

Evaluation of the Quality of Living Street Space from an Emotional Perspective

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Abstract

This thesis explores street renewal and emotional experience repair based on the concept of emotional design, aiming to build a street space with a sense of belonging, identity, and intimacy. An evaluation model from the emotional perspective was constructed by eight elements, and an AHP method and SD questionnaire were applied for investigation. The final results show that pedestrians rate the smoothness of the road surface the highest while rating the completeness of landscape features and public service facilities the lowest. This thesis provides reference value for street space quality and emotional experience and offers guidance and suggestions for urban planning and street renewal.

Keywords: living street, street space quality evaluation, emotional design

1. Introduction

With the continuous development of urbanization, the construction mode of cities in China is gradually shifting towards refined construction, which requires greater attention to the “precision” and “temperature” of urban public spaces. As an important component of urban public spaces, living street spaces not only showcase the image of cities but also carry the social public activities of residents. In 2022, Shijiazhuang proposed to “complete the creation of 100 boutique streets, focus on cultivating a number of distinctive blocks that demonstrate regional characteristics and are well-known nationwide, and fully release the vitality of urban development” (Interpretation

of the Overall Implementation Programme for Key Urban Renewal Projects in Shijiazhuang, 2022). Therefore, it is necessary to evaluate the quality of living streets in Shijiazhuang.

Currently, there are many studies on the evaluation of street space quality both domestically and internationally, mainly focusing on pedestrian accessibility, streetscape quality, street interface, and green view index evaluation (Wang De, Lu Yinquan, Zhu Wei & Zhang Jian, 2015; Tang Jingxian, Long Ying, Zhai Wei & Ma Yaotian, 2016; Wang Yanchun, Chen Qiuxia, Hou Yan & Xu Dan, 2017; Donghwan Ki & Sugie Lee, 2021). However, there is rarely a comprehensive evaluation of the quality of street space from the perspective of

human emotion. This study takes living streets in the urban area of Shijiazhuang as an example and explores the application of emotional design concepts in street space. Combining emotional design theory, a comprehensive evaluation model including environmental perception elements, spatial elements, green elements, facility elements, safety elements, commercial format elements, cultural connotation elements, and emotional resonance elements has been constructed with the aim of improving the quality of street space and creating emotionally engaging street spaces.

2. Research Object

This study selects three representative living streets, Minsheng Road, Bachang Street, and Meijie Street, located in the Xinhua, Yuhua, Chang'an, and Qiaoxi districts of Shijiazhuang City, as the research objects. The selection criteria for typical streets were summarized and concluded based on expert opinions, considering factors such as street social characteristics, traffic characteristics, spatial environment, and surrounding land attributes. These streets have pedestrians from different social classes, occupations, and ages, with low traffic volume and slow speed. They also provide basic service facilities, entertainment and leisure, and spiritual and cultural needs, and are mainly surrounded by residential land, representing a certain degree of representativeness.

3. Research Methodology

Analytic Hierarchy Process, also known as AHP, is a decision analysis method proposed by Professor Thomas Saaty in the mid-1970s that combines qualitative and quantitative approaches. It can be widely applied to the analysis of decision-making problems of various types (Chen Shuai, Gao Jiànkāng & Wei Hong, 2022). The method decomposes complex problems into multiple levels for step-by-step analysis and uses quantitative analysis instead of subjective judgment and qualitative analysis (Zhao Huancheng, 1986). In the evaluation of street space quality, AHP is a commonly used method; for example, Sun Dingwen et al. evaluated the quality of street space in Xiaobailou Street in Tianjin using AHP (Sun Dingwen, Yang Meng, Zang Xinyu et al, 2018); Chen Shuai et al. applied AHP to street

landscape evaluation and proposed optimization strategies based on existing problems (Chen Shuai, Gao Jiànkāng & Wei Hong, 2022). From existing research, AHP mainly relies on expert scoring to determine the weights of various evaluation indicators, but the subjectivity of the expert evaluators can affect the evaluation results to some extent. Therefore, it is necessary to introduce more methods to improve the reliability of the evaluation model in the study of living street space quality.

Semantic Differential, also known as SD, obtains the SD curve by quantifying the psychological feelings of survey subjects using semantic differential scales, which can accurately reflect the feelings of the surveyed subjects and evaluate their characteristics in a simple and clear way. In recent years, the application of SD method in the study of street space quality has gradually increased. For example, Zhao Yazhi evaluated the quality of street space in historical and cultural districts using SD (Zhao Yazhi, 2019); Yu Junjie constructed an index system and model using SD to obtain tourists' evaluations of street space quality in the Hua Wang district of Macau and proposed optimization suggestions (Yu Junjie, 2021). However, the evaluation subjects of SD are ordinary pedestrians in the streets, with a large number and strong pertinence, but the results of the evaluation are subjective and personalized.

Therefore, this study adopts a comprehensive research method, combining AHP and SD to construct a living street-space evaluation model from an emotional perspective. First, the weights of various factors are determined through the hierarchical structure model of AHP. Secondly, a judgment matrix is established using AHP, and combined with expert opinions, the weight distribution and consistency are checked, and the comprehensive weight is finally determined. Thirdly, a questionnaire survey is conducted among street pedestrians, and SD is used to score various indicators, obtaining the scores of each evaluation factor. Finally, the weights obtained from AHP are combined with the scores obtained from SD, and the final score of the living street space is calculated. This combined method reflects both the evaluations of experts in living street space quality and the overall

evaluations of street pedestrians, making the evaluation more scientific, comprehensive, and accurate.

4. Research Process

4.1 Emotional Design

American psychologist Donald Norman proposed the theory of emotional design in his book "Emotional Design". He conducted in-depth research and analysis on emotional expression in product design from a psychological perspective. He divides emotional design into three levels: visceral

design, behavioral design, and reflective design.

4.2 Application of Emotional Design Theory in the Translation of Living Street Space Design

Based on the previous research on emotional design theory and its application in spatial design, this study provides inspiration and reference for the translation of emotional design concepts into living street space design. When translating the three levels of emotional design into living street space design, it is important to pay attention to the particularity of emotional expression in street space (see Figure 1).

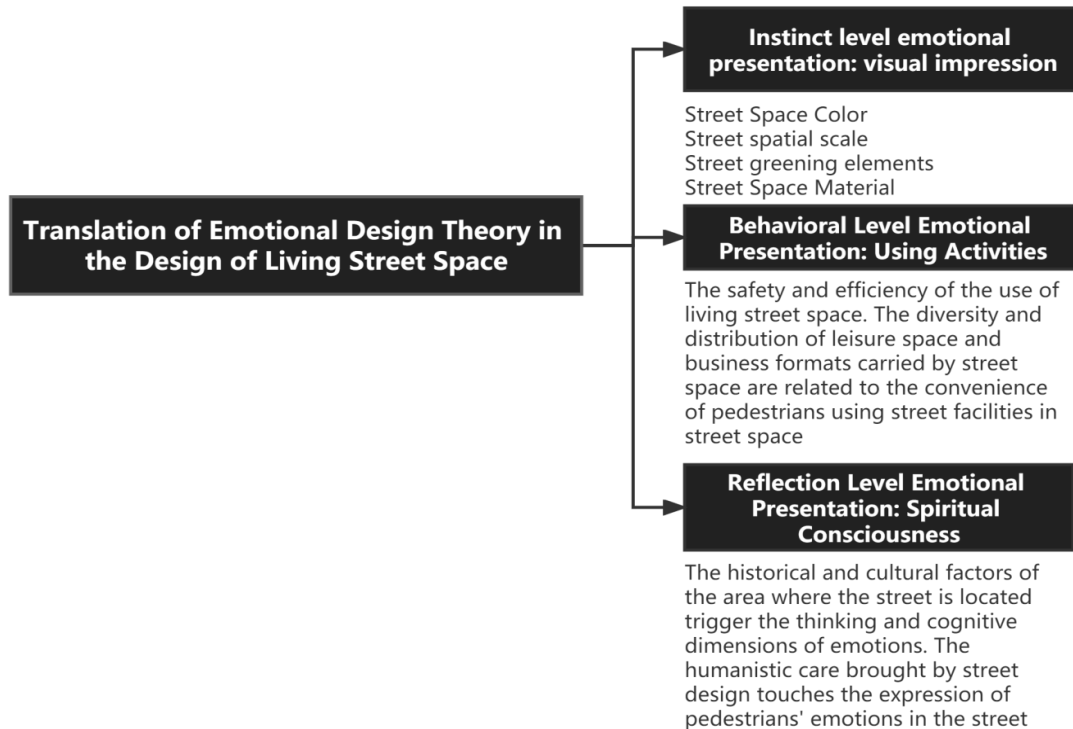


Figure 1. Translation of Emotional Design Concepts into living Street Space Design (Image Source: Self-Drawn by Author)

The instinctual level of emotional design in living street space refers to people's initial reactions when an object appears in front of them, emphasizing the dominance of physiological features such as visual and tactile senses. At this level, the focus is on external form and visual aesthetics, with visual sensory experience being the key factor. Factors that affect emotional presentation include building color and style, spatial scale and form, interface materials, etc. High-quality street space can directly stimulate people's visual senses, producing a good aesthetic experience.

Living street space achieves emotional transmission and penetration through users' activities on the street. At the level of behavioral emotion presentation, it mainly includes users' safety, efficiency, commercial format, facility interaction, etc.

The reflective level of emotional design in living street space presents three aspects. Firstly, deep thinking can be used to conduct theme design based on historical culture and regional characteristics, rejecting the "one-size-fits-all" approach to spatial planning and highlighting the regional characteristics and historical

cultural atmosphere of the street. Secondly, emotional touch can allow people to have a deeper memory of the street's design. Thirdly, users' self-expression of emotions can enhance their sense of participation, create ideological resonance, and thus produce emotional connections.

4.3 Construction of a Model for Evaluating the Quality of Living Street Space from an Emotional Perspective

(1) Selection of Indicators and Construction of the Model

Referring to literature on street space quality evaluation, 40 pairs of adjectives suitable for the

research content were pre-set. After 3 rounds of Delphi method to solicit industry experts' opinions, 23 evaluation indicators were finally selected. The criteria level was based on the instinctual level, behavioral level, and reflective level; the evaluation factors were summarized into 8 elements: environmental perception, spatial elements, greening elements, facility elements, safety elements, commercial format elements, humanistic connotation elements, and emotional resonance elements, which were used as sub-criteria layer. Finally, the model for evaluating the quality of living street space from an emotional perspective was obtained, as shown in Figure 2.

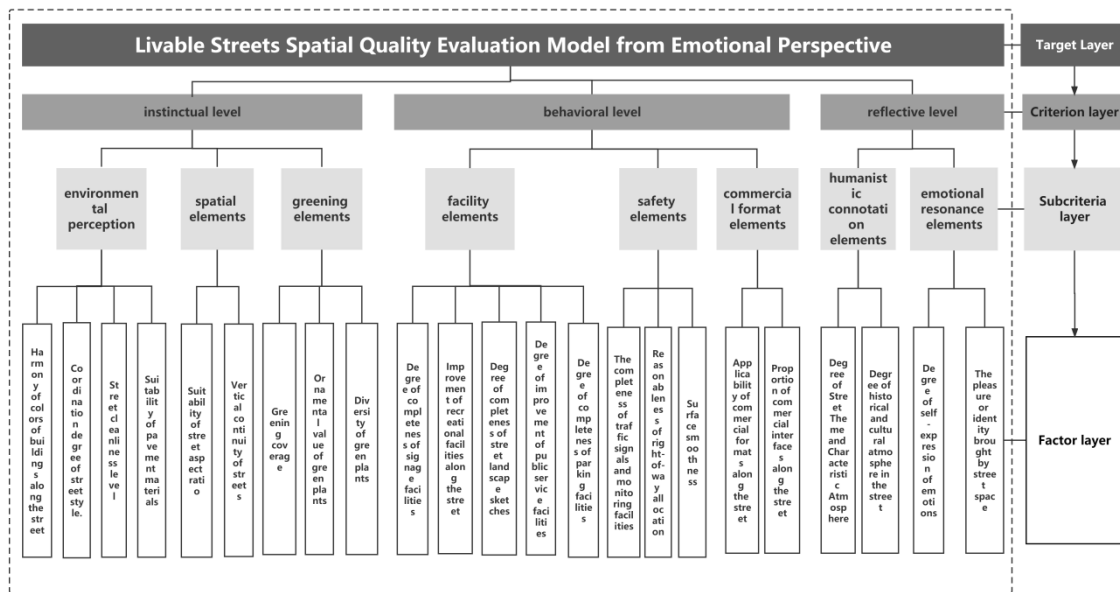


Figure 2. Living Streets Spatial Quality Evaluation Model from Emotional Perspective (Image Source: Self-drawn by Author)

(2) Calculation and explanation of indicator weights. In order to determine the weights of evaluation indicators, 10 experts from fields such as architecture, landscape architecture, and civil engineering were invited to fill out

questionnaires and the data was processed using the YAAHP software. The average value of each factor was calculated as the final weight value, resulting in the weights of each evaluation indicator for living streets (Table 1).

Table 1. Weight Values of living Street Spatial Quality Evaluation Factors from Emotional Perspective

Target Layer	Criterion layer	Weight value	Subcriteria layer	Weight value	Factor layer	Comprehensive weight value
living Streets Spatial Quality	instinctual level	0.2432	environmental perception	0.1580	Harmony of colors of buildings along the street.	0.0813

Evaluation Model from Emotional Perspective			Coordination degree of street style.	0.0394
			Street cleanliness level	0.0177
			Suitability of pavement materials	0.0196
			Suitability of street aspect ratio	0.0325
	spatial elements	0.0530	Vertical continuity of streets	0.0205
			Greening coverage	0.0165
	greening elements	0.0322	Ornamental value of green plants	0.0082
			Diversity of green plants	0.0074
			Degree of completeness of signage facilities	0.0292
			Improvement of recreational facilities along the street	0.0301
behavioral level			Degree of completeness of street landscape sketches	0.0293
	facility elements	0.1481	Degree of improvement of public service facilities	0.0227
			Degree of completeness of parking facilities	0.0369
			The completeness of traffic signals and monitoring facilities	0.0719
	safety elements	0.2868	Reasonableness of right-of-way	0.1282

reflective level	0.1884	commercial format elements	0.1336	allocation	
				Surface smoothness	0.0866
				Applicability of commercial formats along the street	0.0591
		humanistic connotation elements	0.0728	Proportion of commercial interfaces along the street	0.0745
				Degree of Street Theme and Characteristic Atmosphere	0.0298
				Degree of historical and cultural atmosphere in the street	0.0430
		emotional resonance elements	0.1156	Degree of self-expression of emotions	0.0511
				The pleasure or identity brought by street space	0.0644

According to Table 1, the importance ranking of criteria indicators in the criterion layer is as follows: behavioral level > instinctual level > reflective level, indicating that the behavioral level has the greatest impact on people's emotional states. In the sub-criteria layer, street safety elements > environmental perception elements > facility elements > commercial format elements > emotional resonance elements > humanistic connotation elements > spatial elements > greening elements are ranked in order of importance. The top five factors are reasonable road allocation, road smoothness, color coordination of buildings along the streets, proportion of commercial interfaces along the streets, and the degree of completeness of traffic signals and monitoring facilities. Other highly important factors include feelings of pleasure or identification, suitability of commercial formats along the streets, the degree of self-expression of emotions, the level of historical and cultural

atmosphere, the level of theme and atmospheric coordination, and the coordination of street style. Although factors such as parking facilities, landscape features, and height-to-width ratio have lower weights, they still play an important role in street planning and design.

(3) Design and Implementation of Questionnaires.

1) The questionnaire content was divided into two parts. The first part included basic information about street pedestrians, including gender, occupation, age, and education level. The second part involved quantitatively rating subjective perceptions of 23 indicators of street space, ranging from very poor to very good quality. The survey was conducted between August and December 2022 on three lively streets.

2) The survey was organized and the basic information of those who evaluated it was analyzed. 100 questionnaires were distributed

on each street, with 91 valid responses collected on Minsheng Road (91% effective rate), 89 on Barchang Street (89% effective rate), and 93 on Coal Machine Street (93% effective rate). Analysis of the evaluators' basic information revealed that the gender distribution among the evaluators on all three streets was balanced; the age range was mostly between 26 and 45 years old; the professional composition was mainly employed personnel; and the educational background was mainly college and undergraduate degrees, which ensured the accuracy of the data. These research data reflect to some extent the basic situation of residents on the three streets.

5. Result Analysis

5.1 Comprehensive Score for Spatial Quality of Three Streets

According to the questionnaire survey, calculate the comprehensive scores of each street. Firstly, input the results of the SD method questionnaire into an Excel spreadsheet, conduct statistical analysis, and calculate the total average scores V_j ($j=1,2,3,...,23$) for each evaluated factor of three streets, and also calculate the total average

scores V_j ($j=1,2,3,...,23$) for each evaluated factor.

$$V_j = \frac{1}{3} \times (W_{j\text{living Streets1}} + W_{j\text{living Streets2}} + W_{j\text{living Streets3}})$$

Secondly, due to the fact that the SD method assigns a score with 3 as the center when conducting evaluations, its score range is between 1-5. After converting the scores into a percentage system, the scores for each evaluation factor T_j ($j=1,2,3,...,23$) can be obtained through percentage calculation.

$$T_j = (W_j) \times 20$$

Finally, the weight values of the 23 factors obtained by the AHP method are used to perform a weighted calculation on the scores of each factor, and the final score D of the spatial quality of the living street is obtained.

$$D = \sum_{j=1}^{23} T_j \times K_j$$

According to the questionnaire data, Table 2 was created to display the evaluation scores for three streets — Minsheng Road, Meiji Street, and Bachang Street. The spatial scores of these streets showed similar trends, yet there were differences in various indicators which reflected their respective strengths and weaknesses.

Table 2. Scores of Evaluation for Each Street

Factor Layer	Minsheng Road	Bachang Street	Meiji Street	Average score
Harmony of colors of buildings along the street.	3.81	2.92	3.72	3.4833
Coordination degree of street style.	3.33	3.15	3.87	3.4500
Street cleanliness level	3.71	3.45	3.66	3.6067
Suitability of pavement materials	4.02	2.59	3.59	3.4
Suitability of street aspect ratio	4.03	3.35	3.22	3.5333
Vertical continuity of streets	4.36	3.52	3.87	3.9167
Greening coverage	4.14	2.85	3.21	3.4000
Ornamental value of green plants	4.09	2.97	3.26	3.4400
Diversity of green plants	4.32	2.73	3.51	3.5200
Degree of completeness of signage facilities	4.23	3.33	3.65	3.7367
Improvement of recreational facilities along the street	4.12	2.97	3.08	3.3900
Degree of completeness of street landscape sketches	4.08	2.68	2.76	3.1733
Degree of improvement of public	3.46	2.75	3.16	3.1233

service facilities				
Degree of completeness of parking facilities	3.29	3.21	3.66	3.3867
The completeness of traffic signals and monitoring facilities	3.64	3.46	3.78	3.6267
Reasonableness of right-of-way allocation	3.25	3.47	3.71	3.4767
Surface smoothness	4.17	3.82	4.33	4.1067
Applicability of commercial formats along the street	4.07	2.95	4.14	3.72
Proportion of commercial interfaces along the street	3.52	2.76	3.87	3.3833
Degree of Street Theme and Characteristic Atmosphere	4.32	3.2	3.26	3.5933
Degree of historical and cultural atmosphere in the street	4.48	2.76	2.69	3.3100
Degree of self-expression of emotions	3.74	2.71	3.11	3.1867
The pleasure or identity brought by street space	4.06	2.96	3.54	3.5200

Pedestrians are generally satisfied with the overall evaluation of the urban space of Minsheng Road, but some indicators have average scores. An analysis of each indicator shows that Minsheng Road's prominent advantages are suitable pavement materials, appropriate street width-to-height ratio, longitudinal continuity, ornamental vegetation, diverse vegetation, complete signage facilities, complete street rest facilities, complete street landscape features, high degree of street thematic and cultural atmosphere. However, street style coordination, parking facilities and rational allocation of road rights need improvement.

Pedestrian evaluations of Meijin Street are average, with some indicators having lower scores. Meijin Street's prominent advantages are coordinated street style, complete parking facilities, complete traffic signals and monitoring facilities, reasonable distribution of road rights, flat road surfaces, high scores for commercial formats along the street and commercial interface proportions, but evaluations of street width-to-height ratio appropriateness, street thematic and cultural atmosphere, and self-expression are lower.

Pedestrian evaluations of Bajian Street are

generally low, ranging from poor to average, indicating a low evaluation of various aspects. All aspects of Bajian Street require improvement. Only the index of rational allocation of road rights is close to the average score, while the other indicators are slightly lower than the average score, indicating an urgent need for optimization and transformation.

By combining the average scores of each indicator with the AHP method weightings, the comprehensive scores of each street were calculated and converted to a percentage scale. The comprehensive score of Minsheng Road's urban space quality evaluation was 76.4564, Bajian Street's was 62.7906, and Meijin Street's was 72.4349. It can be seen that the three living streets follow a certain pattern, with Minsheng Road having the highest score, followed by Meijin Street and Bajian Street having the lowest score.

5.2 Overall Scores of Spatial Quality for the Three Streets

Through field research, a qualitative analysis was conducted on the material environmental elements and psychological perception factors of the urban spaces of three typical residential streets in Shijiazhuang city, based on eight sub-

criteria. This aimed to verify the rationality of the evaluation model. In terms of environmental perception factors, the score for the material environmental factors of Minsheng Road was between average to good. The road surface in Minsheng Road has various paving styles, with porous asphalt used for the car lanes and diverse materials used for the sidewalk paving. Granite, bluestone bricks, and bluestone carvings were commonly used for the sidewalks located alongside traditional architectural clusters. The road surface is clean, artistic, and interesting. On the side where modern buildings are located, the sidewalks are uniformly paved with red and yellow clay bricks that provide comfortable pavement textures. The buildings along the street have harmonious colors, and commercial signboards are uniformly designed. The street is relatively clean and neat. However, compared with Coal Machine Street, the coordination of the street style in Minsheng Road is relatively low. The modern buildings are not harmoniously integrated with the traditional ones, creating a lack of overall unity.

The four indicators of Bachang Street scored lower than the average level. Research shows that the colors of the buildings along the street are outdated, and the colors of the store signboards are chaotic, resulting in color incoordination. Many car lane surfaces are damaged, and the sidewalk paving lacks aesthetic appeal and has a confusing mix of colors. The design of the pavement structure is

single and outdated, lacking regional cultural features reflected in patterns and designs. In some sections, there are problems with garbage accumulation, causing a general evaluation score for cleanliness.

Coal Machine Street's four indicators rating are medium to good. The score for the coordination of the street style is the highest. The large modern residential complexes built after 2015 make the street a unified style. The construction technology and economic level have improved, and the residential style has evolved towards modernity. Modern elements such as electronic screens and colored neon lights are commonly used for the bottom commercial facades along the street, creating an overall modern and fashionable appearance. The majority of users are young people.

In terms of spatial elements, except for Minsheng Road, the D/H ratio of the street spaces in Bachang Street and Coal Machine Street is too large (Table 3), which creates a sense of emptiness and lack of enclosure and liveliness. Minsheng Road has high compactness of the street interface, creating a strong sense of enclosure. Bachang Street's continuous rating of the street interface was medium to good, as research found that the walls of the buildings facing the street were relatively loose. Coal Machine Street's street interface density is even due to the presence of continuous commercial buildings on both sides, creating a strong sense of continuity.

Table 3. Statistical Table of Average D/H Ratio by Street

Average D/H Ratio by Sections of Minsheng Road	D/H Ratio by Sections of Bachang Street	Meiji Street
1.975	2.3889	2.61

Among the greening elements, Minsheng Road has a good greening situation, with street trees and green plants separated between the sidewalks and motor vehicle lanes. Traditional buildings have a rich combination of trees, shrubs, and grass on one side. Among them, many hundred year old trees have been preserved, and the diversity and ornamental value of green plants are high.

The green rating of Shooting Range Street is low,

with less plant coverage, monotonous landscape, and few types. Mainly double row street trees, but with large spacing, the shading effect is poor, and there are no other green landscapes.

The green rating of Meiji Street is slightly lower than the average level, but slightly better than that of Shooting Range Street. The investigation found that except for street trees, there are fewer other green elements and a single type of plant in Coal Machinery Street, which requires further

improvement in aesthetics.

(4) In terms of facility elements, Minsheng Road has diverse and balanced facilities; Integrating traditional elements into the signage facilities in traditional architectural areas, the quaint design and elegant colors are coordinated with traditional architecture; There are abundant recreational facilities in the streets. There are few parking spaces on Minsheng Road, and non motorized vehicles and motor vehicles are parked indiscriminately, occupying walking space, resulting in a mediocre walking experience.

The number and types of signage facilities in Shooting Range Street are relatively small, all of which are traffic signage facilities; Lack of recreational facilities and landscape sketches; The style of garbage cans and street lights is ordinary, lacking street characteristics; Most sections of the road are illuminated on one side, and only on both sides at street intersections, which affects pedestrian safety at night; There are no underground parking lots in the surrounding communities of Shooting Range Street, and there is a serious shortage of internal parking spaces. Residents parking along the street has surged, and parking management is insufficient. Parking behavior on the roadside and sidewalks is common, affecting traffic flow and safety.

The signs, rest facilities, landscape facilities, and public restrooms of Meiji Street are relatively few, with sufficient lighting facilities but simple design. The large commercial front area only has a small number of stainless steel seats and low usage rate, which cannot stimulate residents' communication activities. The parking facilities in Meiji Street are higher than the average level. The street has wide space and surrounding communities have large underground parking lots, effectively alleviating the parking problem.

In terms of safety factors, Minsheng Road adopts a mixed mode of motor and non motor vehicles, without separating them; The smoothness of the road surface is relatively high, and the area of pavement damage is small; The number of traffic signals and monitoring facilities is sufficient and arranged along the road.

The distribution of right of way in shooting range street is not high, and the non motorized

vehicle lanes are not connected. In some sections, the motorway and non motorized vehicle lane are mixed and there is no obvious separation facilities. In the narrower sections, there is no non motorized vehicle lane. In some sections, the tactile paving does not exist or is not continuously occupied by various objects; Pedestrians' visual perception of traffic signals and monitoring facilities on Shooting Range Street is not obvious, and some road sections lack monitoring facilities; The road surface of some sections of Shooting Range Street has been significantly damaged, and the pavement in the pedestrian area is severely damaged and covered with cement material for repair. There is local water accumulation on rainy days, which affects normal traffic and safety.

The Coal Machine Street is in the mode of separating people from vehicles. The roadway is separated from the non motorized vehicle lane by railings. The sidewalk is set along the boundary of the non motorized vehicle lane, with a width of 1-3 meters. There are clear boundaries between motor vehicle lanes, non motor vehicle lanes, and sidewalks, with a high degree of allocation of road rights, ensuring the normal passage and safety of pedestrians and vehicles; Residents and pedestrians have a strong perception of the monitoring and signal facilities in the street space. Due to the relatively complete traffic signals and monitoring facilities in Meiji Street, there are a total of 4 traffic lights and monitoring facilities. The road surface is well paved and undamaged.

(5) Among the elements of commercial formats, the suitability of commercial formats along Minsheng Road is rated between average good and very good, and the proportion of commercial interfaces along the street is rated between medium to average good; The survey found that there are a total of 98 shops on the north and south sides of Minsheng Road, with commercial shops mainly distributed on the north side of Minsheng Road. There are fewer shops on the traditional building side and most of them are calligraphy, painting, tea rooms, etc. The scale of the shops is relatively small, and the business content is also more lively. The overall business type can meet the daily consumption needs of residents.

The number of commercial stores along

Shooting Range Street is relatively small, and the overall types of businesses are relatively single and of low quality. There are a total of 57 commercial stores along the street, mostly concentrated at road intersections. From the perspective of content, they are more daily oriented, mainly focusing on daily shopping, catering services, and healthcare.

There are various types of commercial activities along Meiji Street, with a total of 147 commercial stores, mainly focusing on life services and science, education, and culture. Science, education, and culture are mainly focused on education and training. This is because the residents of the surrounding communities of Meiji Street are relatively young, and there are many schools nearby, providing a large amount of consumption potential for the education and training industry.

(6) Among the elements of cultural connotations, the score of Minsheng Road is generally between good and very good. This is because the traditional buildings on both sides of the street have distinct characteristics, presenting a architectural style that combines the late Qing Dynasty and the early Republic of China, as well as a combination of Chinese and Western styles. In addition, various exquisite cultural signage facilities and traditional decorative flooring also enhance the historical and cultural atmosphere.

There are no traditional buildings or structures around Shooting Range Street, and the various facilities in the street are single, not maintained in a timely manner, lack distinctive features, and lack recognition, resulting in a low rating of Shooting Range Street in terms of the degree of thematic and historical cultural atmosphere in the street.

The theme characteristics of Meiji Street are not strong, and the surrounding residential buildings are too standardized, resulting in a lack of characteristics. The design of signage and landscape facilities is simple and limited, and the perception of regional characteristics by pedestrians is weak. Lack of unique culture belonging to the city of Shijiazhuang, strong commercial atmosphere, and low score of historical and cultural atmosphere.

Among the emotional resonance elements, the scores of various indicators on Minsheng Road are generally above average, because Minsheng

Road is closely connected to surrounding communities, with frequent activities of residents and pedestrians. In addition to common activities such as photography, outdoor dining, and rest, there are also rich and colorful cultural activities. At the same time, the traditional buildings on Minsheng Road inject new cultural formats, making it easy for pedestrians to have a highly rated user experience.

Although Meiji Street has sufficient space and street interfaces for various activities, due to the lack of landscape sketch facilities and intelligent facilities, there is less interaction between people and the street, which cannot provide deep stimulation and feelings, resulting in a low level of self-expression.

The buildings along Shooting Range Street are old and messy, with many walls on both sides. The interaction between people and the street is low, and emotional expression and fluctuation are insufficient. The street lacks vitality and is only a space for vehicles and pedestrians to pass through.

In summary, the evaluation scores of the spatial quality of the three living streets are consistent with the objective facts of the streets, verifying the rationality of the evaluation model for the spatial quality of living streets from the perspective of sentiment.

6. Conclusion

In this interdisciplinary study, emotional design theory and the design of living street spaces were combined to analyze the layered logic of emotional design concepts in living street design. The study found that living streets are more richly imbued with emotional design concepts. The study further constructed an emotional evaluation model for living street space quality based on the combination of AHP method and SD method. This model integrated subjective and objective, qualitative and quantitative factors, and carefully considered pedestrians' emotional feelings and impressions, while also quantifying the importance of different factors in evaluation. This combined method reflects both expert evaluations of living streets and overall pedestrian evaluations, making it more scientific and reasonable. Nevertheless, this study has some limitations, as it relied on mathematical models and

questionnaires for data collection, which may be subject to subjective factors. Future studies may incorporate physiological monitoring to more accurately identify pedestrians' emotions and physiological changes in specific street contexts.

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