

Article

Evaluation of Spatial Pressure in High Density Residential Areas

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Abstract: It is important to understand how landscape elements affect the spatial oppression of people as high-density areas are increasing due to the limited space availability in cities. Therefore, we carried out a statistical analysis of the questionnaire survey result which was obtained from residents of the high-density areas in Xuzhou, China. From the literature review, we defined 9 landscape elements including the density of buildings in residential areas, duration of sunshine acceptable to residents, the skyline of sight opening, the proportion of the sky in the picture, a sense of closeness between buildings, the sense of distance between buildings, open area, area proportion of green vegetation, and types of green vegetation analysis. We analyzed the correlation and linear relationship of the elements with the spatial oppression of the respondents. The results show that there is no significant positive correlation between the proportion of the sky in the picture and space oppression, but the other 8 elements are significantly correlated with spatial oppression. Especially, the density of buildings in the residential area, the time that residents can accept sunshine, the openness of the skyline of sight, the sense of closure between buildings, the sense of distance between buildings, the open area, the area ratio of green vegetation, the types of green vegetation and spatial oppression are more significant factors to affect spatial oppression.

Keywords: Quantitative evaluation, High-density residential, Spatial stress

1. Introduction

With the continuous development of the economy and the rapid expansion of the urban environment, land supply has been limited. The economical and compact housing policy is executed with urban and rural planning, which requires rational distribution, land saving, and effective development. In September 2010, the Notice on Further Strengthening the Management and Control of Real Estate Land and Construction issued by the Ministry of Land and Urban-rural Development in China stipulates that the ratio of residential land to the rest must be greater than 1 to limit low-density and large-family residences [1]. For living space, high-density residence with high-rise buildings is one of the important means to solve the problem of the strain on limited urban living space. This means that the high-density residential area is the inevitable trend of urban development and the mainstream of China's large and medium-sized city development.

Development of the market economy and the real estate industry, housing has become an important commodity for people. The environment of the residential area is considered to be an important indicator of development. Although high-rise buildings alleviate the problems of land availability in cities, it is difficult to overcome the spatial oppression of urban residents caused by the increasing population density [2]. Nowadays, the landscape of high-density residential areas in China only satisfies sensory desires or simply pursues added values with nice designs, but fails to create a better and deeper residential landscape for people [3–5]. When designing the environment of high-density residential areas, designers need to pursue the aesthetic feeling of space, green configuration as well as a high rate of green area. Thus, they tend to ignore residents' spatial oppression and psychological needs brought by high-rise and high-density buildings [6,7].

People feel stress in an environment that is harming, threatening, or challenging. People spend about half of their life in residential buildings. In the main living environment of cities, so people living in the residential area can have a long-term and life-long psychological influence [8,9]. Studies have shown that residents' experiences of growing up or living in a stressful environment affect brain activity, which in turn affects a person's ability to cope with mental stress. [10–14] Thus, it is necessary to explore the relationship between landscape design elements and spatial pressure in high-density residential areas. The result is used for the policy-making of landscape design in high-density residential areas to alleviate the sense of spatial pressure.

2. Methods

Previous studies have proved that there is no significant difference between using photos to replace landscapes as the evaluation of the space [15,16], and using photos even has advantages of high efficiency and cost savings and the ability to compare and evaluate multiple spaces at the same time. This method has been widely used in related research [17–20].

We selected 12 representative green spaces of different types in Xuzhou City, China, and took photos. The photos were taken in November 2020. The appearance of the plants was relatively stable with no obvious seasonal changes, ensuring the comparability of photos taken at different times. In order to reduce the influence of weather conditions, sunny days with better light were selected, and the shooting time was chosen between 9:00-16:00. The equipment for the shooting was Canon 30D. 20 sample spaces were taken during the day and night to reflect the main landscape features. The shooting height was the same as that of the photographer's line of sight to simulate the viewing position and angle of people. Daytime photos were taken at the same location as night photos. After the shooting, the day and night pictures of the 20 spaces were arranged on a layout for comparison. These 20 pictures were used for follow-up research and evaluation (Fig. 1).



Fig. 1. Photos of 20 samples spaces.

The questionnaire survey was performed with randomly invited residents in the residential areas online and offline. The questionnaire adopted the Lickert 5-point scale. Respondents scored for each question according to their intuitive feelings. After the online and offline questionnaires were completed, the data obtained were sorted out, and the invalid questionnaires were discarded. The descriptive statistics were analyzed with Microsoft Excel. A total of 152 questionnaires were collected from December 15, 2021 to January 30, 2022, of which 6 were invalid. The recovery ratio was 96%. There are more females (56%) than males (44%). The majority of the respondents were 18-40 years old and had college education or more (Table 1).

Table 1. Demographic characteristics of the respondents.

		Case 1	Case 2	Case 3	Case 4
		High Density Residential Area 1	High Density Residential Area 2	High Density Residential Area 3	High Density Residential Area 4
Total		32	30	50	34
Gender	Men	38%	63%	39%	35%
	Women	62%	37%	61%	65%
Age	18 to 40 years old	88%	94%	81%	82%
	40 to 60 years old	9%	6%	12%	12%
	More than 60 years of age	3%	0%	7%	6%
Education Level	High school and below	6%	16%	10%	8%
	University	36%	53%	43%	74%
	Master's degree or above	58%	31%	47%	18%

3. Results and Discussions

3.1 Reliability and Validity of Questionnaire Survey

Reliability analysis was carried out to test the consistency, stability, and credibility of the survey. The Cronbach' Alpha coefficient was calculated with SPSS23.0. The result is shown in Table 2. The Cronbach's Alpha coefficient is 0.958 (>0.8), indicating that the questionnaire result has good stability and consistency with high reliability.

Table 2. Reliability analysis of the questionnaire.

Spatial Stress Questionnaire	Case 1 (25 items)	Case 2 (25 items)	Case 3 (25 items)	Case 4 (25 items)	The total number of items
Cronbach'Alpha	0.977	0.974	0.953	0.964	0.958

Validity analysis was performed to measure the validity and accuracy of the data obtained from the questionnaire survey and test the rationality of the questionnaire. In the analysis, content validity, scale validity, and structure validity were tested. We used Kaiser-Meyer-Olkin (KMO) value. The KMO value is 0.916 (>0.6), so the reliability was good (Table 3).

Table 3. Questionnaire validity analysis.

Spatial Stress Questionnaire	Case 1 (25 items)	Case 2 (25 items)	Case 3 (25 items)	Case 4 (25 item)	The total number of items
Kaiser-Meyer-Olkin	0.756	0.795	0.727	0.767	0.916

3.2. Spatial Stress

In order to understand how severe the spatial pressure in high-density residential areas is, it is necessary to explore the overall sense of spatial pressure through the questionnaire survey. For spatial stress, we showed 20 photos and asked the respondents to score their stress levels against the photos. The lower score represents the higher pressure. The average score was 3.5, and the lowest score was given to photo No. 18 (2.26) (Table 4).

Table 4. The statistical table of evaluation score of spatial stress scale.

Sample Number	1	2	3	4	5	6	7	8	9	10
Space Pressure Score	2.87	2.78	3.5	2.95	3.17	2.55	3.25	2.88	2.51	2.9
Sample Number	11	12	13	14	15	16	17	18	19	20
Space Pressure Score	2.79	2.56	3.23	2.64	3.17	2.64	2.61	2.26	3.02	3.49

3.3. Evaluation of Landscape Elements

Based on the literature review, the main landscape elements affecting space oppression are summarized and listed as follows. We selected 5 landscape elements for analysis and quantification. The categories are shown in Table 5, which is finalized with experts in landscape design and environmental psychology.

(1) Plot ratio

The plot ratio is also called as floor area ratio (FAR) in the United States. The plot ratio is the ratio of the are of total construction built on the plot of land. FAR is an important index to evaluate the rationality of urban land development and utilization. Under reasonable space environment conditions, the higher the plot ratio, the greater the land development intensity.

(2) Sky opening

Sky opening refers to the area of the sky scene observed between "real" structures (buildings, ground, municipal facilities, other structures) and ground plants. Sky landscape is the expression form of sky opening degree. Sky landscape is an important research object. The quality, quantity, and form of sky landscape n cities have a significant impact on citizens' mental health.

(3) Ratio of width to height of roads and buildings

The ratio of width to height of roads and buildings was first proposed by Lu (Luyuan Yixin) . It is set with the width of streets (D) and the height of building walls (h). When $D/h < 1$, the space enclosed by buildings and roads has a sense of urgency and depression. When $D/H > 2$, buildings are too alienated from each other, and the sense of oppression inside the space is not strong. When $D/H > 1$, the external space has a good sense of scale.

(4) Open space

Open space refers to the areas of the city that maintain the natural landscape, or areas where the natural landscape has been restored. It includes recreation areas, protected areas, scenic spots, or land reserved for the adjustment of urban construction. Open space is often used for ecology and landscape majors.

(5) Green visual index

Green view index (GVI) was originally proposed by environmental psychologists. It refers to the percentage of green in people's vision measuring the evaluation index of green landscape. GVI is an important index to evaluate the function of the landscape. GVI is used to quantify people's psychological feelings in the scene by simulating people's vision, reflecting the visual quality and three-dimensional composition in urban space.

Table 5. Quantitative table of landscape elements.

Landscape Elements	Options (Single Choice)				
	1	2	3	4	5
Plot ratio Density of buildings in residential area A1 Duration of sunshine acceptable to residents A2	Extremely dense Extremely short	dense short	Semi dense Shorter	Semi sparse longer	sparse long
Sky opening Sky line of sight opening B1 Proportion of the sky in the picture B2	Polar closure 0-10%	Polar closure 10-20%	Semi closed 20-30%	semi-open 30-40%	open 40-50%
Ratio of width to height of roads and buildings Closeness between buildings C1 Distance between buildings C2	Polar closure Very close	close near	Semi closed Closer	semi-open Far away	open far
Open space rate Area of open ground D1	0-10%	10-20%	20-30%	30-40%	40-50%
Green visual rate Area ratio of green vegetation E1 Types of green vegetation	0-15% 2 or less	15-35% 3-4 kinds	35-50% 5-6 kinds	50-65% 7-8 kinds	65-80% 8-9 species

The landscape element scores of 20 sample photos were summarized in Table 6, and the average value of the landscape element scores of 4 experts is calculated. The final average value of the landscape element scores is shown in table 6.

Table 6. Average score of landscape elements.

Sample Plot No.	1	2	3	4	5	6	7	8	9	10
Density of buildings in residential areas	3.25	3	4.25	3.25	4	3	4	4	3.75	4
Duration of sunshine acceptable to residents	3.75	3.75	4.25	3.25	4	1.75	4.25	3	3.75	3
Sky line of sight opening	3.75	4	4	3	4.25	2	4	4	3.5	4
Proportion of the sky in the picture	3	3.5	3.5	3.5	4.25	1.25	3.25	3	3.5	3.5
A sense of closeness between buildings	3.25	3.25	4	3.25	4.25	1.75	4	3	3.75	3
The sense of distance between buildings	3.33	3	3.5	3.15	3.25	2.25	3.75	3.15	3.5	3.75
Open area	2.75	3	3.25	2.75	s3.5	1.75	3.25	3	3	2.75
Area proportion of green vegetation	2	2.25	3.75	2.75	3.25	2.25	2.75	2.75	2	2.75
Types of green vegetation	2.75	2.25	3.25	2.25	3	2.5	2.75	2.25	2.5	2.25

Table 6. Cont.

Sample plot No	11	12	13	14	15	16	17	18	19	20
Density of buildings in residential areas	2.5	2.75	4.5	3	4.25	2.25	2.75	2.75	3.25	3.75
Duration of sunshine acceptable to residents	2.75	3.75	4.25	2.5	4	2.75	1.5	1.5	2.5	4
Sky line of sight opening	2.25	4	4.25	3	4.25	1.25	2.5	1.75	2.25	4
Proportion of the sky in the picture	2	4	4.5	3.5	3.5	2	2.5	2	1	3.75
A sense of closeness between buildings	2.75	3.5	4.25	3.25	3.25	1.75	2.55	1.75	1.75	3.75
The sense of distance between buildings	2.5	3.25	4	3.25	3.5	2.75	2.25	1.75	3.25	3.75
Open area	2.5	2.25	3.5	2.75	3.75	1.75	3	2	3	2.75
Area proportion of green vegetation	3	3	2.55	2.5	3.25	2.25	3	2.25	3.25	3.5
Types of green vegetation	2.25	1.75	3	2	2	2.25	3	1.25	2.75	3.5

3.4. Spatial Oppression and Landscape Elements

Correlation analysis is used to study the relationship between quantitative data such as relationship and closeness of the relationship. Through the correlation analysis between spatial oppression and 9 landscape elements, the relationship between them is described. The results are shown in Table 7.

Table 7. Correlation analysis between spatial oppression and landscape elements.

	Spatial Pressure	
	Perason Correlation	Significance
Density of buildings in residential areas	0.719**	0
Duration of sunshine acceptable to residents	0.709**	0
Sky line of sight opening	0.607**	0.005
Proportion of the sky in the picture	0.431	0.058
A sense of closeness between buildings	0.792**	0
The sense of distance between buildings	0.714**	0
Open area	0.662**	0.001
Area proportion of green vegetation	0.687**	0.001
Types of green vegetation	0.718**	0

Note: * indicates significant correlation at the level of 0.05 (bilateral) ** Indicates a significant correlation at the 0.01 level (bilateral)

The correlation between the nine landscape elements and the sense of spatial oppression reveals the following:

- (1) The density of buildings in the residential area, the time that residents can accept sunshine, the openness of skyline of sight, the sense of closure between buildings, the sense of distance between buildings, the open area, the area ratio of green vegetation, the type of green vegetation and the sense of spatial oppression show higher correlation coefficients than 0.60 at the significance level of 0.01. Therefore, these landscape elements are significantly related to spatial oppression.
- (2) The correlation coefficient between spatial oppression and the proportion of the sky in the picture is 0.431 at the significance level of 0.058. This indicates that there is no significant correlation between spatial oppression and the proportion of the sky in the picture.

To investigate the relation of the elements and spatial oppression, we performed a curve fitting analysis to discuss the relationship in detail. The result is shown in Table 8.

Table 8. Fitting analysis of spatial pressure curve of landscape elements.

Dependent Variable	Independent Variable	Equation	Model Summary					Parameter Estimate	
			R ²	F	df1	df2	Significant Level	Constant	b1
Spatial Pressure	Density of buildings in residential areas	linear	0.516	19.210	1	18	0	1.640	0.366
	Duration of sunshine acceptable to residents	linear	0.503	18.185	1	18	0	2.049	0.261
	Sky line of sight opening	linear	0.368	10.502	1	18	0.005	2.191	0.211
	A sense of closeness between buildings	linear	0.376	10.823	1	18	0.004	2.119	0.248
	The sense of distance between buildings	linear	0.509	18.672	1	18	0	1.592	0.412
	Area of open ground	linear	0.438	14.028	1	18	0.001	1.750	0.405
	Area proportion of green vegetation	linear	0.471	16.052	1	18	0.001	1.615	0.463
	Types of green vegetation	linear	0.516	19.156	1	18	0	1.777	0.449

The density function between the sense of spatial oppression and residential buildings is $y = 1.64 + 0.366x$.

The density function of residents' acceptable sunshine is $y = 2.049 + 0.261x$.

The density function of distance between buildings is $y = 1.592 + 0.412x$.

The density function of open area is $y = 1.75 + 0.405x$.

The density function of the area ratio of green vegetation is $y = 1.615 + 0.463x$.

The density function of the types of green vegetation is $y = 1.777 + 0.449x$.

There is a linear relationship between spatial oppression and the six elements, and the model is reliable ($p < 0.001$). Therefore, the above six landscape elements have an important impact on spatial oppression.

The density function of sky line of sight opening is $y = 2.191 + 0.211x$.

The density function of the sense of closure between buildings is $y = 2.119 + 0.248x$.

There is a linear relationship between spatial oppression and the two landscape elements, but the elements do not have a significant impact. The picture ratio of space does not have an impact on space compression, which is consistent with the correlation analysis.

Stepwise linear regression analysis is carried out to verify the relationship between the two variables. In order to further verify the reliability of the stepwise linear regression model is reliable, K-S test is carried out to judge whether the experimental data is normally distributed. The results is shown in Table 9.

Table 9. K-S test results of spatial compression.

Spatial pressure	N	Normal Parameter		Most Extreme Difference			Kolmogorov-Smirnov Z	Asymptotic significance (bilateral)
		mean value	standard deviation	absolute value	just	v		
	20	2.8885	0.33611	0.120	0.120	-0.99	0.120	0.200

The regression line presents a 45° angle from coordinates (0,0) to (1,0), and the observed value of this sample is consistent with the assumption of the normal probability distribution. Combining the K-S test and P-P diagram, the spatial compression data model is consistent with the normal distribution at $p = 0.200 (> 0.05)$. Thus, the spatial compression data and residual are normally distributed, which means that the constructed data model has high reliability.

For 20 different spaces, the evaluation of spatial oppression in high-density residential areas based on the above nine aspects is carried out [19–22]. Photo no. 18 was the most oppressive to the respondents. The main reason is that the landscape inside the residential area is not provided well, and the monotonous road shows a sharp contrast with the surrounding high-density buildings. There is no visual obstruction but it is easy for residents to have a sense of space pressure. Not enough green area, tall buildings to produce huge shadows, and narrow sky openings seem to cause spatial oppression.

Photo no. 3 has the least sense of spatial oppression. The building density is low and the distance between buildings is appropriate, leading to a long sunshine time. The most critical factor is the variety of plants around the building and its many layers,

which mitigates the stiffness brought by the building to a large extent and softens the edge of the building. Studies have found that different types of urban green landscapes help people relieve stress. Compared to urban settings with a complete absence of trees, one with a moderate canopy cover (approximately 30%) enables people to obtain about three times more stress relief. Compared with urban landscapes that lack vegetation and are dominated by hard spaces, green vegetation encourages people to go closer to nature and have a sense of dependence on the place [21]. With more green vegetation, children or adults are more prone to active physical exercise, which effectively enhances the sense of space pressure. In addition, a significant positive correlation is found between the longevity of urban elderly residents and the amount of green landscape in their neighborhoods. It has been proved that green plants play a significant role in the physical and mental health of residents and increase the sense of space dependence of residents in the high-density residential space to eliminate the sense of pressure in the space [22].

4. Conclusions

To find the relation between spatial oppression and landscape elements, we carried out a questionnaire survey and statistical analysis of the result of the survey. According to the literature review and experts' opinions, we defined 9 landscape elements in this study such as density of buildings in residential areas, duration of sunshine acceptable to residents, the skyline of sight opening, the proportion of the sky in the picture, a sense of closeness between buildings, the sense of distance between buildings, open area, area proportion of green vegetation, and types of green vegetation. The questionnaire survey results were tested for reliability and credibility. The results show that there is no significant positive correlation between the proportion of the sky in the picture and space oppression, and it can not be used as an important element in alleviating the sense of space oppression. There is a significant positive correlation between the density of buildings in the residential area, the time that residents can accept sunshine, the openness of the skyline of sight, the sense of closure between buildings, the sense of distance between buildings, the open area, the area ratio of green vegetation, the types of green vegetation and spatial oppression. Residential building density, residents' acceptable sunshine, the sense of distance between buildings, open area, the area ratio of green vegetation, the types of green vegetation, and spatial compression have a linear functional relationship, and the model is reliable ($p < 0.001$). Therefore, the six landscape elements have an important impact on the sense of spatial compression, which can further reduce the sense of spatial compression.

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Appendix

Look at the photos carefully and imagine yourself in the scene shown in the photos. Please answer the following five questions according to your direct experience and draw \checkmark in the corresponding options.

Residential area 1

Picture 1:

- 1、 Do you think this scene is depressing?
A. Very depressed B, depressed C, general D, relaxed e, very relaxed
2. What is your mood when you see this scene?
A. Very depressed B, depressed C, average D, in a good mood e, in a good mood
- 3、 What is your psychological reaction to this scene?
A. Very nervous B, quite nervous C, average D, relaxed e, very relaxed
- 4、 Are you interested in this scenario?
A. Not interested at all B, slightly interested C, somewhat interested D, quite interested e, very interested
- 5、 Do you like to visit in this scene?
A. Don't like B at all, don't like C, average D, like e, very much

Picture 2:

- 6、 Do you think this scene is depressing?
A. Very depressed B, depressed C, general D, relaxed e, very relaxed
- 7、 What is your mood when you see this scene?
A. Very depressed B, depressed C, average D, in a good mood e, in a good mood
- 8、 What is your psychological reaction to this scene?
A. Very nervous B, quite nervous C, average D, relaxed e, very relaxed
- 9、 Are you interested in this scenario?
A. Not interested at all B, slightly interested C, somewhat interested D, quite interested e, very interested
- 10、 Do you like to visit in this scene?
A. Don't like B at all, don't like C, average D, like e, very much

Picture 3:

11、 Do you think this scene is depressing?

A. Very depressed B, depressed C, general D, relaxed e, very relaxed

12. What is your mood when you see this scene?

A. Very depressed B, depressed C, average D, in a good mood e, in a good mood

13、 What is your psychological reaction to this scene?

A. Very nervous B, quite nervous C, average D, relaxed e, very relaxed

14、 Are you interested in this scenario?

A. Not interested at all B, slightly interested C, somewhat interested D, quite interested e, very interested

15、 Do you like to visit in this scene?

A. Don't like B at all, don't like C, average D, like e, very much

Picture 4:

16、 Do you think this scene is depressing?

A. Very depressed B, depressed C, general D, relaxed e, very relaxed

17、 What is your mood when you see this scene?

A. Very depressed B, depressed C, average D, in a good mood e, in a good mood

18、 What is your psychological reaction to this scene?

A. Very nervous B, quite nervous C, average D, relaxed e, very relaxed

19、 Are you interested in this scenario?

A. Not interested at all B, slightly interested C, somewhat interested D, quite interested e, very interested

20、 Do you like to visit in this scene?

A. Don't like B at all, don't like C, average D, like e, very much

Picture 5:

21、 Do you think this scene is depressing?

A. Very depressed B, depressed C, general D, relaxed e, very relaxed

22、 What is your mood when you see this scene?

A. Very depressed B, depressed C, average D, in a good mood e, in a good mood

23、 What is your psychological reaction to this scene?

A. Very nervous B, quite nervous C, average D, relaxed e, very relaxed

24、 Are you interested in this scenario?

A. Not interested at all B, slightly interested C, somewhat interested D, quite interested e, very interested

25、 Do you like to visit in this scene?

A. Don't like B at all, don't like C, average D, like e, very much

Residential area 2

Picture 6:

1、 Do you think this scene is depressing?

A. Very depressed B, depressed C, general D, relaxed e, very relaxed

2. What is your mood when you see this scene?

A. Very depressed B, depressed C, average D, in a good mood e, in a good mood

3、 What is your psychological reaction to this scene?

A. Very nervous B, quite nervous C, average D, relaxed e, very relaxed

4、 Are you interested in this scenario?

A. Not interested at all B, slightly interested C, somewhat interested D, quite interested e, very interested

5、 Do you like to visit in this scene?

A. Don't like B at all, don't like C, average D, like e, very much

Picture 7:

6、 Do you think this scene is depressing?

A. Very depressed B, depressed C, general D, relaxed e, very relaxed

7、 What is your mood when you see this scene?

A. Very depressed B, depressed C, average D, in a good mood e, in a good mood

8、 What is your psychological reaction to this scene?

A. Very nervous B, quite nervous C, average D, relaxed e, very relaxed

9、 Are you interested in this scenario?

A. Not interested at all B, slightly interested C, somewhat interested D, quite interested e, very interested

10、 Do you like to visit in this scene?

A. Don't like B at all, don't like C, average D, like e, very much

Picture 8:

11、 Do you think this scene is depressing?

A. Very depressed B, depressed C, general D, relaxed e, very relaxed

12. What is your mood when you see this scene?

A. Very depressed B, depressed C, average D, in a good mood e, in a good mood

13、 What is your psychological reaction to this scene?

A. Very nervous B, quite nervous C, average D, relaxed e, very relaxed

14、 Are you interested in this scenario?

A. Not interested at all B, slightly interested C, somewhat interested D, quite interested e, very interested

15、 Do you like to visit in this scene?

A. Don't like B at all, don't like C, average D, like e, very much

Picture 9:

16、 Do you think this scene is depressing?

A. Very depressed B, depressed C, general D, relaxed e, very relaxed

17、 What is your mood when you see this scene?

A. Very depressed B, depressed C, average D, in a good mood e, in a good mood

18、 What is your psychological reaction to this scene?

A. Very nervous B, quite nervous C, average D, relaxed e, very relaxed

19、 Are you interested in this scenario?

A. Not interested at all B, slightly interested C, somewhat interested D, quite interested e, very interested

20、 Do you like to visit in this scene?

A. Don't like B at all, don't like C, average D, like e, very much

Picture 10:

21、 Do you think this scene is depressing?

A. Very depressed B, depressed C, general D, relaxed e, very relaxed

22、 What is your mood when you see this scene?

A. Very depressed B, depressed C, average D, in a good mood e, in a good mood

23、 What is your psychological reaction to this scene?

A. Very nervous B, quite nervous C, average D, relaxed e, very relaxed

24、 Are you interested in this scenario?

A. Not interested at all B, slightly interested C, somewhat interested D, quite interested e, very interested

25、 Do you like to visit in this scene?

A. Don't like B at all, don't like C, average D, like e, very much

Residential area 3

Picture 11:

1、 Do you think this scene is depressing?

A. Very depressed B, depressed C, general D, relaxed e, very relaxed

2. What is your mood when you see this scene?

A. Very depressed B, depressed C, average D, in a good mood e, in a good mood

3、 What is your psychological reaction to this scene?

A. Very nervous B, quite nervous C, average D, relaxed e, very relaxed

4、 Are you interested in this scenario?

A. Not interested at all B, slightly interested C, somewhat interested D, quite interested e, very interested

5、 Do you like to visit in this scene?

A. Don't like B at all, don't like C, average D, like e, very much

Picture 12:

6、 Do you think this scene is depressing?

A. Very depressed B, depressed C, general D, relaxed e, very relaxed

7、 What is your mood when you see this scene?

A. Very depressed B, depressed C, average D, in a good mood e, in a good mood

8、 What is your psychological reaction to this scene?

A. Very nervous B, quite nervous C, average D, relaxed e, very relaxed

9、 Are you interested in this scenario?

A. Not interested at all B, slightly interested C, somewhat interested D, quite interested e, very interested

10、 Do you like to visit in this scene?

A. Don't like B at all, don't like C, average D, like e, very much

Picture 13:

11、 Do you think this scene is depressing?

A. Very depressed B, depressed C, general D, relaxed e, very relaxed

12. What is your mood when you see this scene?

A. Very depressed B, depressed C, average D, in a good mood e, in a good mood

13、 What is your psychological reaction to this scene?

A. Very nervous B, quite nervous C, average D, relaxed e, very relaxed

14、 Are you interested in this scenario?

A. Not interested at all B, slightly interested C, somewhat interested D, quite interested e, very interested

15、 Do you like to visit in this scene?

A. Don't like B at all, don't like C, average D, like e, very much

Picture 14:

16、 Do you think this scene is depressing?

A. Very depressed B, depressed C, general D, relaxed e, very relaxed

17、 What is your mood when you see this scene?

A. Very depressed B, depressed C, average D, in a good mood e, in a good mood

18、 What is your psychological reaction to this scene?

A. Very nervous B, quite nervous C, average D, relaxed e, very relaxed

19、 Are you interested in this scenario?

A. Not interested at all B, slightly interested C, somewhat interested D, quite interested e, very interested

20、 Do you like to visit in this scene?

A. Don't like B at all, don't like C, average D, like e, very much

Picture 15:

21、 Do you think this scene is depressing?

A. Very depressed B, depressed C, general D, relaxed e, very relaxed

22、 What is your mood when you see this scene?

A. Very depressed B, depressed C, average D, in a good mood e, in a good mood

23、 What is your psychological reaction to this scene?

A. Very nervous B, quite nervous C, average D, relaxed e, very relaxed

24、 Are you interested in this scenario?

A. Not interested at all B, slightly interested C, somewhat interested D, quite interested e, very interested

25、 Do you like to visit in this scene?

A. Don't like B at all, don't like C, average D, like e, very much

Residential area 4

Picture 16:

1、 Do you think this scene is depressing?

A. Very depressed B, depressed C, general D, relaxed e, very relaxed

2. What is your mood when you see this scene?

A. Very depressed B, depressed C, average D, in a good mood e, in a good mood

3、 What is your psychological reaction to this scene?

A. Very nervous B, quite nervous C, average D, relaxed e, very relaxed

4、 Are you interested in this scenario?

A. Not interested at all B, slightly interested C, somewhat interested D, quite interested e, very interested

5、 Do you like to visit in this scene?

A. Don't like B at all, don't like C, average D, like e, very much

Picture 17:

6、 Do you think this scene is depressing?

A. Very depressed B, depressed C, general D, relaxed e, very relaxed

7、 What is your mood when you see this scene?

A. Very depressed B, depressed C, average D, in a good mood e, in a good mood

8、 What is your psychological reaction to this scene?

A. Very nervous B, quite nervous C, average D, relaxed e, very relaxed

9、 Are you interested in this scenario?

A. Not interested at all B, slightly interested C, somewhat interested D, quite interested e, very interested

10、 Do you like to visit in this scene?

A. Don't like B at all, don't like C, average D, like e, very much

Picture 18:

11、 Do you think this scene is depressing?

A. Very depressed B, depressed C, general D, relaxed e, very relaxed

12. What is your mood when you see this scene?

A. Very depressed B, depressed C, average D, in a good mood e, in a good mood

13、 What is your psychological reaction to this scene?

A. Very nervous B, quite nervous C, average D, relaxed e, very relaxed

14、 Are you interested in this scenario?

A. Not interested at all B, slightly interested C, somewhat interested D, quite interested e, very interested

15、 Do you like to visit in this scene?

A. Don't like B at all, don't like C, average D, like e, very much

Picture 19:

16、 Do you think this scene is depressing?

A. Very depressed B, depressed C, general D, relaxed e, very relaxed

17、 What is your mood when you see this scene?

A. Very depressed B, depressed C, average D, in a good mood e, in a good mood

18、 What is your psychological reaction to this scene?

A. Very nervous B, quite nervous C, average D, relaxed e, very relaxed

19、 Are you interested in this scenario?

A. Not interested at all B, slightly interested C, somewhat interested D, quite interested e, very interested

20、 Do you like to visit in this scene?

A. Don't like B at all, don't like C, average D, like e, very much

Picture 20:

21、 Do you think this scene is depressing?

A. Very depressed B, depressed C, general D, relaxed e, very relaxed

22、 What is your mood when you see this scene?

A. Very depressed B, depressed C, average D, in a good mood e, in a good mood

23、 What is your psychological reaction to this scene?

A. Very nervous B, quite nervous C, average D, relaxed e, very relaxed

24、 Are you interested in this scenario?

A. Not interested at all B, slightly interested C, somewhat interested D, quite interested e, very interested

25、 Do you like to visit in this scene?

A. Don't like B at all, don't like C, average D, like e, very much