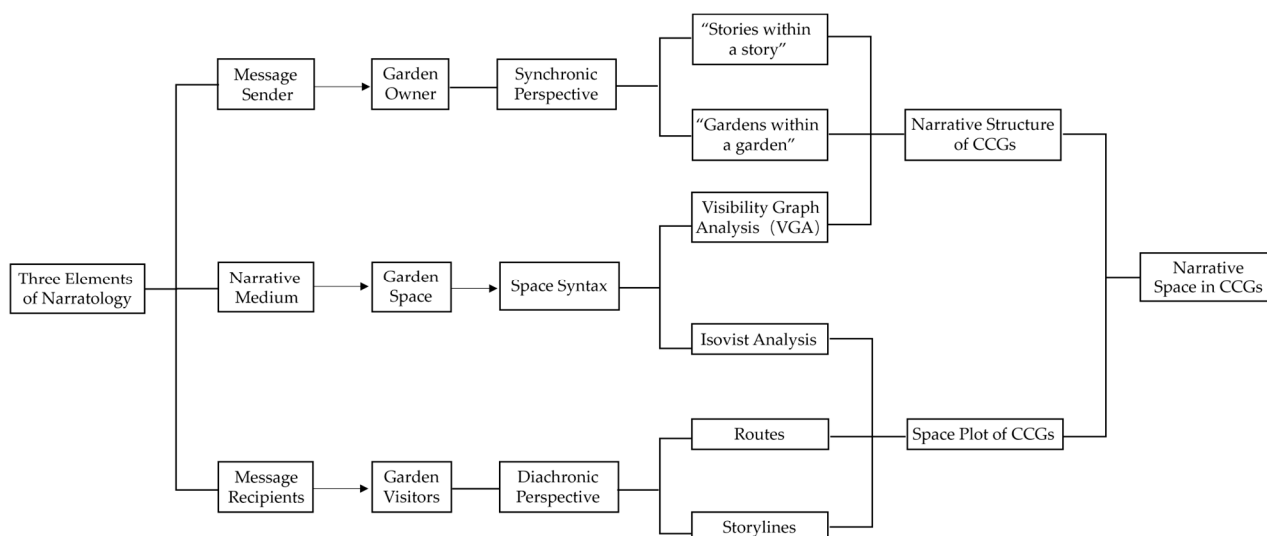


Figure 7. A framework for “Narrative space in CCGs”.

3. Analysis of the Narrative Space in the HAG

3.1. The Structure of the Spatial Narrative of the HAG

3.1.1. The Spatial Structure of the “Gardens within a Garden”

- Small gardens in a large garden

The layout of the central part of the HAG revolves around a central pond, covering approximately one-third of the total area. The main structure, Yuanxiang Hall, is the primary reception area located near the original southern residential entrance, providing the best scenic viewpoints. To the north of Yuanxiang Hall, the landscape opens up with a spacious and clear view, while the southern bank features various pavilions and terraces, creating a distinct contrast with the northern bank [7].

The garden’s spatial arrangement ingeniously utilizes mountains, ponds, buildings, and corridors, creating a rich interplay of distinctive and interconnected layers. In Figure 8a, the elements responsible for the spatial division in the central part of the HAG are highlighted and roughly categorized into boundaries, buildings, and water bodies, including corridors, walls, and artificial rockeries. From the figure, it can be observed that the HAG can be broadly divided into four sections: an entrance area predominantly centred around Yuanxiang Hall, a northern area featuring landscape views and extensive main scenic regions, a secluded courtyard enclosed by solid walls and buildings in one corner, and a water courtyard area characterized by meandering and tranquil features.

In Figure 8b, based on the delineated boundaries in (a) and the distinctive landscape features of each section, the HAG is further classified into four sub-gardens: Yuanxiang Hall Area (A), Central Water Scenic Area (B), Loquat Garden Area (C), and Small Canglang Water Courtyard Area (D).

- The spatial division of units in the sub-garden—the example of the Yuanxiang Hall area

After dividing the central part of the HAG into four sub-garden spaces, it can be found that each sub-garden can be further divided into several unit spaces. These unit spaces, such as buildings, courtyards, flowers, rocks, and water bodies, are scenic. Among them, buildings and courtyards are generally the main constituent elements of these unit spaces, while flowers, trees, rocks, and water bodies are the second.

The Yuanxiang Hall Area (A) is the first scenic area when entering the HAG. Figure 9 specifically focuses on analysing the Yuanxiang Hall Area (A). The figure highlights elements that contribute to its enclosure and division, including buildings, corridors, walls, and rocky landscapes. It can be observed that the Yuanxiang Hall area is subdivided into five distinct spatial units by the waist-shaped entrance gate, Yellowstone Rockery, and

Yuanxiang Hall. The five-unit spaces are the entrance lane (A1), the waist-shaped entrance gate (A2), the yellow stone rockery in front of the waist gate (A3), The southern part of Yuanxiang Hall (A4), and Yuanxiang Hall (A5). Table 1 lists the five-unit spaces' primary and secondary constituent elements.

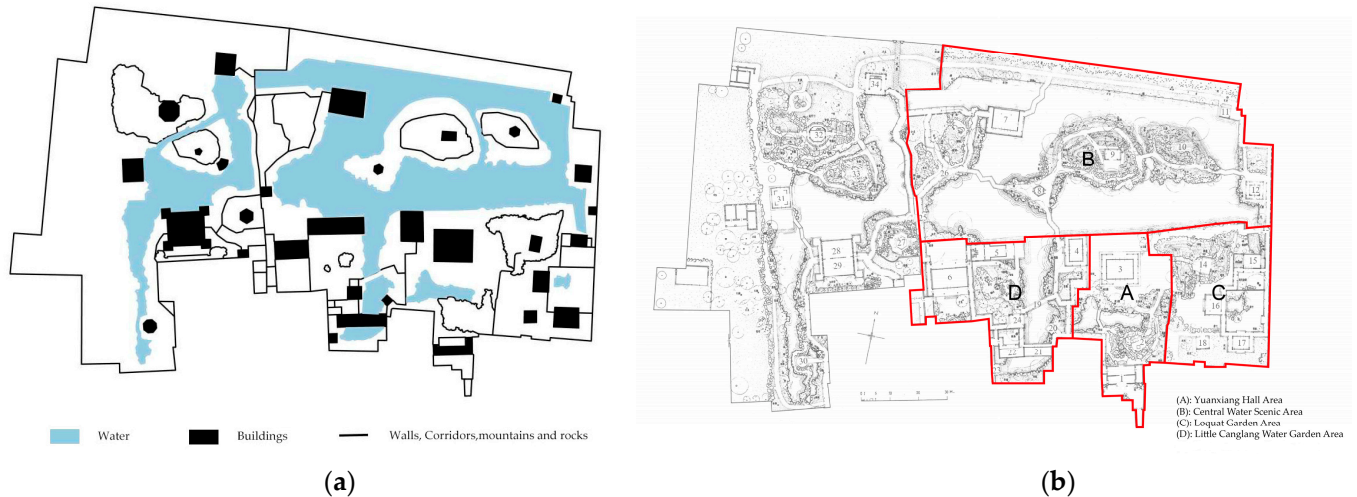


Figure 8. (a) Division of space in the HAG; (b) Diagram of the four sub-gardens in the central part of the HAG (Author drew the figure, and the base map was adapted according to Liu Dunzhen's drawing).

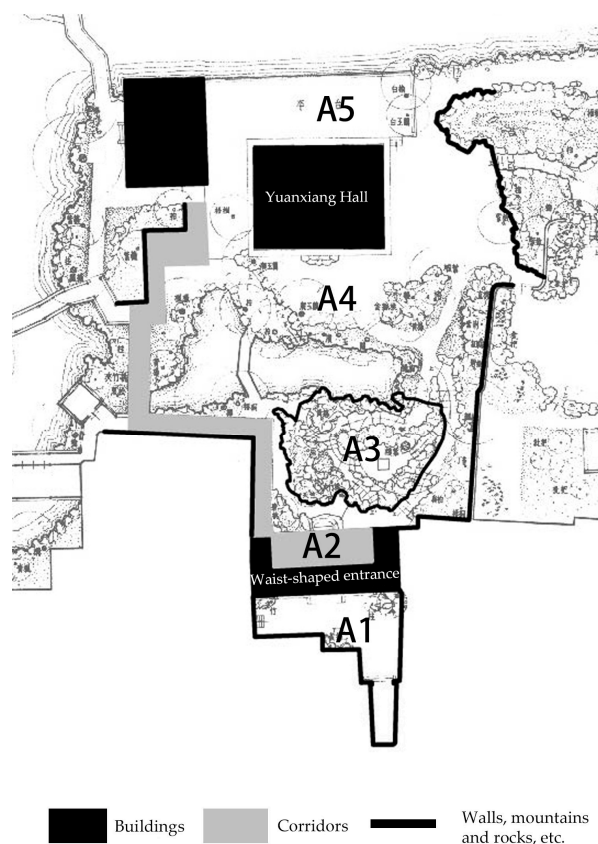


Figure 9. The spatial division of the unit of Yuan Xiang Hall Area (A).

Table 1. Composition of the unit space of the Yuan Xiang Hall area.

	Cell Space	Main Components	Secondary Components
Yuanxiang Hall area (A)	Entrance lane (A1)	The narrow alleyway	
	Waist-shaped entrance gate (A2)	Waist-shaped entrance gate	
	Yellowstone Rockery (A3)	Yellowstone Rockery	
	The southern part of Yuanxiang Hall (A4)	Water, stone bridge	Flowers and trees
	Yuanxiang Hall (A5)	Yuanxiang Hall and its north platform	Yuquan Well

- Node space within the Yuanxiang Hall area

Each of the four sub-gardens in the HAG has at least one main building (halls, chambers, rooms, pavilions, etc.). Moreover, almost every small unit space also contains or corresponds to a scenic garden building. These buildings are the main components of each small unit space, so they can be regarded as the nodes of each unit space. These node spaces contain much humanistic information for daily life events and rituals, providing temporal and spatial places for the garden owner's daily life or social activities, where the garden owner chants, reads, paints etc., with his guests or by himself [43]. This feature is especially pronounced in relatively major architectural spaces.

As shown in Table 2, the Yuanxiang Hall area mainly has one main building and one small building, namely Yuanxiang Hall and the waist-shaped entrance gate.

Table 2. Distribution of buildings in the Yuan Xiang Hall area.

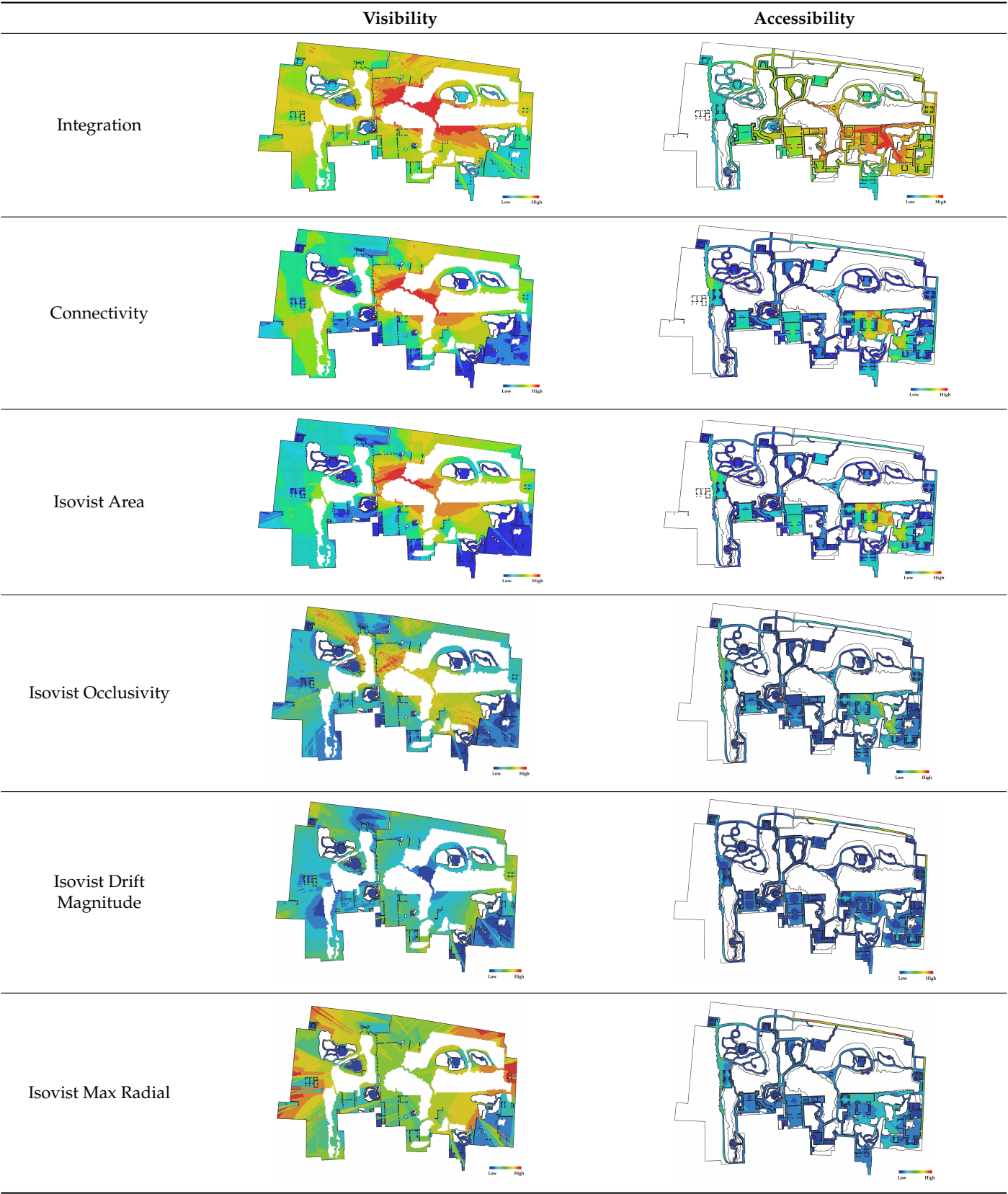
	Main Buildings	Secondary Buildings	Three-Level Buildings	Constructions
Yuanxiang Hall area (A)	Yuanxiang Hall		Waist-shaped entrance gate	Yuquan Well

3.1.2. VGA Analysis of the HAG

Within the structure of the main garden, which includes several nested sub-gardens, and under the organization of unit spaces, the relationships between the sub-gardens in the HAG, the relationships between unit spaces, and the integration of the architectural elements with the overall landscape all require the use of VGA for spatial quantification analysis. Therefore, this chapter analyses the distribution of five parameter values on the visibility and accessibility of the HAG using the VGA method.

First, the analysis results show a big difference between the visibility and the accessibility regarding the values of integration, connectivity and the four variables of the isovist. As shown in Table 3, regarding visibility, the area with the highest degree of integration is radially distributed, with Hefengsimian Pavilion as the centre. This area also includes the northern terrace of Yuanxiang Hall, Liuyinluqu, and parts of Yiyu and the Xiang Zhou Pavilion. The lowest integration value, excluding the part of the Yellowstone Rockery, is mainly the entrance of the waist-shaped entrance gate and the whole of Loquat Garden. Regarding accessibility, the area with the highest integration degree is distributed in the platform area centred on Yuanxiang Hall. The area with the lowest degree of integration, excluding the building on the Yellowstone Rockery, is mainly the waist-shaped entrance gate. Comparing the visibility and accessibility shows that Yuanxiang Hall, especially its northern platform, is the most accessible and has the best viewing location in the garden, followed by the Hefengsimian pavilion. Although the Loquat Garden is not easily visible, it is more accessible due to its proximity to Yuanxiang Hall [72,73].

Table 3. VGA analysis of the HAG.



From the connectivity distribution of the visibility, we can see that the highest value of connectivity distribution in the central part of the garden continues to radiate in all direc-

tions, centred on the Hefengsimian Pavilion. The result indicates that the Hefengsimian Pavilion is well connected to other areas. Regarding accessibility, the highest value is still in the Yuanxiang Hall. In addition, by comparing the connectivity values of visibility and accessibility, we can find that the connectivity of accessibility is much lower than that of visibility. The result indicates a big gap between the garden path's visibility and convenience.

The isovist area correlates directly with connectivity, so their analysis results are similar. However, it is noteworthy that in comparing the connectivity and the area of visibility, the analysis results in the central and eastern parts of the garden are mostly the same. However, the isovist area in the west is much lower. The result highlights the breadth of views along the central waters.

The occlusivity value of visibility is distributed in the central waterscape area and Yuanxiang Hall. There are rockeries and buildings in the middle, and the landscape is rich in layers, which makes it easy to confuse people visually.

The drift magnitude of visibility's value radiates outward from the centre of the Hefengsimian Pavilion and increases step by step. The high values of drift magnitude are mainly located in Wuzhuyouju Pavilion, Yihong Pavilion and Small Canglang Pavilion. The waters directly opposite the Yihong and Wuzhuyouju Pavilion are long, with a 110 m-long stretch spanning the garden's east and west. The water where the Small Canglang Pavilion is located is in a long north-south direction and has a strong visual pulling effect [74].

From the distribution of the max radial values in visibility, we can find that the distribution of values at the cave door of Loquat Garden, on the south courtyard wall of Yiyu Xuan and near the corridor leading to the second floor of the Jianshan Building is slightly different from the rest of the area. The result is due to the spatial permeability of the wall windows and doorways. This "partitioned but impermeable" design stimulates visitors' interest in exploring [75].

Based on the comprehensive analysis above and considering the spatial structure of the "gardens within a garden" in the HAG, the following conclusions can be drawn:

- The degree of connectivity and integration of visibility of the garden is higher than that of the accessibility, especially the degree of connectivity, which is much higher than the value of accessibility, which means that the visibility and visual guidance of the landscape in the garden is good. However, the spatial organization and guidance of the tour path are relatively poor, which means that visitors' behaviour regarding touring activities should be guided more by visibility than the tour route.
- The whole space of the garden is characterized by an "inward-looking" layout, with the central water area as the centre of the overall space and dispersing in all directions. The farther away from the central water area, the less likely it is to attract visitors' eyes. The central water area has a wide view and the most abundant viewing experience in the garden. The closer the attractions are to the boundary of the garden, the higher its visual pull, and visitors eventually return to the central waters under the strong visual pull. Therefore, the Central Water Scenic Area (B), especially the region centred around the Hefengsimian Pavilion, serves as the focal point of the entire garden. The Small Canglang Water Courtyard Area (D) is situated in the southwestern part of the garden and also revolves around water features. However, its overall spatial visibility and accessibility are not as prominent as the Central Water Scenic Area (B).
- The Yuanxiang Hall Area (A) serves as the garden's entrance scenic zone, with a significant contrast between the northern part of the Yellowstone Rockery and the area to its south, particularly in terms of visibility. Yuanxiang Hall and its northern platform, being the focal point of the southern bank in the central water area, are easily accessible to visitors, providing excellent viewpoints and a rich sightseeing experience. In contrast, the Waist Gate and the Huangshi Rock area offer the opposite characteristics.
- The Loquat Garden is the most enclosed area in the entire garden. It is almost self-contained, creating an inward-looking, quiet environment with little interference from external views. However, the Loquat Garden Gate is relatively easy to find because

of its proximity to Yuanxiang Hall. In contrast, the space near the waist-shaped entrance gate, positioned at the southernmost part and obstructed by the sight of the Yellowstone Rockery in the north, remains secluded and less noticeable.

- There are many places in the garden with corridor walls with leaky windows, creating a “partitioned but impermeable” design effect that leaves suspense and hints to visitors passing by, driving them to the next attraction.

3.1.3. The Narrative Structure of the “Stories within a Story”

When building a garden, the garden owner projects his emotions and philosophies onto the physical space of the garden. Therefore, to understand the meaning and emotions embedded in the garden space, it is also necessary to analyse the narrative system of the material space of the garden.

- Sub-themes within a theme

The four sub-gardens of the HAG all correspond to a sub-theme. These four sub-themes continue the sub-theme idea of Wang’s HAG period. They are the Yuanxiang Hall Area (A)—feasting and music, Central Water Scenic Area (B)—taking refuge in the landscape, Loquat Garden Area (C)—farming and reading, and Small Canglang Water Courtyard Area (D)—fishing and seclusion [45].

- Storyline within sub-themes—the example of the Yuanxiang Hall area

Each sub-garden of the HAG has sub-themes that revolve around the central theme of the garden. The owner’s interpretation of each sub-theme is translated into each unit space and pavilion in the garden, which makes up the different spatial plot contents of the sub-gardens. Each small plot theme is characterized by the pavilions, courtyards, materials, details, narrative media, and scenes in its sub-garden. Each tiny unit space, building, vignette, and detail in the sub-gardens continuously interprets the story and experience of the same theme. These sub-themes are derived from the central theme of the HAG, “The Politics of the Humble one”. Meanwhile, they present their own stories and interpret the central theme in their ways.

The plot structure of the sub-themes embedded in this theme is closely related to the different levels and dimensions of the physical structure of the garden. The storyline or sub-themes in each unit space are divided into three main levels: the first level is the sub-garden space with its sub-themes; the second level is the sub-themes and storylines in the unit space; the third level is mainly some detailed spatial episodes or fragments, such as structures, carvings, door and window decorations, etc., where each small storyline corresponds to one or more unit space scenes in the garden [46].

Yuanxiang Hall is the main building in the garden, which was originally the main place for the garden owner to invite guests and hold elegant activities with literati and celebrities. It is one of the best viewing places in the garden because it has a wide view of the landscape. The setting of the Yellowstone Rockery in front of the waist-shaped entrance gate and the elaborate scenario of “Wuling people stumble upon Peach Blossom Spring” are the main manifestations of the storyline of “Reclusive in the landscape”. In addition, the name of Yuanxiang Hall is taken from the poem “Xiangyuan yiqing” (The fragrance spreads far and wide and becomes more and more fresh and fragrant). The garden owner uses the lotus flower to express his high and pure character, which is also one of the storylines in the garden. Lastly, the plaques and pillars in the garden, the images, as well as the Yuquan well in the southeast of Yuanxiang Hall tell visitors two storylines: “Recalling the history of the garden” and “The Heart of Politics”.

In summary, the five units of the Yuanxiang Hall area tell visitors five different storylines (Table 4): reclusive in the landscape, recalling the history of the garden, elegant activities, noble character, and the heart of politics.

Table 4. The narrative structure of stories embedded in the Yuanxiang Hall area.

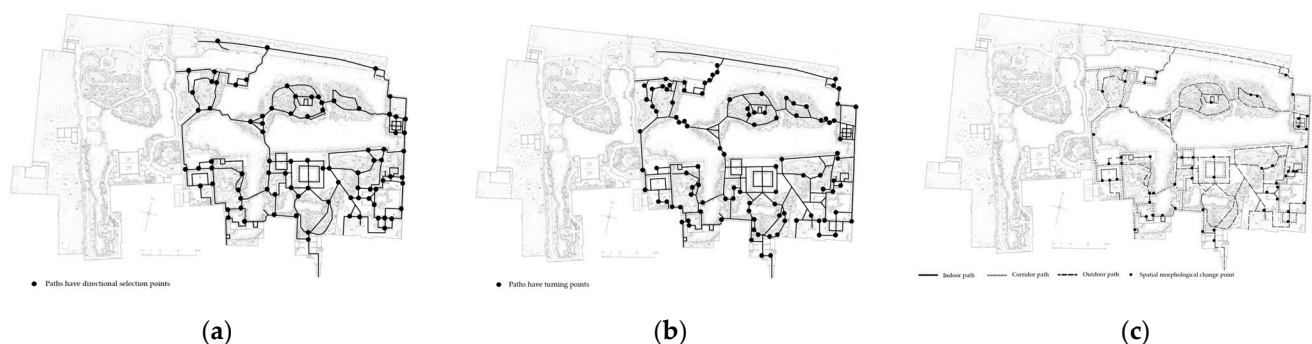
Second Level		Third Level
Sub-themes in sub-gardens	Sub-themes and storylines in the unit space	Detailed spatial episodes or fragment
A Yuanxiang Hall: Feasting	Storyline 1: reclusive in the landscape: From the waist-shape entrance gate through the rock cave of the rockery to turn into the middle scenic area, there is a symbolic meaning of Wuling fishermen occasionally getting the Peach Blossom Spring. (A3, A4, A5)	Storyline 5: the heart of politics: The Yuquan well in the southeast corner of Yuanxiang Hall was built by Wang Xianchen when he found a spring in the southeast corner of the garden, which tasted “sweet and pleasant for tea,” no less than the Jade Spring in Xiangshan Mountain. Then, he named the spring in the garden “Yuquan” to show that he would not forget the beautiful spring in Xiangshan (A5)
	Storyline 2: Recalling the history of the garden (A1, A4)	
	Storyline 3: Yuanxiang Hall used to be a hall for the master to invite guests, where the master and his friends held elegant activities, etc. (A5)	
	Storyline 4: Using the lotus flower’s “Xiangyuanyiqing” (The fragrance spreads far and wide and becomes more and more fresh and fragrant) as a metaphor for the gardener’s noble character (A5)	

3.2. The Plot of the Spatial Narrative of the HAG

3.2.1. Complex Linkage Systems

The spatial linkage system in the HAG consists of two main aspects: the path system implied in the site and the characteristic water system.

The path system in the HAG accounts for about 18% of the entire garden area. These paths add layers of spatial division, and more importantly, they connect the unit spaces, buildings and sub-gardens. As shown in Figure 10, the complexity of the path system in the HAG manifests mainly in the numerous intersections and turning points, which create a complex cognitive feeling when walking in the garden. The path system’s rich and diverse composition enriches the spatial experience as visitors constantly switch between indoor, outdoor, and grey spaces under the corridor while walking [76].

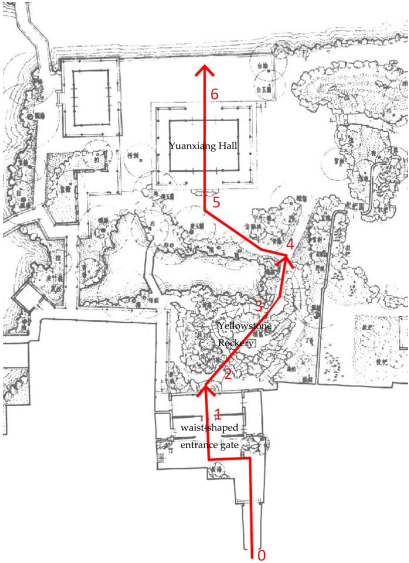
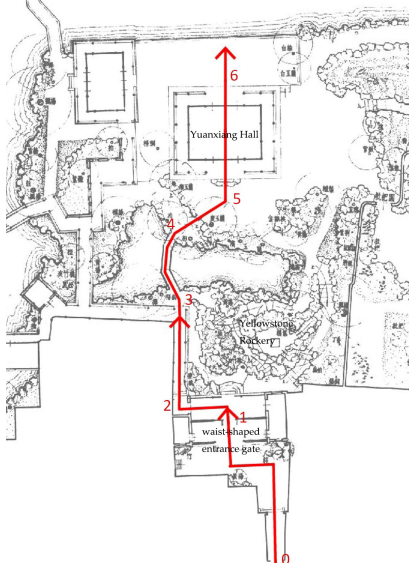
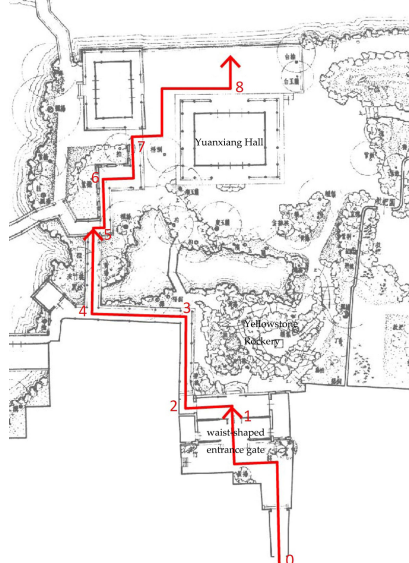
**Figure 10.** The path systems (a–c) in the Humble Administrator’s Garden.

3.2.2. Analysis of the Plot Space of the HAG—Taking the Yuanxiang Hall Area as an Example

In analysing the space on the path, isovist analysis was used to analyse the points on each section of the route in the entrance space of the HAG. The specific operation method is to first determine a tour route in the garden, set a point every 0.6 m on the path according to the human scale and step length, and conduct an isovist analysis on the points on this path—the cognitive illustration of the garden as a whole. In the plot structure analysis, we mainly combine the narrative vocabulary of each site and draw a diagram of the “Tying” and “Untying” of each storyline in the sub-garden according to the progression of the route.

In the Yuanxiang Hall Area, the overall route follows a linear progression from the entrance gate to the Yuanxiang Hall. As we can see from Table 5, the three routes are based on the descriptions by Professor Sun Xiaoxiang in his article “Life Conception, Picturesque Conception, Artistic Conception—on the Artistic Stages and Expressions of Literati’s Enjoyable Landscape Gardens” [77]. These routes depict three different scenarios for entering the HAG. Route 1 corresponds to the first scenario, where visitors can experience the artistic ambiance described in the ‘Peach Blossom Spring’ tale, which states, ‘The forest ends, and the springs originate, where a mountain lies with a small opening, as if emitting light.’ To appreciate this ambiance, visitors must enter the garden through the Yellowstone Rockery on the north side of the waist-shaped entrance gate. Route two corresponds to the second scenario. On clear days and in case of urgency, visitors can proceed directly from the entrance to Yuanxiang Hall by crossing the meandering arched bridge over the pond on the south side of Yuanxiang Hall. Route three encompasses the entire journey from the entrance to Yuanxiang Hall within covered corridors. This route is designed for visitors facing adverse weather conditions such as heavy rain or extreme heat and cold. Visitors can reach Yuanxiang Hall directly using the covered corridors on the left side of the entrance, avoiding exposure to rain and intense sunlight. These three routes represent the three different situations from the entrance to the Yuanxiang Hall in the scenic area. Therefore, they serve as the basis for the route analysis presented in this article.

Table 5. Three main routes of the Yuanxiang Hall Area.

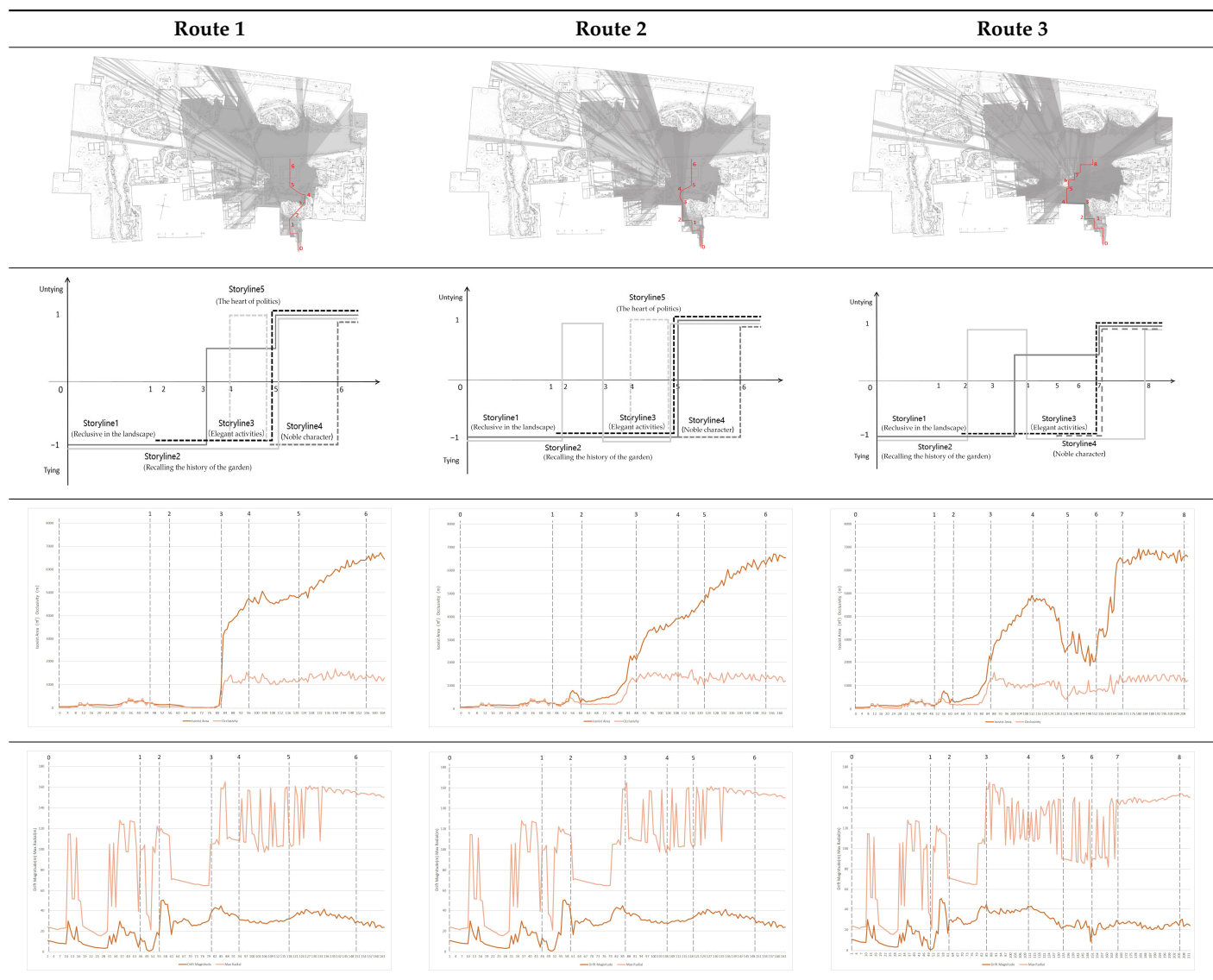
Route 1	Route 2	Route 3
		

- **Route one**

As shown in Table 6, the brick engraving of the entrance lane (0), “Interesting landscape,” points out the theme of “Reclusive in the landscape” and begins the first storyline of the garden. The second brick engraving of the lane, “Guimoshihuan”, referring to the restoration in August of Guangxu Dinghai, is the second storyline—the beginning of recalling the history of the garden. One of the old couplets depicts the poetry and wine singing in the garden by literary scholars of two different eras. The couplet leads to the third storyline—the elegant activities of scholars in the garden. The second couplet tells the history of the garden and is a continuation of storyline two (recalling the history of the garden). The value of drift magnitude rises steeply at the waist gate and forward through the stone cave of the Yellowstone Rockery (2). In contrast, the value of the max radial decreases during the journey from the waist gate to the Yellowstone Rockery, indicating

that the intensity of the visual pull at this location rises. Moreover, the decrease in the max radial indicates that the orientation of spatial movement is not obvious. Although the Yellowstone Rockery's cave entrance is visually attractive and makes visitors want to explore, the tiny cave entrance is less strongly oriented to movement than the long, narrow space from the pinch to the waist-shaped entrance gate. The experience is what the gardeners wanted to create when the Wuling people discovered the Peach Blossom Spring: "At the end of the forest headwaters, there is a mountain with a small cave as if there is light" [78]. In addition, the isovist area and occlusivity values are very low in the section from the entrance to the Yellowstone Rockery's cave.

Table 6. The space plot of three main routes in the Yuanxiang Hall Area.



After passing through the Yellowstone Wigwam (3), we can see that the values of all four parameters in the graph have increased, especially the isovist Area. This is due to the barrier effect of the Yellowstone Rockery, which opens up the view after passing through the rockery. This experience is similar to the one depicted in the Peach Blossom Spring: "After a few dozen steps, the view opens up". The increase in max radial is also due to the increase in occlusivity. Because the view is much richer than the alleyway and cave, at this moment, the visitors are able to interpret the meaning of the "Interesting landscape" plaque.

After walking around the pond in front of the Yellowstone Rockery (4), you will come to Yuanxiang Hall (5). Yuanxiang Hall is the garden's main building and the garden owner's place to invite friends and guests. The plaque of Yuanxiang Hall reads "Xiangyuanyiqing", which reminds people of the lotus flower planted in the pond in front of it. The couplets on the pillars of Yuanxiang Hall, such as the old couplets, chant the beauty of the scenery. There are memories of the previous elegant events and the "Restoration Garden" plaque left in Jiang's garden during the Qianlong period. Therefore, Yuanxiang Hall is the climax of the narrative, as it concentrates on four storylines: "Reclusive in the landscape", "Recalling the history of the garden", "Elegant activities", and "Noble character". Passing through Yuanxiang Hall to the northern terrace (6) is the end of this route. Visitors are confronted with the vast waterscape in the middle of the garden, and the isovist area value is at its maximum. On the southeast side of Yuanxiang Hall is a well called "Yuquan," one of the thirty-one scenes in the period of Wang's HAG. Wang Xianchen named the well "Jade Spring" to commemorate the Jade Spring on Xiangshan Mountain, which he had tasted when he was a government official in Beijing, "to show that he would not forget it". It expresses that although the garden owner is retired, he still hopes to be reappointed by the imperial court and make a career in the world. Therefore, a small storyline is here: "The heart of politics".

- Route two

As shown in Table 6, the occlusivity, drift magnitude, and max radial of route two are not very different from those of route one. However, the trend of the isovist area is less strong than that of route 1, although there is also a sudden increase in the isovist area of route two (3) after it bypasses the Yellowstone Rockery. The isovist area value of route two keeps increasing from the time it crosses the stone bridge over the pond (4) to the time it reaches Yuanxiang Hall (5). In contrast, the isovist area value of route one remains the same after crossing the stone cave until the Yuanxiang Hall.

Regarding the narrative plot, route two also has less of the experience of "Wuling people stumble upon Peach Blossom Garden"; Its storyline of "Reclusive in the landscape" does not begin to unravel until before Yuanxiang Hall. However, the corridor that route two passes through is inscribed with seal engravings and images of when Jiang built the Fuyuan Garden. The storyline of "Recalling the history of the garden" has begun to unravel.

- Route three

The biggest difference between the parameters of route three and the previous two routes is the value of the isovist area. As shown in Table 6, route three, while turning left at the end of the corridor (3) to the next point (4), the area of the visual field is still in the same trend as route two, continuously increasing. However, the isovist area value of route three starts to decrease when it turns 90 degrees to the north and reaches the lowest value when it reaches the wall (6) on the south side of Yiyu Xuan. The decrease in the isovist area is due to the corridor on the south side of Yiyu Xuan having a solid wall, so the visitors' view is blocked by the wall when they travel north. However, since there is a leaky window (5–7) in the corridor, the visitors' sight is blocked in front. At the same time, their sight is also attracted by the bamboo scene in the southern courtyard of Yiyu Xuan on the other side of the leaky window, revealing part of the scenery of the small Canglang water garden area to visitors. This discontinuous and fractured view through the window frame not only leaves the visitor with strong suspense, but also interrupts the narrative of the Yuanxiang Hall area, forming a montage like "spatial editing" [79]. As the route turns to the right, the view area rises steeply again, returning to the Yuanxiang Hall courtyard side until it reaches the Yuanxiangtang platform (7). At this point, the narrative also returns to the Yuanxiang Hall area. Both space and narrative culminate in the entire garden at Yuanxiang Hall.

The following conclusions can be drawn from the above comparison of the three main routes of the Yuanxiang Hall area:

- The overall route of the Yuanxiang Hall area is linear in development. Moreover, its spatial experience has a clear change of initiation and transition as the route

progresses: Initiation (entrance pinch lane)—commitment (waist-shaped entrance gate)—transition (Yellowstone Rockery)—integration (Yuanxiang Hall). Among them, the barricade of the Yellowstone Rockery allows visitors to feel the strong contrast from small to large, and from monotonous to rich space, after crossing or bypassing it. Then, the visitors reach the climax of space at Yuanxiang Hall. The storylines of the Yuanxiang Hall area are synchronized with the spatial perception of the visual field. The constant textual or pictorial hints from the entrance to the lane tie the visitors to the knot of three storylines, namely “Reclusive in the landscape”, “Elegant activities”, and “Recalling the history of the garden”. These three storylines are untied when they finally reach Yuanxiangtang, the storyline’s climax and space.

- Yuanxiangtang District has a total of five storylines: “Reclusive in the landscape”, “Recalling the history of the garden”, “Elegant activities”, “Noble character”, and “The heart of politics”. The five storylines have “Reclusive in the landscape” and “Elegant activities” as the main storyline of the space plot, while the remaining three are secondary. As the main hall of the garden, Yuanxiang Hall is not only the first narrative and spatial climax of the garden, but is also the first building and the best viewpoint after visitors enter the garden. Where visitors can view the “flat and far” and “high and far” of the central waterscape and see the “heart” of the garden owner, is the best spot for the “feasting” narrative.
- Route one has the visual experience of walking through the cave; not only does the visual space suddenly become open at the moment of walking through the cave, but the complexity of spatial perception and the direction of movement of space is also suddenly enhanced. This experience is also the intention of the garden owner to create the context of “Wuling people stumble upon the Peach Blossom Spring”. This combination of visual perception and narrative is the best way to reflect the idea of the HAG as a reclusive place. On the other hand, route two and route three are similar in their sudden change of space from small to large after bypassing the rockery. The complexity and spatial orientation of the visual field are comparable to that of route one. Still, the openness of the visual field is less strong than the steep rise of route one, but is gradually enhanced after crossing the pond until reaching the northern platform of Yuanxiang Hall.
- As visitors move along route three, the visual pressure of the corridor wall to the south of Yiyu Xuan and the perspective effect of the window on the wall create a film-like montage of “spatial editing”. This perspective briefly removes visitors from the narrative context of the Yuanxiang Hall area, creating a sense of narrative suspense in the small Canglang Water Garden area.

4. Discussion

4.1. The Impact of Changing Garden Entrances on Spatial Experience

The plot narrative of the Yuanxiang Hall area shows a dramatic change in the space as the route progresses. This transition is similar to the one in Tao Yuanming’s “Peach Blossom Spring”: “At the end of the forest headwaters, there was a mountain with a small cave, as if there was light. . . . At first, it was extremely narrow, but only then did it lead to people. After a few dozen steps, it became clear. . . .” This echoes the prelude to the garden owner’s elaborate design of “Reclusive in the landscape” to isolate this “world in a pot” from the mundane world. As shown in Figure 11, in the present HAG, although the overall spatial structure is the same as that of the Liu Dunzhen period, the entrance has been changed to the east. This way, the first thing you see when you enter the central part of the HAG is the main scenic area in the middle, losing the spatial narrative of “Wuling people stumble upon Peach Blossom Spring”. Visitors enter the open main scenic area of the central part of the garden from the modern park-like landscape of “Returning to the garden”; the spatial narrative seems to become a different script, losing the original mood and atmosphere of the garden. In VGA analysis, the integration and connectivity at the entrance are the lowest due to the rockery’s obstruction. However, after losing the entrance,

the waist-shaped entrance gate is the most difficult place for visitors to see and discover. The space plot and narrative here are equivalent to missing [77].

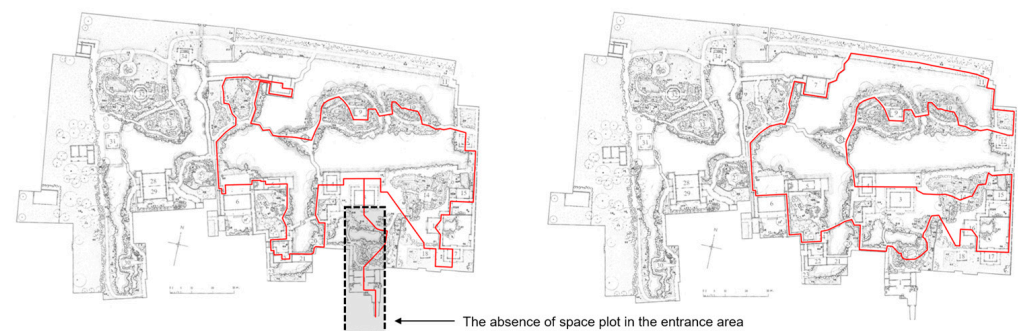


Figure 11. The change of the entrance in the Humble Administrator's Garden.

4.2. Limitations and Future Research

This article attempts to introduce the method of space syntax within the context of narratology to study a representative of Chinese Classical Gardens (CCGs)—the Humble Administrator's Garden (HAG). As an independent discipline, narratology has evolved various schools of thought and perspectives since the late 19th century. Similarly, architectural narratology is increasingly applied in various fields, including design, research, multimedia, and digital applications. This study primarily adopts the theoretical frameworks of structuralist narratology and plot narratology to interpret the narrative space of the HAG from a spatiotemporal perspective.

In the future, there is potential to consider integrating 3D animation and more intricate narrative techniques, thereby expanding the research scope to include other gardens, small public spaces, urban design, and other domains. This method would provide novel perspectives for garden researchers in conserving garden spaces, and would offer innovative design reference methods in the architectural field.

Regarding space syntax research, future endeavours may involve combining 3D scanning technology and considering the impact of plantings on visual spaces. The application of the isovist three-dimensional method could be explored to analyse the visual spaces of elevated garden areas, such as the upper floors of pavilions, and viewpoints on artificial mountains accessible to visitors. Furthermore, future research could extend the analysis of visual spaces along pathways to encompass other sub-garden spaces and different garden settings, facilitating comparative analyses of the complexity and diversity of spatial plot narrativity.

5. Conclusions

This paper uses the theory of narratology to view CCG as autobiographical novels in which the garden owner uses the garden space as a carrier. Simultaneously, it uses the analysis method of space syntax to quantify the garden space. The main conclusions are as follows:

- The narrative space of the garden mainly includes both the narrative structure and plot of the garden space. In the construction process, subsequent garden users pursue previous versions and cultural prototypes of the scene. Furthermore, they continuously incorporate specific functions and situations, and constantly reproduce, subdivide, and reorganize the space in new scenes with garden elements of the same nature in a homogeneous way, constituting an irregular topological fractal structure of the garden space. Specifically reflected in the garden space is the spatial structure of “gardens within a garden” and the textual structure of “stories within a story”. The path system of the garden corresponding to the topological fractal space is like a forked tree branch with the main path as the backbone, which is continuously extended and differentiated by homogeneous techniques, forming the nonlinear plot structure of the garden.

- We takes the Yuanxiang Hall area of the HAG as an example and present the parallel, superimposed, and nested storylines on the paths, combined with the changes in the visual space, with the visual content of the diagram. It can be seen that although the garden space is as complex as a labyrinth, it is closely linked everywhere to the theme of the “reclusive” nature of the HAG. No matter how visitors choose the tour route, they can experience the rich spatial changes of the paths and the constant flashing in and out of the storyline.
- Although the spatial structure of the present HAG has remained the same as that of Liu Dunzhen’s time, the changes to the entrance have caused the narrative experience of the paths to lose some of its drama and richness. The narrative theme of “taking refuge” in the Yuanxiang Hall area has been largely lost.
- There are many porch walls with leaky windows in the garden, creating a see-through design that gives visitors a brief break from the current narrative, creating a sense of suspense and hints of other scenic spots, driving them to visit the next one.

Author Contributions: Conceptualization, H.C.; methodology, H.C.; software, H.C.; formal analysis, H.C.; investigation, H.C.; resources, H.C.; data curation, H.C.; writing—original draft preparation, H.C.; writing—review and editing, L.Y.; visualization, H.C.; supervision, L.Y. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Data is contained within the article.

Conflicts of Interest: The authors declare no conflict of interest.

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