



# **A PRELIMINARY STUDY ON THE ATTRACTIVENESS ATTRIBUTES OF SOUNDSCAPE AND SMELLSCAPE IN COMMUNITY PUBLIC SPACES BASED ON THE VISUALLY IMPAIRED**

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People with visual impairment have unique cognitive and use requirements for urban spaces, audition and olfaction are important media for them to perceive the surrounding environments. Therefore, understanding the auditory and olfactory attributes of the urban soundscape and smellscape that attract them can help to promote their cognition, and encourage them to go out of their homes and better integrate into society. In this study, the Evaluation Grid Method (EGM) was used to conduct a semi-structured in-depth interview with 20 visually impaired people. The interview mainly involved three aspects: the attractiveness attributes of soundscape, the attractiveness attributes of smellscape, and the attractiveness attributes of the matching of soundscape and smellscape. Through merging and sorting out the interview results, 18 soundscape attractiveness attributes (*quite, informative, euphonious, directional, eventful*, etc), 12 smellscape attractiveness attributes (*natural, fresh, regional, appetizing, familiar*, etc), and 16 groups of soundscape and smellscape matching attractiveness attributes (*euphonious+natural, natural+natural, regional+regional, eventful+eventful, social+appetizing*, etc) were extracted. The research results will help to improve the inclusiveness of urban spatial layout and infrastructure.

Keywords: soundscape, smellscape, the visually impaired, attractiveness attributes, community public spaces

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## **1. Introduction**

The population of visually impaired people is large, however, due to the lack of consideration of their needs in current urban and architectural space design, the range of activities of the visually impaired is usually small, and community public spaces often become the main venue for carrying activities and social interaction among them.

Audition and olfaction are important media for the visually impaired to perceive the ambient (taste and touch belong to active perception and depend more on subjective will) [1]. There are few studies on the perception of soundscape or smellscape of people with visual impairment [2,3]. In addition, the current spatial environment design for the visually impaired often separates the soundscape and the

smellscape, and lacks to explore the optimal matching of soundscape and smellscape factors in the spatial environment that attracts the visually impaired.

The attractiveness attribute comes from the field of miryoku engineering, which aims to study the technology and knowledge of creating attractive products or spaces [4]. In the study of attractiveness attributes, in-depth interview is usually used to obtain people's feelings of attractiveness and preference for various things [5]. Its research can help designers understand user preferences more accurately and help products or spaces increase their attractiveness.

In summary, this study used the evaluation grid method in the attractiveness attribute study to explore the attractiveness of soundscape, smellscape and the matching of soundscape and smellscape in the community public spaces to attract the visually impaired people, with the aim of promoting spatial cognition of visually impaired and encouraging them to go out of their homes, thereby enhancing the inclusiveness of urban spaces.

## **2. Method**

### **2.1 Evaluation Grid Method**

Evaluation grid method (EGM) is an important method to study attractiveness attributes, and to capture personal cognitive concepts in miryoku engineering. Through interviews with highly involved people, it is used to explore the attractiveness of research objects when designing new products or spaces, and then summarize the evaluation structure, so as to concretize vague concepts [4]. The specific interview process is as follows: first, the original evaluation item (median) is obtained through the question, that is, what kind of research object is attractive; then, the specific conditions and characteristics (lower) are asked, that is, what are the specific details of the research object with the attractiveness; finally, the abstract value judgment (upper) is asked, that is, what kind of feelings does the research object with the attractiveness bring [6].

### **2.2 Participants**

A total of 20 visually impaired participants were recruited in this study, including 15 completely blind and 5 amblyopic. There were 12 males and 8 females with an average age of 33 (Min = 18; Max = 60).

### **2.3 Interview procedure**

The interview involved the attractiveness attribute of soundscape, the attractiveness attribute of smellscape, and the attractiveness attribute of the matching of soundscape and smellscape. Before the interview, the researcher explained the meanings of soundscape and smellscape to the participants, and then asked the following specific questions in turn:

(1) Original evaluation item (median position): what do you think is the soundscape (smellscape/ the matching of soundscape and smellscape) of the community public space that is good, attracts you, and makes you willing to go out of your home to do some activities or stay in it?

(2) Specific conditions and characteristics (lower position): what are the specific characteristics or details in such a soundscape (smellscape/ the matching of soundscape and smellscape)?

(3) Abstract value judgment (higher position): how does this soundscape (smellscape/ the matching of soundscape and smellscape) make you feel?

Finally, the interview results were sorted out, and the evaluation structure of soundscape, smellscape, the matching of soundscape and smellscape of the community public space were summarized.

### 3. Results

#### 3.1 Soundscape attractiveness attributes

The results showed that a total of 18 soundscape attractiveness attributes have been extracted (original evaluation item) (Table 1). The attractiveness attributes of the soundscapes corresponded to 10 positive feelings (abstract value judgment) and 21 specific soundscape elements (specific conditions and characteristics). Among them, the attractiveness attribute of *quiet* brought the most positive feelings, including “comfort”, “guidance”, “pleasantness”, “convenience”, “relaxation” and “safety”. The number of positive feelings brought by *informative*, *social* and *natural* was the second.

Table 1: Evaluation structure of soundscape

	abstract value judgment	original evaluation item	specific conditions and characteristics
1	comfort, guidance, pleasantness, convenience, relaxation, safety	quite	low volume, less traffic noise
2	guidance, safety, convenience	informative	sound of peddling, voice introduction of places or facilities, voice prompt of location, advertisement sound
3	pleasantness, relaxation	euphonious	advertisement sound, music
4	guidance, convenience	directional	advertisement sound, music
5	pleasantness, guidance, equality	social	sound of relatives and friends, conversation sound
6	comfort, relaxation, pleasantness, safety	natural	birdsong, water sound, frog sound, cat sound
7	pleasantness, excitement	rhythmic	square dance sound
8	pleasantness, curiosity	lively	square dance sound, conversation sound
9	safety	anthropogenic	conversation sound, footsteps, exercise sound, children sound
10	pleasantness, curiosity	regional	regional instrument sound, sound of peddling
11	comfort	harmonious	conversation sound
12	curiosity	semantically appealing	conversation sound, quarrel sound
13	curiosity	interesting	conversation sound, quarrel sound
14	curiosity	unusual	sound of cultural and recreational activities
15	curiosity	eventful	sound of cultural and recreational activities
16	vitality	sportive	exercise sound
17	comfort, relaxation	soothing	instrument sound
18	vitality, pleasantness	playful	children sound

### 3.2 Smellscape attractiveness attributes

The results showed that a total of 12 smellscape attractiveness attributes have been extracted (Table 2). The attractiveness attributes of the smellscapes corresponded to 10 positive feelings and 20 specific smellscape elements. Among them, the attractiveness attribute of *flowery*, *natural*, *fresh* brought the most positive feelings, including “comfort”, “pleasantness”, “relaxation” and “sobriety”. *Appetizing*, *familiar* and *informative* also brought more positive feelings.

Table 2: Evaluation structure of smellscape

	abstract value judgment	original evaluation item	specific conditions and characteristics
1	comfort, pleasantness, relaxation, sobriety	flowery	osmanthus odour, rose odour, lilac odour
2	comfort, sobriety, pleasantness, relaxation	natural	defoliation odour, flower odour, tree odour, grass odour, water odour, wet earth odour
3	belongingness, reminiscence	regional	cooking odour, restaurant odour, hotpot odour
4	comfort, pleasantness, relaxation, sobriety	fresh	flower odour, tree odour, grass odour, wet earth odour
5	pleasantness	artificial	perfume odour, air freshener odour
6	pleasantness, comfort, hunger	appetizing	bakery odour, deli odour, hotpot odour, food stall odour
7	comfort	light	grass odour, tree odour, flower odour
8	hunger	strong	hotpot odour, restaurant odour
9	belongingness, safety, reminiscence	familiar	cooking odour, restaurant odour, food odour
10	safety	daily life	cooking odour
11	comfort	clean	sun-dried quilt odour
12	guidance, safety, convenience	informative	food stall odour, flower odour, road odour

### 3.3 Soundscape and smellscape matching attractiveness attributes

The results showed that a total of 16 attractiveness attributes of the matching of soundscape and smellscape have been extracted (Table 3). The attractiveness attributes of the matching of soundscape and smellscape corresponded to 7 positive feelings and 19 specific soundscape and smellscape elements. Among them, the attractiveness attribute of *natural+natural* and *quiet* brought the most positive feelings, including “comfort”, “relaxation”, “pleasantness” and “sobriety”. In addition to *quiet*, *euphonious* and *appetizing* were also considered by the visually impaired to have this single attribute which was enough to attract them.

Table 3: Evaluation structure of the matching of soundscape and smellscape

	abstract value judgment	original evaluation item	specific conditions and characteristics
1	relaxation, comfort, pleasantness	euphonious+natural	music+plant odour
2	comfort, relaxation, pleasantness, sobriety	natural+natural	water sound+plant odour, birdsong+plant odour
3	comfort, relaxation, pleasantness, sobriety	quiet	low volume, less traffic noise
4	comfort, safety	daily life+daily life	cooking sound+cooking odour
5	comfort	euphonious	music
6	relaxation, pleasantness	euphonious+appetizing	music+bakery odour
7	pleasantness	appetizing	restaurant odour
8	curiosity	regional+regional	regional instrument sound+regional food odour, sound of peddling+regional food odour
9	comfort	eventful+eventful	sound and odour of cultural and recreational activities
10	comfort, relaxation, pleasantness	harmonious matching	birdsong+flower odour, music+bakery odour, advertisement sound+restaurant odour, sound of peddling+food odour
11	pleasantness	social+appetizing	sound of relatives and friends+food odour
12	curiosity, guidance	informative+informative	sound of peddling+food odour, birdsong+flower odour
13	curiosity, guidance	informative+appetizing	sound of peddling+food odour
14	comfort, relaxation, pleasantness	quiet+light	low volume+flower odour
15	comfort, relaxation, pleasantness	quiet+natural	less traffic noise+plant odour
16	comfort, relaxation, pleasantness	soothing+fresh	music+flower odour

## 4. Conclusions

Through the evaluation grid method, this study extracted 18 soundscape attractiveness attributes, 12 smellscape attractiveness attributes and 16 groups of attractiveness attributes of the matching of soundscape and smellscape to attract the visually impaired in the community public space. Overall, the study found that quiet soundscapes as well as natural and fresh smellscapes were more attractive to the visually impaired. As for the matching of soundscape and smellscape, the visually impaired thought that a quiet soundscape was attractive enough, and it is also attractive when both soundscape and smellscape were natural. In addition, both the soundscape and the smellscape were informative to the visually impaired, the information of the attractiveness attribute of the smellscape was reflected in the

orientational and functional guidance brought by the odour, while the information of the attractiveness attribute of the soundscape also contained the semantics and connotation of the sound sources.

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