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Improving the Environmental Health Benefits of Modern Community Public Spaces: Taking the Renovation of Residential Facades as an Example

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Abstract: The complications and sequelae of COVID-19 have jeopardized the well-being of residents, hindering community sustainability. Experiencing positive emotions can mitigate or counteract the negative effects of some diseases, but modern residential facades cannot effectively stimulate positive emotions among residents. Traditional culture influences people's emotional responses. However, it is unclear what the result would be if traditional architectural patterns, one of the symbols of traditional culture, were redecorated as modern residential facades. Therefore, this paper used questionnaire research to collect data from residents of the Zhouxinyuan community in Wuxi on different types of traditional architectural patterns in assessing architectural aesthetics (N = 365) and health benefits (N = 154), using the Wilcoxon signed rank test to analyze the data for variance. The results indicate that modern residential facades decorated with traditional architectural patterns were more consistent with residents' visual preferences and more likely to stimulate positive emotions than existing residential facades. Most importantly, modern residential facades decorated with traditional architectural patterns showed higher health benefits, especially in calming emotions (mean = 5, SD = 1.033). Based on these findings and the theory of positive experience, this paper constructs a conceptual framework for modern community public space renovation that contributes to improving the health benefits of modern communities. The framework can mitigate or counteract the complications or sequelae of the pandemic, contributing to the sustainable development of modern community public space environmental systems.

Keywords: post-pandemic era; modern residential facades; community public spaces; positive experiences; community health benefits

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1. Introduction

As the most important form of settlement in the human world, the city is a complex system [1–3]. Even though it is difficult to predict the future of such a complex system as a city, the growing population, the spreading scale of cities, the invention of new technologies, and the emergence of various urban environmental problems result in a constant stream of ideas about the future state of existence and operation of cities in order to design a better future city for urban planners or architects to enhance the residents' well-being. Therefore, visions or themes of a future city, such as the smart city [1,2,4,5], the resilient city [6], the healing city [7], the healthy city [8], and the active city [9], are constantly proposed, discussed, and executed. Just as the famous British urban planner Michael Batty pointed out in his writings, although it is very difficult to predict the future, the development of cities is not completely random [1]. Undoubtedly, people will always be the subject of cities, no matter what form in which a city might appear in the future. Therefore, how to effectively and efficiently improve the health of urban residents is always a hot topic of discussion. Because health is the result of all factors and activities affecting the lives of individuals and communities [10], it concerns everyone, and it is essential for

the sustainable development of cities [11]. However, the new coronavirus pandemic, a significant public health emergency, has posed a great threat to the health dividends of urban residents [12].

Since December 2019, almost all countries have been affected by COVID-19 [13]. The pandemic has caused significant material damage and physical harm to people worldwide [14] and had significant adverse psychological or spiritual effects on people [15]. Even more terrible are the mental health consequences of the COVID-19 crisis, including suicidal behavior, which may persist for a long time and peak later than the actual pandemic [16]. However, there is no specific treatment for the major complications and sequelae of COVID-19 [17]. The complications and sequelae of COVID-19 have become central dilemmas in the post-pandemic era [17] that seriously jeopardize communities' well-being [18]. Therefore, as we transition to the post-pandemic period, more attention must be paid to health awareness and perspectives [19]. This means that finding ways to promote urban health well-being in the post-pandemic period will not only help to address the sequelae and complications of the pandemic, but will also have positive implications for improving the health benefits of future cities.

1.1. Community Public Space Environmental System and Residents' Health

As the most effective form of settlement for modern urban residents, communities play an essential role in improving a city's health and the well-being of residents [10]. A community is a complex environmental system closely related to its residents [20], and the specific community spatial environment can stimulate or influence the residents' emotions [21]. In particular, community public spaces are the most relevant to the residents' daily lives. A community public space is a type of urban public space that is considered open to all community residents, providing freedom of movement, temporary occupation, and ownership [22]. The main types of community public spaces include parks, plazas, sidewalks, community centers [23], and spaces in front of residential entranceways [24]. One of the most important characteristics of community public spaces is that they are highly interactive [24], i.e., residents engage in a large number of environmental transactions with the constituent elements of these public spaces daily, which is one of the most important conditions for the generation of spatial or environmental experiences [25]. In terms of system science, one way to build a system is to make its components interact with each other according to certain rules [26]. This means that community public space can be seen as a subsystem in a complex community environment system. Therefore, community public space is important in influencing people's perception of the community's spatial environment.

This subject has been extensively studied in fields such as environmental psychology and social psychology within the framework of spatial syntax [27,28]. A simple model can summarize the concepts regarding the perception of community public space environments or their role in environmental health research [24]. The properties of the spatial environment (physical level or social level) interact with various human characteristics (e.g., people's perceptions of the environment) to influence people's behavior, which in turn affects health benefits. This is of course an interacting social system. The main means of assessing the environmental attributes of community space is the residential environment assessment tool (Perceived Residential Environment Quality Index, PREQI), developed by Bonaiuto and his colleagues [29], which consists of two main macro levels: the physical level includes architectural and town-planning spaces, and green spaces, and the social level includes the accessibility and organization of roads, human and social relations, and welfare services, etc. Various human characteristics mainly include community attachment [30], community satisfaction [31], and community responsibility [32], etc., while People's behaviors mainly include community participation [32] and prosocial [12] and inoffensive behavior [33], etc. Of course, the mechanism of influence of the community environment on residents' health is a complex process of causal interaction [20]. Therefore, community public space environmental systems might play an important role in resolving the complications and

sequelae of COVID-19 in the post-pandemic era [34], thus contributing to the sustainability of community or urban environmental systems.

A review of the existing literature reveals the following limitations in the current research on the perception of community public space environments: First, the cultural elements are not sufficiently explored in the assessment of community health benefits, especially the traditional cultural elements (both material and immaterial). Second, little attention has been paid to the role of building facades in the assessment of community environmental health benefits in previous studies. Third, the environmental health benefits of community spaces are not directly assessed, mainly through the subjective elucidation of their role in health benefits by the sense of community or community behavior.

1.2. Current Situation of Modern Community Public Space Environmental Systems

Due to the increasingly deepened urbanization and growing urban population across the world, substantial quantities of modern communities (whose style is of modernist design) have been produced, reproduced, and used. Undoubtedly, modern houses are often hygienic [35] and meet the practical needs of many people. Nevertheless, they ignore the inheritance and development of traditional culture in the renovation or design of community public space, which is reflected in the community residential facades in particular.

The universalized design approach of modern housing has caused a disregard for traditional culture. To satisfy the housing needs of an increasing number of urban dwellers, modernist architects have developed a universal design approach [36] that stresses functionalism and mechanism. However, they only showed concern for the economic costs and production effectiveness, disregarding the local historical and cultural roots and traditions. This design approach has led to a style of contemporary residential facades characterized by no decoration, geometry, abstractness, and modularization, which is reflected in the general lack of fractal patterns on these facades, the adoption of straight-line shapes for them, and the preference for modern building materials and techniques [37–39]. Moreover, facade elements such as concrete, glass windows, balconies, and regular geometric shapes are strikingly similar. Consequently, the modern dwelling represents monotony, duplication, and similarity [40–42]. Following the wave of globalization, this design concept has spread rapidly in China, causing the departure of modern residential facades from traditional culture [43]. This situation has caused many negative emotions among the residents [44,45]. Since the residential facade is one of the most important physical boundaries of the community's public space system, it is the main foothold for people to perceive the community environment [46] and impacts people's assessment and use of the community buildings or spaces [47]. Some scholars point out that the modern community public space, mainly enclosed by this kind of building facade, is hostile and unfriendly to people, and people can hardly gain any emotional nourishment from such space [48]. Therefore, the negative emotions associated with modern residential facades contribute to a negative environmental experience of modern community public spaces. This means that modern residential facades are the key to improving the health benefits of public space environmental systems in modern communities.

1.3. Renovation and Aesthetic Evaluation of Modern Residential Facades

Given the crucial role of building facades in the community or urban environment [49], as early as the 1990s, some regeneration practices were performed for modern residential building facades in some areas. The then-conventional methods of building facade renovation were usually limited to simple adjustments of appearance, such as colored plastering, expansion, and the glazing of small balconies [50]. In recent years, with the continuous development of relevant building technologies, the reconstructive practices of building facades have shifted to more technically focused improvements such as vertical greenery [51], energy-saving reformation [52], and automatic generation [53]. These renovation measures consolidate and beautify the building facades, reflecting the designers'

consideration of transforming community spaces at an instrumental rational level. From a long-term perspective, in order to better realize the sustainable development of community spaces, we suggest that the renovation of modern residential facades should not only focus on breakthroughs in the technical aspects of renovation, but also needs to be considered from the value dimension. An important value dimension is culture, as culture is an essential factor in shaping the architectural facade [54], which relates to how we perceive and understand the physical environment around us and our behavior [55]. It has a great influence on shaping urban identity [56], creating regional characteristics [57], and building future cities [2,4].

At the same time, researchers have assessed the aesthetics of some building facades at the visual level from the perspective of environmental psychology. The evaluated ontologies include building facades of all types, predominantly involving those of different styles, periods, and regions. The main visual elements assessed are color, openings, and form [37,58,59], etc. The visual attributes assessed are void-to-solid ratio, order, complexity [37,49,60–62], etc. The assessment methods chiefly consist of field research, psychological experiments, questionnaire research, and semi-structured interviews. The assessment criteria mainly involve cognitive and affective factors [63]. The primary purpose of the evaluation is to determine the aesthetic preference for building facades [46,58,60] among the public and the aesthetic differences in building facades among diverse demographic groups [46,49,58]. The assessment identifies which stimuli and human characteristics determine aesthetics [61]. As proof, building facades with medium complexity are more likely to be favored [58]. Admittedly, these findings are important in helping architects design a community spatial environment that is more in line with public preferences. However, previous research seems to not explore in depth why people prefer certain physical elements or visual attributes of building facades. The analysis of the above studies revealed that positive emotions are an important criterion in evaluating the visual preference of building facades, so some architects regard "pleasantness" as a significant factor in judging the best facades [49]. Based on this assessment criteria, researchers have identified a considerable amount of visual elements or properties of building facades that can arouse positive emotions among observers. For example, building facades with moderate complexity tend to be more pleasurable [58]. Although these research findings have provided specific design recommendations for future facade retrofitting, a reasonable theory is lacking for their integration into systematic renovations or design solutions.

1.4. Positive Experience and Environmental Health Benefits of Community Public Spaces

Positive emotions are subjectively similar to positive feelings and undifferentiated positive moods [64]. A large number of studies have shown the crucial functions of positive emotions in human well-being [64–67], such as contributing to psychological rehabilitation, boosting resistance to infectious diseases [64], and improving living standards [68]. Therefore, positive emotions have great significance in terms of human health benefits.

People can develop positive experiences by experiencing more positive emotions in their daily lives [66]. The positive experience is derived from positive psychology [69], aiming to push traditional psychology away from focusing only on fixing the worst things in life and toward building positive qualities. An experience is often a special experience for a subject, which is often reflected in the experience itself or the process of experience that stimulates the subject to generate a special emotion or meaning, which is remembered or shared. It is a positive experience when the emotion or meaning brought about by an experience is positive. Positive experiences are a core component of well-being, and have a significant positive impact on an individual's subjective well-being [70]. Although the theory has been widely applied in multiple industries, it has not been applied to the design of community public space environmental systems. In fact, the existing approach to renovating modern community public spaces is essentially a problem-driven design. The design approach tends to focus on a specific and well-defined design problem, so the design path is linear, which is an ongoing process [71]. However, with the development

of society, environmental problems in community public spaces, in reality, are becoming more complex and diverse. Problem-driven design often loses its ability to address these issues in the face of new social changes and may even result in new problems. Excitingly, the design approach that focuses on positive experiences may offer new hope for current design efforts because its point is to support existing possibilities and create new ones in the design process [72]. This logic of rethinking the design mission to propose a new design solution based on positive experiences could provide a valuable research direction for designing modern community public spaces (Figure 1).

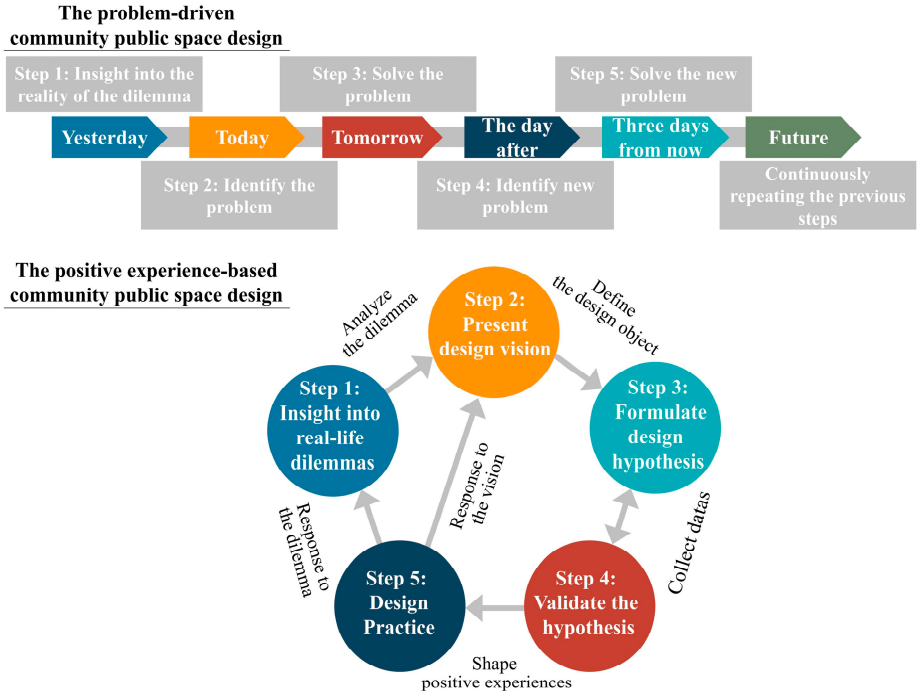

Figure 1. Two types of community public space design method.

The residential space environment significantly influences one's positive emotions [73]. Therefore, when redesigning or renovating modern community public space, it may be effective to shape positive community public space experiences and improve residents' health benefits if some important visual elements that can create positive emotions are used in the renovation program. Accordingly, we developed a conceptual framework for the redesign of modern community public space based on positive experiences, which is divided into four steps: first of all, an analysis is performed on the effects caused by changes in various social aspects on the residents' health; next, departing from this dilemma, a design vision in favor of the residents' physical and mental health is proposed in combination with the status quo of community public space; third, in light of the design vision, design hypotheses (there may be more than one) are proposed for community public space renovation; fourth, the collected data are used to verify the design hypotheses by applying certain evaluation methods or tools; and finally, the design hypothesis or hypotheses that are capable of stimulating positive emotions among residents are applied to the concrete community public space renovation to create a positive environmental experience (Figure 2).

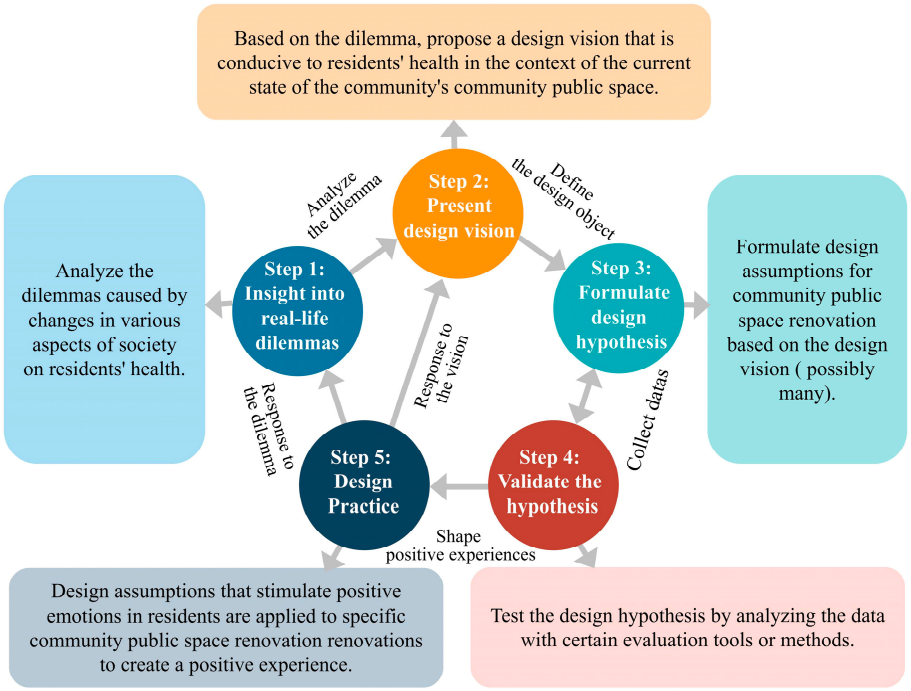

Figure 2. The conceptual framework for modern community public space redesign based on positive experiences.

1.5. The Present Study

Previous studies have indicated that certain specific architectural patterns can have numerous beneficial psycho-physiological effects on people, such as fractal architectural patterns [74,75] and natural architectural patterns [76]. Unfortunately, the role of traditional architectural patterns in the aesthetic assessment of modern residential public space facades has yet to be researched in academia. As an important part of traditional architectural decoration, traditional architectural patterns are a significant symbol of traditional culture [77]. In particular, traditional architectural patterns contain a wealth of auspicious cultural meanings (Table 1), which can give rise to many beautiful associations [78–82].

Table 1. The main auspicious meanings of traditional Chinese architectural patterns.

S/N	Symbolic Meaning	Examples
1	Avoiding disaster	Wormwood Pattern, Dark Eight Immortals Pattern, Phoenix Pattern, Bamboo Pattern, Taiji Bagua Pattern, and Wan Word Pattern, etc.
2	Wealth and prosperity	Coin Pattern, Deer Pattern, Loop Pattern, Wreathed Branches Pattern, and Moonflower Pattern, etc.
3	Peace and happiness	Fu Word Pattern, Bat Pattern, and Vase Pattern, etc.
4	Good luck	Xi Word Pattern, Magpie Pattern, Ru Yi Pattern, and Pencil Pattern, etc.
5	Longevity and health	Shou Word Pattern, Pine Pattern, Scrolling Grass Pattern, and Crane Pattern, etc.
6	Harmonious family	Two Immortals of Hehe, Mandarin Ducks Pattern, Orioles Pattern, and Lotus Flowers Pattern, etc.
7	Prosperity for future generations	Unicorn Pattern, Hui pattern, Lion Pattern, and Pomegranate Pattern, etc.
8	Noble character	The Four Gentlemen Patterns, The Story of the Three Kingdoms Patterns, and The 24 Filial Exemplars Patterns, etc.
9	Peaceful world	Fish Pattern, Lotus Pattern, and Crab Pattern, etc.

Furthermore, cultural elements will, likewise, have a crucial influence on the generation of positive emotions [64], particularly the traditional cultural factors. Therefore, disregarding or ceasing to pay attention to traditional culture in several post-disaster reconstruction projects is considered as an unsustainable practice [83]. However, the departure of modernist design from decoration has almost caused the disappearance of traditional architectural patterns from modern residential facades [37,42]. Therefore, this study has three basic research hypotheses:

Hypothesis 1. *Modern residential facades decorated with traditional architectural patterns are more compatible with the aesthetic preferences of the observer than the existing ones within a certain system of living spaces.*

Hypothesis 2. *Modern residential facades decorated with traditional architectural patterns are more likely to stimulate positive emotions in the observer than the existing ones within a certain system of living spaces.*

Hypothesis 3. *Modern residential facades decorated with traditional architectural patterns have greater health benefits than the existing ones within a certain system of living spaces.*

The purpose of this paper is to (1) verify the role of traditional architectural patterns in the aesthetic assessment of architecture, (2) verify the effect of traditional architectural patterns in the health benefit assessment of community public spaces, and (3) construct a conceptual framework for the redesign of modern community public spaces based on the positive experience theory, and apply it to the renovation of a modern community residential facade in Wuxi to test its rationality in practice. Therefore, the rest of the paper is structured as follows. The theory and method section (Section 2) introduces the case study, and a detailed description of the questionnaire research method. The results section (Section 3) details the results of each method of data analysis. The discussion section (Section 4) discusses the role of traditional architectural patterns in the architectural aesthetic assessment as well as the rationality of the design framework from a systems view and cybernetic perspective, with important implications for the future design of community or urban public spaces. The conclusion section (Section 5) summarizes this study's main findings and innovations, and points out the study's limitations and directions for future research. This study will contribute to improving the environmental health benefits of community public spaces, which will not only be beneficial in mitigating or improving the sequelae or complications of COVID-19 in the post-pandemic era but also have important inspirations for the future sustainability of the environmental systems of community or urban public spaces.

2. Materials and Methods

2.1. Case Study

In order to verify the effectiveness of the above framework, a modern residential community in Wuxi was chosen as a typical case study. The case study is based on the Zhouxinyuan East Phase III Community (hereafter referred to as Zhouxinyuan community, Figure 3) in Binhu District, Wuxi (a highly developed industrial and commercial city in the southeastern part of Jiangsu Province, China), which was completed in 2007 and brought into use in 2010. Currently, there are about 1600 families in the community. A residential community such as this one can be found in almost all cities in China, and it can be considered an ordinary and typical modern community. Therefore, the community meets all the research requirements of the study, and we regard it as a typical case study.

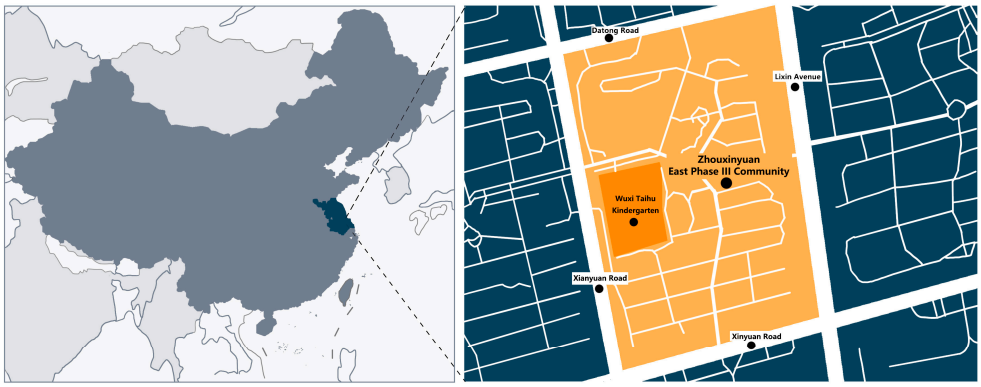

Figure 3. The location of Zhouxinyuan community.

During the pandemic, the residents had several experiences of being under mandatory control. The longest time they were subjected to compulsory control was three months, which occurred from March to May 2020, and the form of control was that each resident was allowed to leave the neighborhood once a week for no more than two hours each time. Most frighteningly, residents of several houses in the community had experienced mandatory control without leaving their homes for periods ranging from one day to half a month. Moreover, the omicron virus outbreak caused by the successive complete decontrol of the pandemic throughout China since the end of 2022 has reinforced the pandemic's negative psychological or spiritual impact on the inhabitants living in the community. However, field research revealed that the community's residential architecture is typically modernistic (Figure 4). As a result, the residential facades in the community cannot provide residents with a positive environmental experience in public spaces, which is not conducive to ameliorating or addressing the negative impacts of COVID-19 in the post-pandemic era.

(**a**) (**b**)

Figure 4. (**a**) A residential building typical of Zhouxinyuan community. (**b**) Residential facades near the Zhouxinyuan community.

Therefore, our design vision is to shape a positive community public space experience by renovating the residential facade, thereby improving the health benefits of the community public space. The design hypothesis is that the application of traditional architectural patterns to the renovation of the residential facades might stimulate positive emotions among the residents, resulting in an improvement in the health benefits of the community's public spaces (Figure 5). Notably, our design approach is not intended to achieve the purpose of renovating the facade by demolishing the existing building to rebuild a new one or changing the original building structure. Such design practices not only cause a waste of existing building resources but also add a huge expenditure of additional resources and disturb the daily lives of the residents.

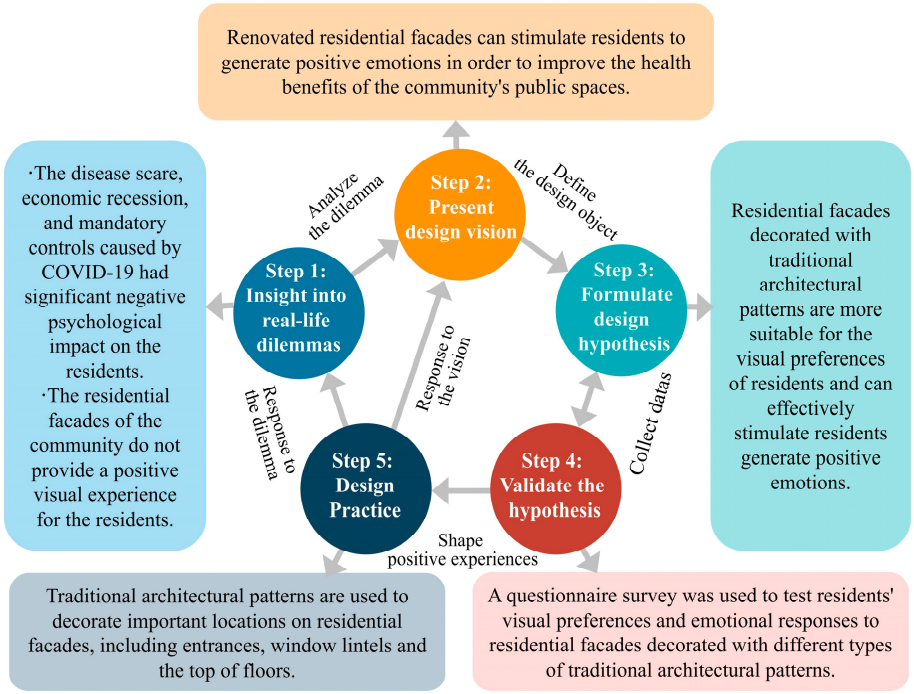

Figure 5. The conceptual framework for modern community public space redesign in Zhouxinyuan community based on positive experience.

2.2. Questionnaire Research

In order to verify the design assumptions and effectiveness of our renovation project, we conducted two questionnaire surveys on the opinions of Zhouxinyuan community residents because some studies point out that the results of people's evaluation of the community environment in which they live are more desirable [84]. Of course, with the rapid development of modern technology, some advanced equipment can be used in studies related to the testing of emotional responses or behavioral tests of test subjects when conditions permit, which may increase the scientific validity of the data [85].

2.2.1. Survey 1: Visual Preferences and Emotional Responses to Different Types of Modern Residential Entrance Space Facades by the Residents

1. Participants

The survey was conducted in the last two weeks of February 2023. The initial plan was to recruit volunteers to conduct a field experiment in the Zhouxinyuan community, but because the community residents had just experienced the first wave of the omicron virus strain since decontrol (6 December 2012), most of them were still afraid to contact strangers or gather with multiple people and increase the risk of infection. Therefore, we finally decided to use an online and offline random sample questionnaire for data collection. The use of questionnaires to measure human emotional responses has been proven to be effective [86,87]. We designed and edited the questionnaire on Wenjuanxing (https://www.wjx.cn/login.aspx) (accessed on 12 February 2023). The online survey was conducted by printing the questionnaire's QR code and posting it on the bulletin board in the elevators of residential buildings for residents to fill in voluntarily (Figure 6), as elevators are how almost all residents navigate the building every day. The offline study was conducted at different times of day (especially after dinner, as we observed that the residents' outdoor activity peaked after dinner) by randomly selecting residents in the neighborhood to fill out the questionnaire on an electronic terminal (iPad Pro 2019). To clarify, respondents who filled out the questionnaire offline saw the same stimulus material, including the same brightness level, size, and color of the images because they did so on the same electronic terminal, which we provided. Respondents who completed the research

questionnaire online may have been affected by the resolution of the electronic terminal they used. Nevertheless, since we also have detailed text descriptions in the questionnaire, which could help the respondents understand the answered questions, the resolution of the electronic terminals employed by the respondents themselves would not significantly affect the final test results.

(**a**) (**b**)

Figure 6. (**a**) Poster of the questionnaire in the elevator. (**b**) A resident filling out the questionnaire.

A total of 415 residents, including 205 males and 210 females, participated in the study voluntarily and anonymously, and all participants were free to withdraw at any time. In order to prevent participants from answering the questionnaire repeatedly, we made a setting in the background of Wenjuanxing so that each IP address was allowed to answer only once. The final exclusion criteria of the questionnaire were as follows: (1) the response time was less than 2 min, because the test results showed that the questionnaires returned in less than 2 min were either incomplete or the quality of the answers needed to be higher, and the maximum response time was not specified; (2) residents who had lived in the community for less than 3 months, because residents who had lived there for too short a time might have not paid enough attention to the community's environment to make an appropriate choice or might be a visitor to the community; and (3) residents who were less than 18 years old, because this category of residents may not yet have formed a sound concept of environmental aesthetics.

2. Visual stimulus materials

Computer-generated images were used in the study instead of real photographs for two main reasons: First, the purpose of this survey was to test the role of traditional architectural patterns in architectural aesthetics, so we did not use separate images of architectural patterns as visual stimuli, as non-architectural contexts may influence participants' judgments and choices. It should be noted that due to the large volume of residential buildings in the neighborhood, the architectural patterns on the fully intact facade do not display well on some electronic terminals (e.g., cell phones or tablet computers), so we only selected the entrance as the architectural context for presentation. Entrance spaces are transitional spaces, and the broad scope of a residential entrance space includes the space around the entrance of a residential building, the passageway connecting the occupants, and the space outside the door of a dwelling. In a general sense, although residents may spend a relatively short time in the residential entrance space, its frequency of daily use is very high [24]. Numerous studies have demonstrated the important role that entrance

spaces play in people's environmental perception and behavior [24,88–90]. Second, using computer-generated images as visual stimuli can effectively control the study variables, and the rationality of the method has been demonstrated [91,92].

In this study, two sets of visual stimulus materials were used: residential entrance walls decorated with different types of traditional architectural patterns and the original residential entrance walls in the community (which were not decorated with any traditional architectural patterns). The development process comprised the following stages (Figure 7): First, we collected various types of traditional Chinese residential architectural patterns from different literature sources [78–82] and field research. Then, we selected sixteen of the most representative traditional architectural patterns from the collected patterns based on the introduction of some literature sources, sketched them using CAD (2022), and imported them into SketchUp Pro (2021) for 3D modeling. In the third step, a typical house in the neighborhood was modeled in 3D using SketchUp. The fourth step was to combine the architectural pattern model with the residential model in SketchUp to produce the initial visual stimulus material. Finally, the preliminary visual stimuli were optimized, adjusted, and exported to the final visual stimuli (the size of the final visual stimuli was 2226 × 1788 pixels, as shown in Figure 8).

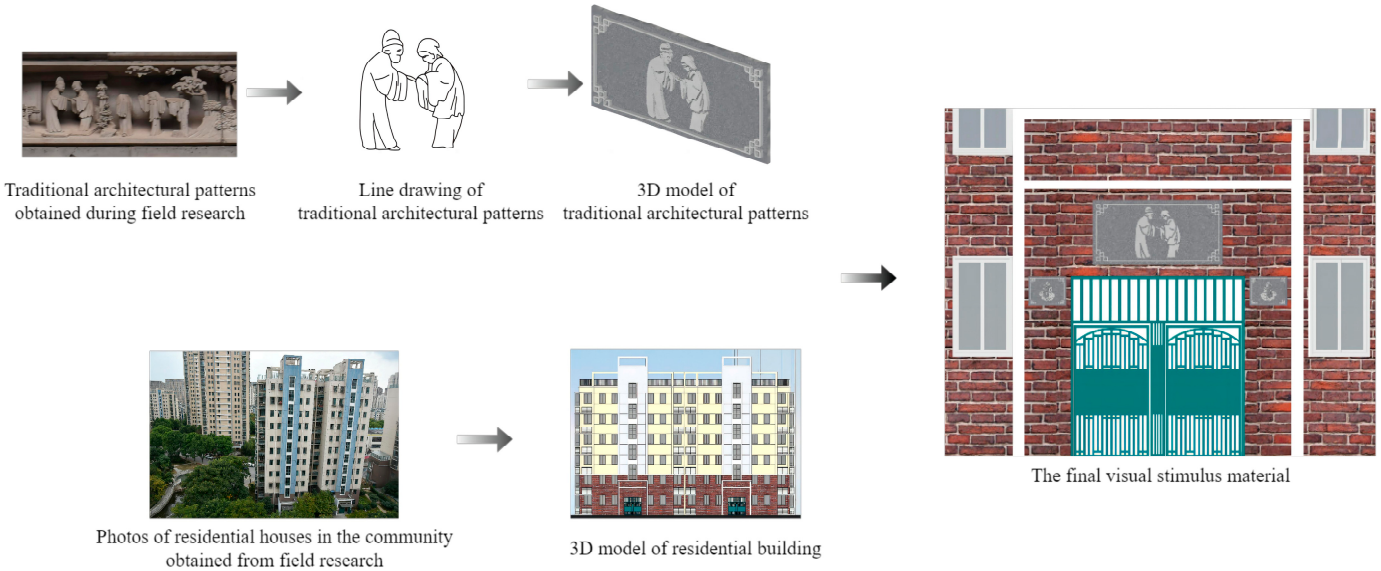

Figure 7. The process of generating visual stimulus materials in the study.

3. Questionnaire design

The questionnaire consisted of two parts. The first one was about the basic information of the participants, including age, gender, and career. In the second part, we tested residents' visual preferences and emotional responses to nine types of residential entrance space facades. First, the observer must select their favorite facade based on their interest. Then, observers were required to complete a positive emotion test scale for the facades consisting of four items: calm, pleasant, safe, and interesting, which were summarized from previous studies [46,87,93–96]. These positive emotions were the most frequently used in the above studies and were the most easily distinguished by participants. Only four items were selected for this scale to reduce participant fatigue.

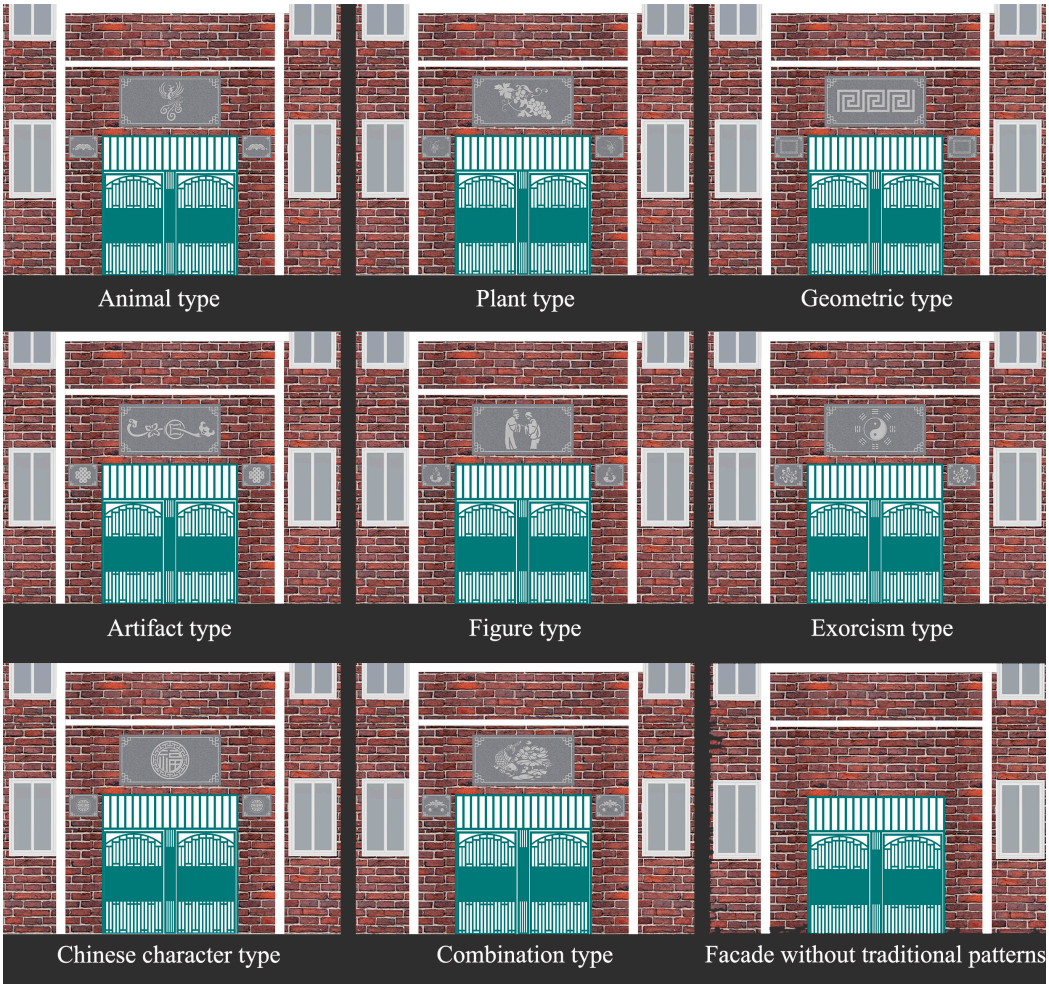

Figure 8. Final visual stimulus materials: the first eight are the residential entrance space facade decorated with different types of traditional architectural patterns, and the last one is the facade without any traditional pattern.

4. Data analysis

We used the professional data processing program SPSS 26.0 to process and analyze these data. First, the number of valid questionnaires obtained after processing the data according to the exclusion criteria was 365, and the valid questionnaire rate was 87.95%. Second, the study used Cronbach's α to measure the internal consistency of the data, and the overall reliability coefficient for all tested items was 0.878 (Table 2), indicating that the quality of the study data reliability is high and can be used for further analysis. Third, we analyzed the frequency of the participant's demographic data to determine their socioeconomic demographic characteristics (Table A1). Fourth, we tested the data for normality using the Kolmogorov–Smirnov test, and all data showed a non-normal distribution. Fifth, frequency analysis was used to determine the residents' aesthetic preferences for different types of residential entrance facades. Finally, to determine the rank of residents' emotional responses to different types of residential entrance facades, the study adopted the Wilcoxon signed rank test because it does not require the data to obey a normal distribution [75]. Moreover, we used variance and chi-square tests to analyze the effect of the demographic characteristics of the sample on the test results.

Table 2. Cronbach's reliability analysis of research data on the emotional responses of modern community residents to different types of modern entrance residential facades.

Item	Sample	Cronbach α
36	365	0.878

Although demographic differences in the study are expected to impact the dependent variables (residents' visual preferences, emotional responses, and health benefits to different types of residential entrance facades), due to the limited geographical location of the sample in this study, a comprehensive report on the impact of demographic differences on traditional architectural patterns in the assessment of architectural aesthetics requires the stratification of a broader sample of different participants in terms of age, education, and career, and in a broader context. The current study's statistics on demographic differences in these samples apply only to the interpretation of some of the phenomena in this study but also can be used in preparation for future in-depth research.

2.2.2. Survey 2: Assessment of Health Benefits of Different Types of Modern Residential Public Space Facades by the Residents

1. Participants

This research was conducted one week after the end of the research in Section 2.2.1 and lasted three days. The questionnaire was edited and researched in the same way as in Section 2.2.1. Due to the inclusion of fewer questions in the questionnaire, the last exclusion criteria were the same as in Section 2.2.1, except that the response time was adjusted from less than 2 min to at least 80 s. A total of 190 residents participated in this study voluntarily and anonymously.

2. Visual stimulus materials

The same computer-generated images were used in this study. In order to explore the effect of residential facades decorated with traditional architectural patterns on the health benefits of residents, the original residential facade A of the neighborhood was used as a control group in the study. The selection of traditional architectural patterns for facade B was based on those chosen in the survey presented in Section 2.2.1. Specifically, we selected three types of traditional architectural patterns that best fit the visual preferences of the residents: the Ruyi pattern (artifact type), the Hui pattern (geometric type), and the scrolling grass pattern (plant type). Because visual preferences can reflect the renovation needs of the residents, satisfying these needs is also an important factor in generating positive experiences [97]. Moreover, the exorcism type represented by the Taiji Bagua pattern can bring a high level of security, and the animal type represented by the phoenix pattern can bring a strong sense of fun, so we also used these two architectural patterns in the visual stimulus materials for this research. It should be noted that, first, due to the large building volume in the community, in order to present the complete building facade without affecting the display of the stimulus materials at the electronic terminal, we reduced the original 11-story residence to 6 stories; second, the locations where the architectural patterns were arranged were mainly the building entrances, window lintels, and the tops of the dwellings, the importance of which has been confirmed [60,98,99]. The final visually stimulating materials were also generated and optimized in SketchUp (the size of the final visual stimuli is 3002 $\times$ 2253 pixels, see Figure 9).

Figure 9. The final visual stimulus materials for testing residents' assessment of the health benefits of different types of modern residential public space facades.

3. Questionnaire design

The questionnaire consisted of two parts; the first was about the participants' basic information with the same questions as in the first survey. The second part was the participant's assessment of the health benefits of facades A and B. The participants were first given unlimited time to view facades A and B. After that, they were required to complete a four-item scale of the health benefits, which was developed based on previous research [100–104] and included eliminating fatigue, revitalization, calming mood, and concentration. The answers used a five-point Likert scale to rate the statements in the responses, ranging from 1 (completely disagree) to 5 (completely agree), with the four statements being "This facade helps me get rid of fatigue," "This facade helps me rejuvenate," "This facade helps me to calm my emotions," and "This facade helps me to concentrate." The rationality of using a questionnaire to assess people's health has been demonstrated [101,102,105].

4. Data analysis

The data collected in Survey 2 were analyzed using the same software, methods, and procedures as in Survey 1. Table 3 shows that the data collected in this survey were of good quality in terms of reliability and can be used for further analysis. Table A2 shows the statistical demographic characteristics of the respondents of the research.

Table 3. Cronbach's reliability analysis of research data on the assessment of health benefits of modern community residents to different types of modern residential public space facades.

Item	Sample	Cronbach α
8	154	0.738

3. Results

3.1. Visual Preferences for Different Types of Modern Residential Entrance Facades by Modern Community Residents

In this study, nine different types of modern residential entrance space facades were tested, the first eight of which are the facades decorated with eight types of traditional architectural patterns, and the ninth is a modern residential entrance facade without any traditional architectural patterns (in the following, we use the type of traditional architectural pattern to name the corresponding residential entrance facades for the convenience of description; for example, the modern residential entrance space facade decorated with plants is called "plant type," and the modern residential entrance space facade not decorated with any traditional architectural patterns is called "facade without architectural patterns"). The results show that the most popular type of entrance space facade is the

artifact type, with 29.32% of the residents choosing it, followed by the geometric, botanical, and exorcism types, respectively, being preferred by 19.45%, 15.34%, and 10.14% of the residents. However, only 1.10% of the residents chose facades without architectural patterns (Figure 10).

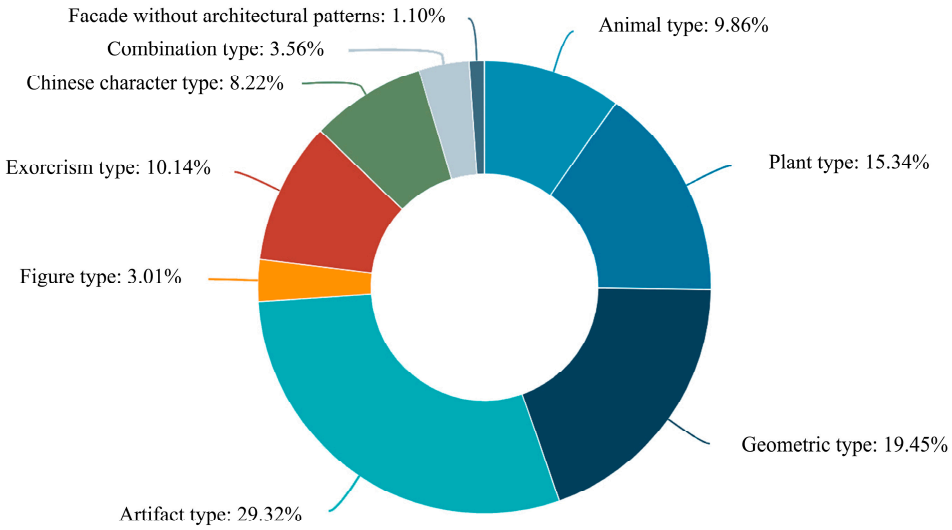

Figure 10. The visual preference ring diagram of different types of modern residential entrance space facades.

Data analysis using the chi-square test revealed that the samples' demographic characteristics significantly affected the visual preference for different types of modern residential entrance space facades ($p < 0.01$). For example, the differential relationship of education level with the preferred type of entrance space facade indicated that residents with an education level below high school preferred the animal type (25.71%), while residents with a bachelor's degree showed a preference for the artifact type (29.17%). Due to this article's length, see Table S1 for more details on the differential relationships.

3.2. Emotional Responses to Different Types of Modern Residential Entrance Space Facades by Modern Community Residents

The four mood indices (calm, pleasant, safe, and interesting) were measured on a linear 5-point Likert scale ranging from "not at all," "a little," "moderately," "quite a bit," to "extremely," which were converted into numerical ranges 0–4 for statistical analysis. The results (Figure 11) show that residents were most likely to feel "calm" about the plant type (Mean = 4, SD = 1.039), followed by the geometric type (Mean = 3, SD = 0.896). The artifact type was shown to be the most likely to create a "pleasant" feeling (Mean = 4, SD = 0.986), followed by the Chinese character type (Mean = 3, SD = 0.788). Even though the animal type, artifact type, exorcism type, and Chinese character type have the same median safety index (Mean = 3), by comparing the average of these four types of residential facades, we found that the animal type is the most stimulating for residents in terms of feeling safe (Mean = 3, $\overline{X}$ = 2.649), followed by the exorcism type (Mean = 3, $\overline{X}$ = 2.608). People felt "interesting" the most about the animal type (Mean = 4, SD = 0.941), followed by the artifact type (Mean = 3, SD = 0.788).

Notably, the facade without architectural patterns has the lowest emotional rating for all categories, but this type can create a relatively slight "calmness" (Mean = 1, SD = 0.895). Interestingly, the resident's response to the strength of the "safe" feeling (SD = 1.388) brought about by the exorcism type fluctuated greatly. The exorcism-type architectural patterns are typical religious symbols. Religion brings a high sense of psychological security to believers [106], so the exorcism type bring a high level of safety to religious residents. However, atheists may not feel this way, and we confirmed this suspicion by applying a one-way analysis of variance (Table 4). Furthermore, we used a one-way variance test to

the relevant data to find that some of the sample's demographic characteristics influenced the emotional responses to different types of modern residential entrance space facades, as detailed in Table S2.

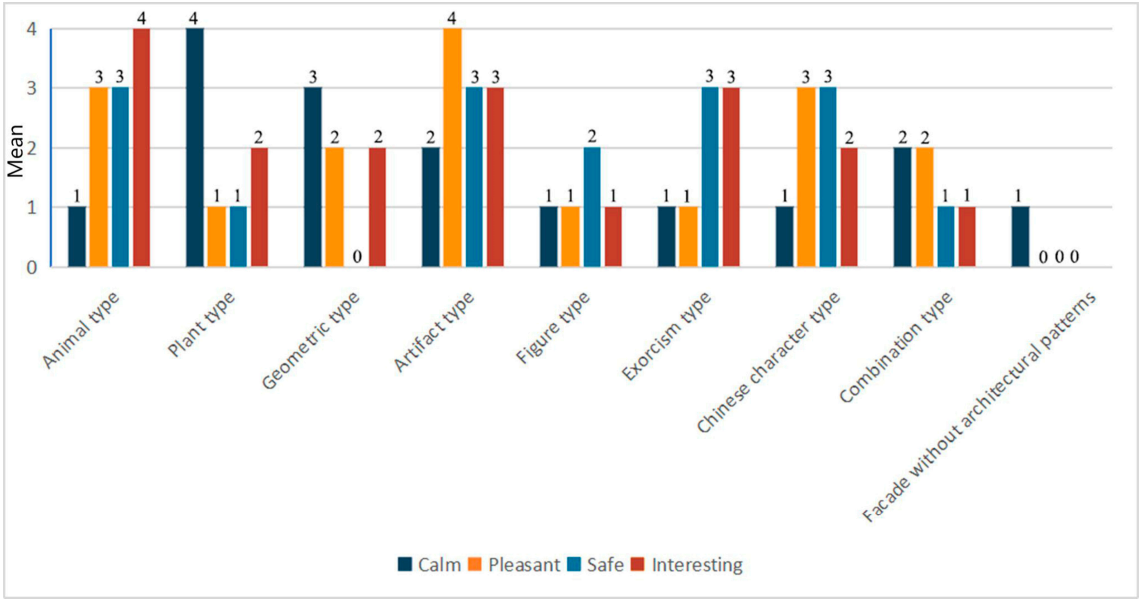

Figure 11. The four emotional responses of residents to different types of modern residential entrance space facades.

Table 4. Statistical analysis of the emotional responses of residents with different religious beliefs to the "safe" index of "exorcism type" by one-way variance test.

	Religion ($\overline{X} \pm SD$)				F	*p*
	None (*n* = 328)	Buddhism (*n* = 27)	Taoism (*n* = 4)	Christianity (*n* = 6)		
Exorcism type	2.54 ± 1.39	2.96 ± 1.29	4.00 ± 0.00	3.83 ± 0.41	3.843	0.010 **

** represents $p < 0.01$.

In fact, from a semiotic point of view, the eight types of traditional architectural patterns used in this paper can be further divided into three major categories of cultural symbols, in which the animal, plant, and combination categories can be regarded as nature-inspired symbols; artifacts, figures, and exorcisms can be regarded as human-related symbols; and Chinese characters can be regarded as text-based symbols. These three cultural symbols are the main types of traditional Chinese architectural patterns. After processing the data, it was found that the facades of modern residential entrance spaces decorated with these three types of cultural symbols scored significantly higher than the facades of existing modern residential entrance spaces in the emotional response test (Table A3).

3.3. Assessment of Health Benefits of Different Types of Modern Residential Public Space Facades by Modern Community Residents

The data were analyzed using the Wilcoxon signed rank test, and it was found that facade B had a higher health benefit than facade A. Table 5 shows four sets of paired data showing significant differences ($p < 0.05$). More specifically, the results show that the three levels of health benefits of facade B (residential facades decorated with traditional architectural patterns) were roughly equivalent in terms of fatigue elimination (Mean = 4, SD = 0.788), revitalization (Mean = 4, SD = 0.819) and concentration (Mean = 4, SD = 0.898)

among residents, but their calming effect was prominent (Mean = 5, SD = 1.033). Although facade A (residential facade without traditional architectural patterns) was lower than facade B in all health benefit indicators, it also had an appropriate calming effect on mood (Mean = 2, SD = 0.832) and fatigue elimination (Mean = 2, SD = 0.840).

Table 5. Results of Wilcoxon paired signed rank test analysis of four health benefit indicators for facade A and facade B.

Name	Median Pairing M(P25, P75)		Median M-Difference (Pair 1-Pair 2)	Statistic z-Value	*p*
	Pair 1	Pair 2			
B1 Pairing A1	4.000 (3.0, 4.0)	2.000 (1.0, 2.0)	2.000	10.219	0.000 **
B2 Pairing A2	4.000 (3.0, 4.0)	1.000 (1.0, 2.0)	3.000	10.236	0.000 **
B3 Pairing A3	5.000 (4.0, 5.0)	2.000 (2.0, 3.0)	3.000	10.045	0.000 **
B4 Pairing A4	4.000 (3.0, 4.0)	1.000 (1.0, 2.0)	3.000	9.650	0.000 **

** represents $p < 0.01$, in the name field, 1 represents fatigue elimination, 2 represents revitalization, 3 represents mind calming, 4 represents concentration.

Although the overall health benefits of facade B are significantly higher than those of facade A, analysis of the data using one-way variance shows that there are differences in the responses of different groups of residents to the health benefit assessment of the two types of facades, in terms of different health indicators. For example, age range shows a 0.01 level of significance (F = 6.150, $p = 0.001$) for the fatigue elimination health benefit of facade B. Specific comparison of the differences shows that there is a more obvious difference when comparing the mean scores of the groups, as follows: "Over 61 years old > 18–30 years old; Over 61 years old > 31–40 years old; Over 61 years old > 41–60 years old." This means that modern residential facades decorated with traditional architectural patterns can provide higher fatigue elimination health benefits for residents over 61 years old, as detailed in Table S3.

4. Discussion

4.1. Traditional Architectural Patterns: An Important Element in the Aesthetic Assessment of Architecture

The system that determines whether a hypothesis or theory is valid or not is bounded [1], so in order to reasonably test Hypothesis 1 and 2 of this study, we set the space of Survey 1 as the residential entrance space. Within this scope, the findings of our study are consistent with previous studies, which show that facades with architectural decorations are more in line with people's visual preferences than facades without architectural decorations [37,38,74,76]. Compared to all residential facades decorated with traditional architectural patterns, those without traditional architectural patterns are much weaker in terms of visual interest. Thus, modern residential facades decorated with traditional architectural patterns are more in line with the aesthetic preferences of observers than existing modern residential facades, which confirms Hypothesis 1. One reasonable explanation for this result is that the decoration of existing residential facades with traditional architectural motifs appropriately increases the complexity of their architectural facades compared to the existing flat residential facades, thus better matching the visual aesthetic preferences of the residents [107].

Regarding emotional responses, our results show that almost all residential facades with traditional architectural patterns receive higher positive emotion ratings among residents than facades without traditional architectural patterns, thus proving Hypothesis 2. An important reason for these results may be that almost all traditional architectural patterns have wonderful symbolic meanings. For example, the artifact-type architectural pattern used in this study is the Ruyi pattern, the main body of which is a typical traditional Chinese auspicious cultural symbol, symbolizing that people can successfully achieve their ideals. These auspicious meanings represent the Chinese people's common spiritual and cultural values, which is the essential difference between facades with architectural

patterns and modern building facades. Meanwhile, the study again verifies that culture is important in people's emotional judgments about architecture [108].

Furthermore, our results show that residential facades decorated with different types of traditional architectural patterns result in different categories and levels of positive emotions among people. For instance, plant-type architectural patterns are most likely to bring people a sense of calm because they are nature-like patterns [109], and exposure to such nature-like architectural patterns (and possibly architectural structures) may induce psychological benefits similar to interaction with nature itself [110], which has been shown in numerous studies to bring people a sense of calm [111,112]. Likewise, geometric-type architectural patterns are better able to provide a sense of calmness because they are the most similar to fractal patterns in nature, which also has the effect of reducing mental stress [38,113,114]. Curiously, the animal type also belongs to a natural-like architectural pattern, but it does not bring a significant sense of calmness (Figure 12). One possible reason is that the animal-type architectural pattern used in this study was the phoenix pattern, whose prototype is the legendary phoenix bird, making it more closely associated with mythology. It is therefore not surprising that it was more likely to generate interest among observers. Furthermore, in ancient Chinese mythology, the phoenix bird is one of the four divine beasts (the other three are the Green Dragon, White Tiger, and Xuanwu), and the four divine beasts guard the four sides of the country and protect people from the harm of evil spirits, so the phoenix bird pattern gives people a high level of safety. However, when these traditional architectural patterns were secondarily categorized according to different symbol types, it was surprising that the nature-inspired symbols still received the highest ratings in the calm indicator test. This means that nature-like patterns are still the type of symbols that can best stimulate people's sense of calmness at an overall level.

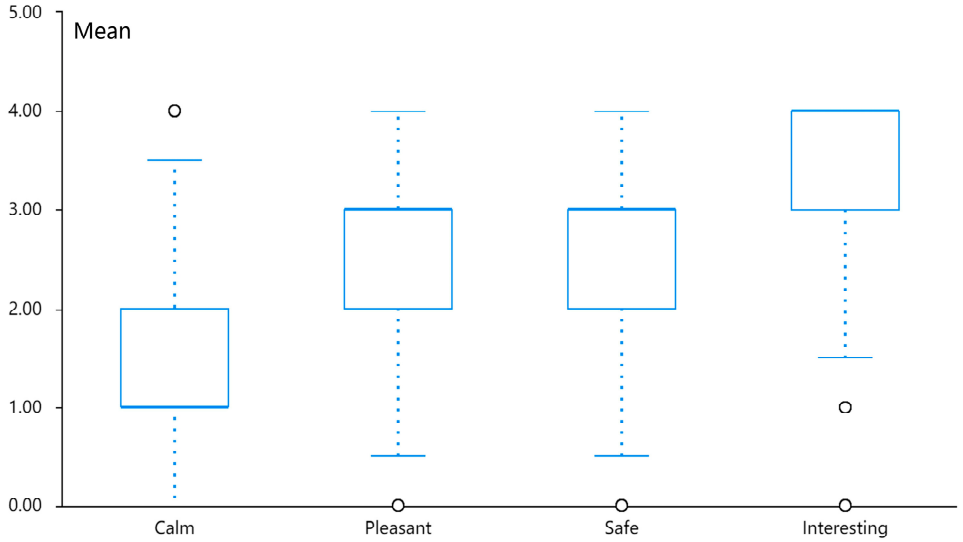

Figure 12. The four emotional responses of residents to modern residential facades decorated with animal-type architectural patterns.

In conclusion, the results of this study suggest that traditional architectural patterns play an important role in the aesthetic assessment of architecture within a certain spatial system in two ways: on the one hand, modern residential facades decorated with traditional architectural patterns are more consistent with the aesthetic preferences of observers than existing modern residential facades; on the other hand, modern residential facades decorated with traditional architectural patterns are more likely to stimulate positive emotions in observers than existing modern residential facades. Most importantly, our findings show that different types of traditional architectural patterns can bring about different types and strengths of positive emotions in response to the original architectural space. This finding will enable designers or architects to use specific traditional architectural patterns to more

precisely design "mood architecture," which is a kind of "healing architecture" that plays a positive role in the treatment of some psychological diseases, thereby improving health conditions [115]. At the same time, the results also contribute to the creation of a different spatial "atmosphere," which is considered to be a meaningful spatial quality with a direct impact on the affective city image, but also with a positive indirect impact on the behavioral intentions of the space users [116].

4.2. Positive Emotions: The Aesthetic Boundaries of Modern Community Public Space Environmental Systems

This study constructs a conceptual framework for redesigning modern community public spaces based on positive experience theory, and validates the design framework with the example of Zhouxinyuan community public space. In the specific design renovation process, we used traditional architectural patterns, an important traditional cultural symbol, to decorate the residential facades of the Zhouxinyuan community, and used questionnaire research to collect residents' aesthetic preferences and emotional responses to the renovated residential facades. Analysis of the collected data revealed that modern residential facades decorated with specific traditional architectural patterns were more likely to stimulate positive emotions, described as calm, pleasant, safe, and interesting, among residents than existing modern residential facades. As mentioned above, experiencing positive emotions facilitates generating positive experiences [66]. Therefore, renovation measures contribute to enhancing the positive environmental experience of public space in the Zhouxinyuan community.

From a systems theory perspective, our design framework is a way to induce new emergent properties in the existing community public space environmental system by intervening in the existing physical boundaries of the system using a cybernetic approach, which is considered to be an effective way to induce new emergent properties in a system [26]. Specifically, the design approach of using traditional architectural patterns to decorate the facades of modern community public spaces broadens the physical boundaries of the existing community public space environmental system. It enriches the aesthetic value of its physical boundaries, thus inducing the emergent properties of new spatial experiences—positive environmental experiences. In other words, positive emotions become the aesthetic boundary of the renovated community public space, which is precisely the aesthetic value that is lacking in modern community public spaces. Therefore, the renovation of existing community public space environmental systems should focus on how to achieve the aesthetic boundary. Exploring this issue is particularly important and urgent in the post-pandemic era, because positive emotions have been shown to act as a buffer against mental illness [67], and they may eliminate the sequelae of negative emotions [65], suggesting that positive emotions may help people to eliminate or alleviate the sequelae or complications of COVID-19 in the post-pandemic period.

4.3. Positive Environmental Experience: The New Turn in the Design of Modern Community Public Space Environmental Systems

This paper constructs a conceptual framework for redesigning modern community public spaces based on positive experience theory to explore how best to improve the health benefits of modern communities through design that emphasizes the quality and attributes of community public spaces. Therefore, health benefits are an important criterion for judging the rationality of the design approach. The test context of Survey 1 is the building entrance space, which is a subsystem of the community public space environmental system. Although the two systems represent different levels of spatial systems, they have a high degree of similarity, such as similar facades, similar interactions with residents, and similar functions, and such similarities between different spatial levels are widely known [1]. This implies that the results we derived in Survey 1 still apply to the whole community or similar spatial systems. In other words, the results of the data analysis of Survey 1 show that decorating modern residential facades with traditional architectural patterns can improve the health benefits of their spatial environments because the view that positive emotions

have the power to promote people's physical and mental health is widely accepted [65,67]. However, research has yet to be conducted to investigate this view empirically. Therefore, in Survey 2, we used the Environmental Health Benefits Assessment Scale to scientifically assess our design proposal's rationality.

The data collected through Survey 2 reveal that modern residential facades decorated with traditional architectural patterns significantly differ from the existing ones in assessing four health benefits (fatigue elimination, revitalization, mind calming, and concentration). In particular, residential facades with traditional architectural patterns were rated higher in terms of mind calming (Mean = 5, $p < 0.01$), which is consistent with the results of previous studies [100]. In other words, modern residential facades decorated with traditional architectural patterns have higher health benefits than existing residential facades, which validates the plausibility of Hypothesis 3. The results of Survey 2 validate that our design framework plays an important role in improving the health benefits of modern communities. In the design framework, we extended the boundary conditions of the existing community public space aesthetically (stimulating positive emotions among residents) by intervening in its physical boundaries (decorating residential facades with traditional architectural patterns), which induced the emergence of a new spatial property of the system, i.e., a positive environmental experience. In turn, this new spatial attribute influences the original spatial system [26], i.e., it improves the health benefits of the original community public space.

Therefore, the design framework proposed in this study is important for the sustainable development of modern communities or cities. In the short term, the design framework would help to mitigate or improve the sequelae or complications of the pandemic, contributing to the sustainable development of modern communities in the post-pandemic period. In the long term, the design framework enriches and develops the design dimension and evaluation criteria for future cities, i.e., through positive environmental experiences, which are important for the design or planning of future communities or cities. On the one hand, the redesign framework enables the shaping of spaces with positive environmental experiences; such spaces, including green spaces or blue spaces in cities, are known to be highly attractive to city dwellers, resulting in the aggregation of people at different scales. The Crime Prevention Through Environmental Design (CPTED) theory suggests that appropriately increasing the number of people in a space will improve the level of natural surveillance in the environment, reducing crime and improving the sense of security in the space [117]. This implies that the design method might be an effective way to increase urban security. It is important to be aware that businesses or capital may exploit positive environmental experiences as a commercial publicity stunt. In other words, the spatial environmental property may lead to the fraudulent utilization of some design resources. Therefore, some departments should improve the corresponding supervision and management in future urban planning and design. On the other hand, this study may inspire a shift in future environmental design research or practice in a more positive direction. Because the current focus of environmental design research and practice is still oriented toward specific environmental problems, as mentioned before, this will be a continual process. Rather than spending their days thinking about how to solve ever-emerging environmental problems, we argue that designers should be considering how to improve the positive qualities of an environment, because "The absence of the negative is not the same thing as the positive; the absence of ill-being is not the same thing as well-being" [118]. Of course, our research does not intend to propose a theory that could be named "positive environmental design" or "positive environmental psychology." However, we believe it is time to contribute to the generation and development of such a theory.

5. Conclusions

Many studies have confirmed that community public spaces have a significant impact on the health of residents. As the most important physical boundary of a community's public space system, residential facades can significantly influence people's spatial experience.

Therefore, this study takes modern residential facades as an entry point to explore how they can be rationally renovated or redesigned to shape the community's positive environmental experience, in order to improve the health benefits of the community's public spaces. In the case study of the Zhouxinyuan community in Wuxi, we used positive experience theory to construct a new framework for redesigning modern community public space environmental systems. Based on this new thought process for design, we proposed Hypotheses 1 and 2 and tested the validity and correctness of these two hypotheses through a questionnaire survey, i.e., modern residential facades decorated with traditional architectural patterns are more compatible with the observers' aesthetic preferences and more likely to stimulate their positive emotions than the existing ones in a certain living space system. For example, residential facades decorated with plant patterns are more likely to create a sense of calm (Mean = 4, SD = 1.039). The rationality of Hypothesis 3 was confirmed by assessing the health benefits of two types of residential facades (one decorated with traditional architectural patterns and one without), i.e., modern residential facades decorated with traditional architectural patterns have greater health benefits than existing ones, especially in terms of calming emotions (Mean = 5, SD = 1.033). This study will contribute to alleviating or ameliorating the pandemic sequelae or complications for community residents in the post-pandemic era. Moreover, the modern community public space design framework based on positive experience is a new environmental design approach that can not only be applied to the renovation or redesign of modern community public space environments, but can also provide some inspiration in the design or redesign of future urban spaces.

The main innovations of this study are as follows: On the one hand, this study explores the significant role of different types of traditional architectural patterns in the visual preference and emotional assessment of modern building facades in a more comprehensive way, thus enriching and deepening the research on the aesthetic assessment of building facades. In other words, this study provides empirical evidence for the important role of traditional architectural patterns in the aesthetic assessment of architecture. On the other hand, this study is the first to apply positive experience theory to the environmental design of community public spaces, which helps to shape the positive environmental experience of community public spaces, thereby contributing to improving the health benefits of the community.

Despite the practicality and innovation of the positive experience-based design approach, there are limitations in the present study. First, we used a specific design based on the positive experience design framework and achieved some success. However, while applying the framework to a case is a successful practice, whether the framework can guide the spatial environmental design of different scales and types needs to be explored further in subsequent design practices. We expect to improve the framework through more design cases in future research and to refine or enrich this study's scientific grounding with more quantitative analysis and assessment tools. Second, the type of traditional architectural pattern is the only variable used in this study. However, in terms of the real situation, the components of traditional architectural patterns are complex, including not only type but also shape, color, expression, material, position, quantity, and size. Whether these elements affect people's aesthetic assessment of the architectural environment needs to be supplemented or deepened by subsequent studies. Third, this research primarily focuses on how real-life spatial environment factors that stimulate positive emotions can shape positive environmental experiences. Various factors affect residents' positive emotions, including harmonious social relationships, positive social activities, the degree of satisfaction of people's needs during experiences, and life satisfaction. Future research should choose one or several of these factors to explore how to effectively stimulate positive emotions in residents of modern communities.

Supplementary Materials: The following supporting information can be downloaded at https://www.mdpi.com/article/10.3390/systems11080388/s1. Table S1: Effects of different sample demographic characteristics on visual preferences for different types of modern residential entry space facades; Table S2: Effects of different sample demographic characteristics on emotional responses

to different types of modern residential entry space facades; Table S3: Effects of different sample demographic characteristics on health benefit assessments for different types of modern residential facades.

Author Contributions: Conceptualization, R.Z. and W.G.; methodology, R.Z. and W.G.; software, R.Z., F.W., Y.L. and C.L.; validation, R.Z. and W.G.; formal analysis, R.Z.; investigation, R.Z.; resources, W.G.; data curation, R.Z.; writing—original draft preparation, R.Z.; writing—review and editing, R.Z. and W.G.; visualization, F.W., Y.L. and C.L.; supervision, W.G.; project administration, W.G.; funding acquisition, W.G. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data that support the findings of this study are available from the corresponding author R.Z. upon reasonable request.

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

Appendix A

Table A1. Demographic and sociological information from the study of visual preferences and emotional responses of modern community residents to different types of residential entrance facades.

Name	Options	Frequency	Percentage (%)
Gender	Male	180	49.32
	Female	185	50.68
Age range	18–30 years old	119	32.60
	31–40 years old	122	33.42
	41–60 years old	88	24.11
	Over 61 years old	36	9.86
Education level	Below high school	70	19.18
	High school	65	17.81
	Specialty	115	31.51
	Undergraduate	96	26.30
	Postgraduate or above	19	5.21
Career	Administration	5	1.37
	Institution unit	39	10.68
	Company	224	61.37
	Freelance	5	1.37
	Students	37	10.14
	Retirement	54	14.79
	Others	1	0.27

Table A1. *Cont.*

Name	Options	Frequency	Percentage (%)
Religion	None	328	89.86
	Buddhism	27	7.40
	Taoism	4	1.10
	Christianity	6	1.64
Annual income	Under 30,000 RMB	35	9.59
	30,000–50,000 RMB	37	10.14
	50,000–100,000 RMB	185	50.68
	100,000–200,000 RMB	97	26.58
	More than 200,000 RMB	11	3.01
Length of residence	Half to 1 year	8	2.19
	1–3 years	52	14.25
	3–10 years	124	33.97
	Over 10 years	181	49.59
Total		365	100.0

Table A2. Demographic and sociological information from the study of health benefit assessment of modern community residents to different types of modern residential public space facades.

Name	Options	Frequency	Percentage (%)
Gender	Male	74	48.05
	Female	80	51.95
Age range	18–30 years old	35	22.73
	31–40 years old	56	36.36
	41–60 years old	37	24.03
	Over 61 years old	26	16.88
Education level	Below high school	18	11.69
	High school	30	19.48
	Specialty	51	33.12
	Undergraduate	39	25.32
	Postgraduate or above	16	10.39
Career	Administration	15	9.74
	Institution unit	16	10.39
	Company	72	46.75
	Freelance	15	9.74
	Students	35	22.73
	Retirement	1	0.65
Religion	None	140	90.91
	Buddhism	5	3.25
	Taoism	4	2.60
	Christianity	5	3.25
Annual income	Under 30,000 RMB	24	15.58
	30,000–50,000 RMB	23	14.94
	50,000–100,000 RMB	58	37.66
	100,000–200,000 RMB	40	25.97
	More than 200,000 RMB	9	5.84
Length of residence	Half to 1 year	20	12.99
	1–3 years	11	7.14
	3–10 years	44	28.57
	Over 10 years	79	51.30
Total		154	100.0

Table A3. Emotional responses of residents to different types of image symbols.

Emotional Response	Symbol Type	Sample	Min	Max	$\overline{X}$	SD	Mean
Calm	Nature-inspired symbols	365	1.000	3.500	2.460	0.529	2.500
	Human-related symbols	365	0.000	4.000	1.515	0.632	1.000
	Text-based symbols	365	0.000	4.000	1.458	0.761	1.000
	Facade without traditional patterns	365	0.000	4.000	0.962	0.895	1.000
Pleasant	Nature-inspired symbols	365	0.000	4.000	1.886	0.578	2.000
	Human-related symbols	365	0.000	4.000	1.658	0.868	1.000
	Chinese character type	365	0.000	4.000	3.071	0.788	3.000
	Facade without traditional patterns	365	0.000	4.000	0.545	0.887	0.000
Safe	Nature-inspired symbols	365	0.000	4.000	1.282	0.685	1.000
	Human-related symbols	365	1.000	4.000	2.326	0.877	2.000
	Text-based symbols	365	0.000	4.000	2.603	0.808	3.000
	Facade without traditional patterns	365	0.000	4.000	0.597	0.926	0.000
Interesting	Nature-inspired symbols	365	0.500	4.000	2.105	0.598	2.000
	Human-related symbols	365	0.000	4.000	2.482	0.821	3.000
	Text-based symbols	365	0.000	4.000	2.263	0.701	2.000
	Facade without traditional patterns	365	0.000	4.000	0.496	0.928	0.000

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