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Female Sense of Security in Public Spaces: The Case of Shanghai

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Abstract. This study, based on the background of China's urbanization process, focuses on the issue of women's safety perception in public Spaces. Taking Shanghai as the research case, through the combination of questionnaire survey and qualitative analysis, this paper systematically explores the sense of security experienced by women in different types of public Spaces including streets, parks and public transportation stops. The research analyzes the key elements that influence women's perception of safety from two dimensions: environmental factors and personal factors. This research also uses theories from multiple disciplines such as feminist geography and environmental psychology to deeply interpret the construction relationship between gender and spatial power. Through this research the aim is to make up for the current situation of insufficient research in related fields in China, and hope to give some advice.

Keywords: female safety perception, urban public spaces, Shanghai, environmental factors, openness of vision

1. Introduction

Urbanization in China has profoundly reshaped the way of living for urban citizens, especially this progress helps to build better public spaces like parks, public transport stations, shopping malls and so on. However, though citizens live have been improved both conveniently and technologically, it is worth noting that among these changes, women's perception of safety in public spaces has emerged as a pressing concern, as it directly affects their mobility, quality of life, and equality in the city. Different factors in different public spaces such as the openness of vision, crowd density and illumination intensity exist in streets, parks, and transportation stations may all influence women's perception of safety. And due to the insufficient research in related fields in China, the problem of the ignorance of woman's sense of security has still remained neglected in Chinese's daily life, which makes this topic a worth discussing topic. In this case, our group decide to study on women's perception of safety in public space in order to not only make up for the current situation of insufficient research in related field in China but also try to call on more people's attention on such topic, reduce some ignorance.

Previous studies in feminist geography and environmental psychology have demonstrated that women's sense of security is shaped by a complex interaction between environmental characteristics

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—such as lighting, surveillance, and crowd density—and individual factors, including prior experiences and risk perception [1].

To address this gap, this study investigates how environmental factors including lighting, crowd density, and the degree of openness of vision affect women's sense of security in Shanghai's public spaces. By combining different questionnaire surveys with quantitative and qualitative analysis, this research aims to reveal the formation mechanisms of safety perception and contribute to broader discussions on social equity and inclusive urban governance.

2. Methodology

2.1. Research question

To what extent do environmental factors influence women's perceived sense of security in urban public spaces?

2.2. Research design

This study adopts quantitative questionnaire survey designs to measure women's subjective sense of security in different public Spaces. Shanghai was chosen as the place where the questionnaire survey was conducted, since it is the representative of Chinese urbanized cities.

The questionnaire was sent online and was sent by a person which we contact through social media platform who have access to contact Shanghai people. This way is the replacement of conducting off-line interview by ourselves since none of us was in Shanghai. The Participants were female residents, recruited through online distribution. A total of 55 valid responses were collected. The sample covered women of diverse age groups but mostly young people; these people are the main group who use the public space and can give the most representative feedback.

To control for situational bias, all survey questions were framed under the same conditions, and being alone in order to erase the influence of time and company.

2.3. Questionnaire design

2.3.1. Questionnaire 1: the relationship between women's sense of secrity and the lighting

First, as the research shows, it could be easily known that lighting is not only about brightness, but also about uniformity, glare control, visibility, and light distribution [2].

Second, it could be easily observed that lighting interacts with several factors. Social factors such as the presence of people, police, or companions, as well as past negative experiences, gender roles, and risk perception, all interact with lighting [3].

Third, through research, our group found that "sense of safety" is also reflected in behaviors, like whether women choose to stay, use the space, or avoid it by changing their route or walking with others [4].

In conclusion, these studies show that there's still a gap in research about how lighting features specifically affect women's safety, and how different lighting factors can be measured. That's why this topic is worth investigating.

By analyzing and comparing different research papers, our group found that women's sense of security can be influenced by certain factors of lighting. So this hypothesis has been made: Women's sense of safety in public spaces is positively correlated with adequate lighting levels, uniform illumination, absence of dark spots, and absence of flickering lights.

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2.3.2. Questionnaire 2: the relationship between women's sense of security and crowd density

Jane Jacobs' The Death and Life of Great American Cities: Introduced the concept of "eyes on the street." She argued that a vibrant, mixed-use street with continuous foot traffic (residents and visitors) fosters natural surveillance, enhancing safety. This implies that moderate and sustained pedestrian density is key to security.

Recent studies have further refined the complex relationship between pedestrian density and women's sense of safety, revealing a non-linear relationship.

So the hypothesis proposed for this research is that women's sense of security in public spaces is positively correlated with crowd density.

Then listed questions about crowd density in different directions, collected the questionnaire data, analyzed it, and made line charts and bar charts. The sample size was 52.

2.3.3. Questionnaire 3: the relationship between women's sense of security of degree of openness of vision

Foreign studies have long focused on the gender specificity of women's sense of security and have accumulated substantial empirical findings [5]. The following analysis combines insights from three key studies:

Study 1 (Delhi research): Through safety audits, a survey of 500 women, and group discussions, this study systematically analyzed the impact of infrastructure (e.g., lighting, sidewalk conditions) and sociocultural factors (e.g., gender access to public spaces) on women's safety. Its findings are comparable to those in Shanghai: for instance, inadequate lighting and low foot traffic often provoke fear among women, while the presence of street vendors actually enhances their sense of security. The study provides methodological insights for Shanghai, such as the use of safety audit tools.

Study 2 (Turkish research): An online survey (n=252) quantified women's fear of crime and their behavioral responses. Results showed that 72.7% of women felt unsafe in public spaces, with fear peaking in isolated streets and dark subway stations. Women commonly adopted avoidance strategies (e.g., avoiding nighttime outings, changing attire). The study highlights the universality of "fear gender gaps," highly relevant to similar issues Shanghai might face.

Study 3 (London experiment): Using a randomized controlled trial (RCT) with image stimuli, this study tested the causal impact of three design interventions (public toilets, removal of solid walls, graffiti removal) on perceived safety. It found that removing solid walls significantly improved women's sense of security ($p<0.001$), while the effect of public toilets was insignificant. The study offers empirical support for urban design in Shanghai, particularly its RCT method, which can serve as a low-cost pre-assessment tool.

All three studies are culturally bounded (India, Turkey, UK), necessitating local validation of their conclusions in Shanghai.

Studies 2 and 3 have a sample bias towards younger, highly educated women, potentially overlooking vulnerable groups (e.g., low-income, elderly women, suggesting the need for diverse sampling in Shanghai research.

Domestic studies on women's safety in public spaces are still in their infancy, mostly qualitative or media-based, with limited systematic quantitative research. Existing studies often focus on cities like Beijing and Guangzhou, with insufficient targeted research on Shanghai. A few studies note that safety issues in Shanghai's subway and night parks are frequently reported but lack empirical data from a female perspective. Domestic planning practices often prioritize "objective safety" (e.g., surveillance cameras) while neglecting gendered perceptions of security.

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So the hypothesis proposed for this research is that women's sense of safety in public spaces is positively correlated with the degree of openness of vision.

3. Result & discussion

3.1. Questionnaire 1: the relationship between women's sense of security and the lighting

The options for the questions are divided into five levels, including Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree. And the four main questions in this questionnaire are:

1. prefer to stay in well-lit public spaces at night.
2. I stay in public spaces where the lighting is consistent and there are no significant differences between light and dark areas.
3. I avoid staying near lighting blind spots.
4. I walk quickly past flickering lights.

To analyze the data, we label the data from strongly disagree to strongly agree as 1 to 5. Figure 1 shows what the data is like.

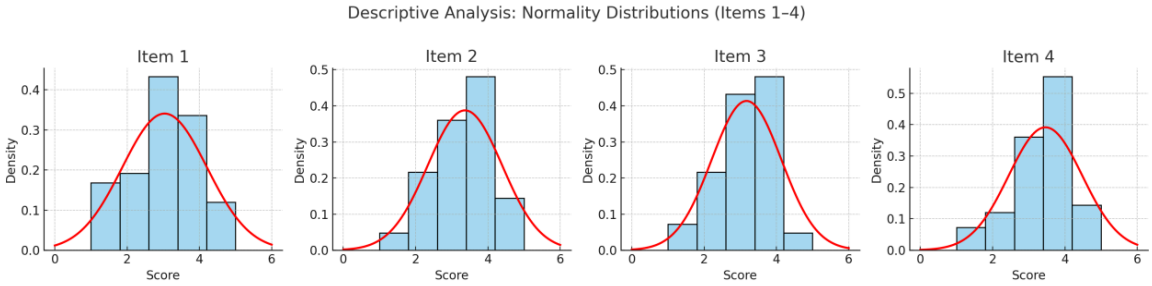

Figure 1. Distribution of responses to the four lighting-related questions

Then, by doing further analysis, it could be easily found that the mean value for those four question answers all fell within the 3-4 range, indicating that respondents generally tended to agree with these statements.

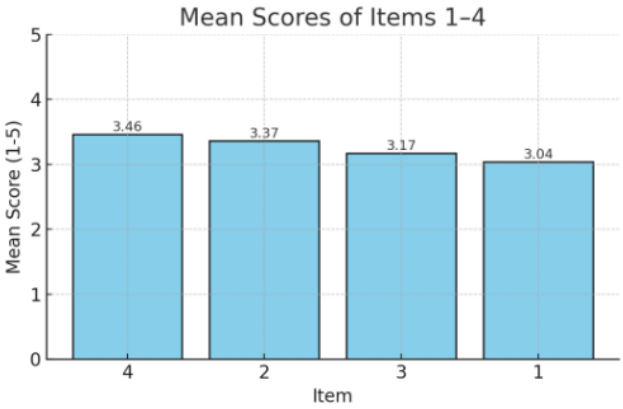

Figure 2. Mean scores of women's perceived safety under different lighting conditions

And among all the data collected, Light uniformity scored the highest, potentially becoming the most core factor for women's sense of security.

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So, it can be concluded that Women's sense of safety in public spaces is positively correlated with adequate lighting levels, uniform illumination, absence of dark spots, and absence of flickering lights, and the uniform illumination will have the biggest impact on women's sense of safety.

3.2. Questionnaire 2: the relationship between women's sense of security and crowd density

Then descriptive statistics were conducted on the a/b/c/d options of the questions, calculating the percentage of choices for "safe" and "very safe" for each option and connecting them to visually present the trend.

As the main question in the questionnaire is which of the following people do you feel most safe? The questionnaire provides several situations that women would commonly face in their daily lives:

1. Please imagine that you are waiting for a bus at a subway platform at night.
2. Please imagine you walking alone on the trail of a large park.
3. Please imagine that you need to go through an underground passage about 50 meters long alone at night.

And a final question:

4. In general, what do you think is the state of the crowd that makes you feel at ease in a public space?

And the diagrams listed below show the data collected(list as the order of questions in the paper):

Figure 3. Perceived safety at a subway platform under different crowd densities

(Green: There are a few sparse people on the platform (about 10-15 people), keep a distance from each other, can clearly see the overall environment on the platform. Blue: people flow is moderate (about 30-50 people), slightly noisy but unimpeded. Orange: platform is very crowded (people stick), and even difficult to move Yellow: There are hardly no one on the platform.)

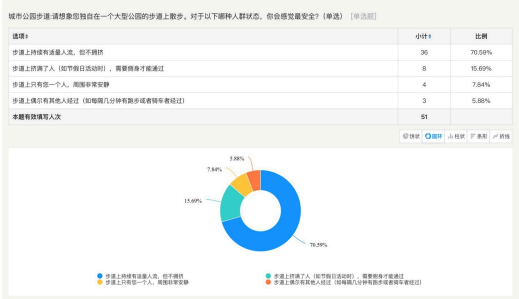

Figure 4. Perceived safety on a park trail under different crowd densities

(Blue: There are always moderate crowds on the trail, but not crowded. Green: The trail is crowded with people (such as holidays). Orange: People pass occasionally (such as runners or

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cyclists every few minutes). Yellow: You are the only person on the trail and the surroundings are very quiet)

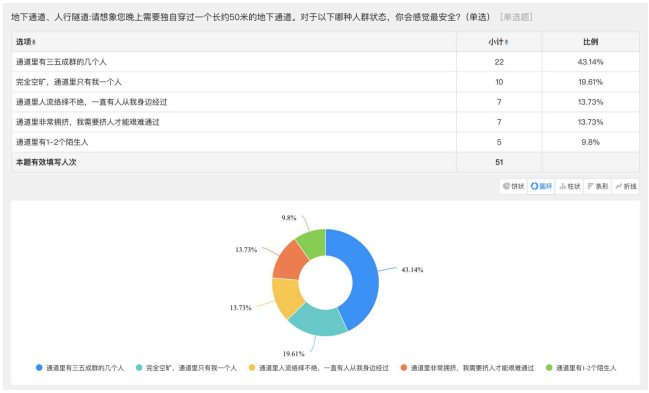

Figure 5. Perceived safety in an underground passage under different crowd densities

(Green: Completely empty, I was the only one in the passage with 1-2 strangers in the passage. Orange: The channel is very crowded, I need to squeeze people to get through. Blue: The channel there are several people in groups. Yellow: The passage in an endless stream of people, someone has been passing past me)

By having participants evaluate the sense of security under different levels of crowding in the same scenario, a curve of "crowd density-sense of security" can be directly plotted to verify the hypothesis is wrong and there is an "inverted U-shaped" relationship.

3.3. Questionnaire 3: the relationship between women's sense of security of degree of openness of vision

As the main question in the questionnaire is which kind of situation will you feel most safe? The questions in the questionnaire mainly provide participants with three options: have high openness of Vision, low openness of Vision and remain not sure. The questionnaire also provides several situations which women would commonly face in their daily lives:

1. When picking an outdoor public sports facility.
2. When along in a large library or shopping mall.
3. When in a large multi-story bus terminal or subway station.
4. When sitting in a park to rest.

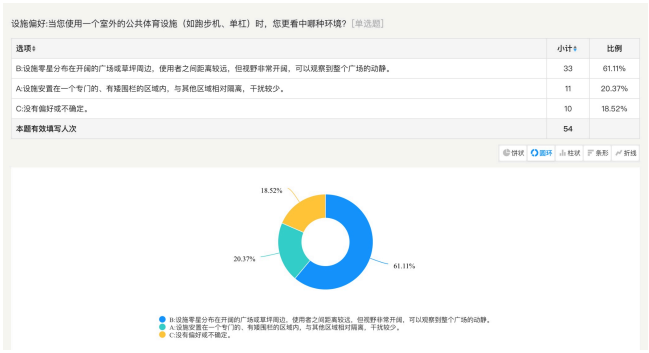

Figure 6. Preference for openness of vision when choosing outdoor sports facilities

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(Blue: The facilities are scattered around open squares or lawns. Users are at a considerable distance from each other, but the view is very wide, allowing them to observe the movements of the entire square.Green: The facilities are placed in a dedicated area with low fences, relatively isolated from other areas and less disturbed.Yellow: No preference or uncertainty.)

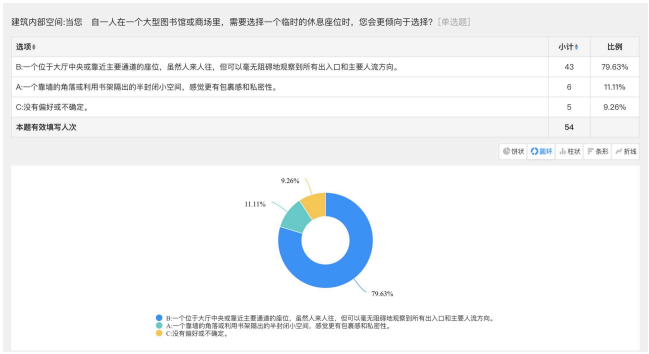

Figure 7. Preference for openness of vision in a library or shopping mall

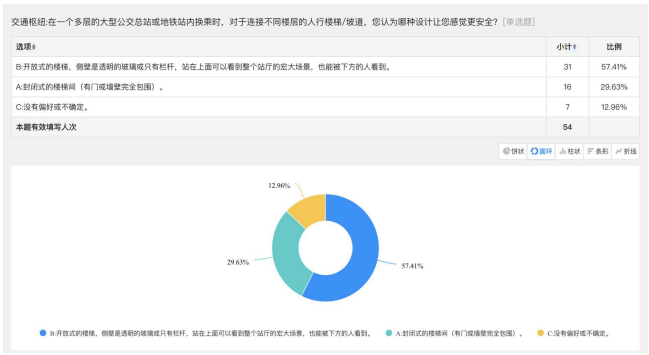

Figure 8. Preference for openness of vision in a multi-story bus terminal or subway station

(Blue: The open staircase has either transparent glass or only railings on its side walls. Standing on it, one can enjoy the grand view of the entire station hall, which can also be seen by those below.Green: Enclosed stairwell (completely surrounded by doors or walls)Yellow: No preference or uncertainty.)

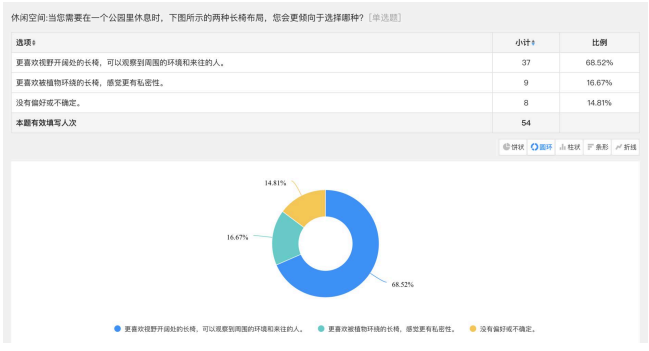

Figure 9. Preference for openness of vision when resting in a park

(Blue: I prefer benches with a wide view, where I can observe the surrounding environment and the people coming and going. Green: I prefer benches surrounded by plants. They feel more private. Yellow: No preference or uncertainty.)

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In all analyze diagrams, Green represents the low openness of vision, blue represents high openness of vision and yellow represents not sure.

Frequency analysis for each question to directly examine whether the proportion of "open option" selections is significantly higher than that of "closed options."

Sum the number of times "open option" is chosen across all questions to obtain a "total score of openness preference. Cross-analyze this score with basic information from the first part (such as age, city type) using methods like T-tests or ANOVA shows that there are significant differences in preferences among different groups.

Factor analysis can be conducted to verify that these questions are indeed show that women's sense of safety in public spaces is positively correlated with the degree of openness of vision.

In conclusion, women's sense of safety in public spaces is positively correlated with the degree of openness of vision.

4. Conclusion

This study examined the impact of environmental factors on women's sense of security in Shanghai's public spaces. Results indicate that adequate lighting and open sightlines will strongly enhance safety perceptions, while crowd density demonstrates an inverted U-shaped effect—moderate density increases safety, whereas both sparsely populated and overcrowded environments reduce it.

These findings highlight the importance of some special gender-sensitive urban design. For example, streets and stations should make restrictions on visitor density and obstacles that may block the street lights or people's vision should be cleared.

In conclusion, the study contributes to the under-researched field of women's safety perception in China by integrating multiple environmental variables. As a result, out study point out come some key factors in women's perception of safety which leads to the thinking of potential problems that may exist in urban design.

5. Evaluation of limitations

Table 1. Limitations of the study and suggestions for improvement

Limitation	Influence on the study	How to improve
Sample size and representative ness	The survey was limited to 55 respondents, mostly young women, which may not fully represent the diversity of Shanghai's female population.	If further research, a wider range of data should be collected.
Geographical limitations	Data were collected remotely and may not capture local nuances of Shanghai's neighborhoods.	When doing further research, the researcher should try to focus on more cities and try to reduce the existence of uncertainty.

The limitations of this study mainly concern the sample representativeness and the geographical coverage. As shown in Table 1, the sample size was relatively small and mainly consisted of young women. This may limit the generalizability of the findings, compared to collecting data among a wider range of the female population. In addition, since the data were collected remotely, the study may not fully capture the differences among various neighborhoods and public spaces within the city. Therefore, future research directions should be focus on more field-based investigations in different urban areas.

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