

Place Attachment and Healing Environment: A Study on the Relationship Between Positive Emotions and Spatial Types During Campus Closure

Dancheng MENG¹, Leiqing XU^{1,2,*}

¹ College of Architecture and Urban Planning, Tongji University, Shanghai 200092, China

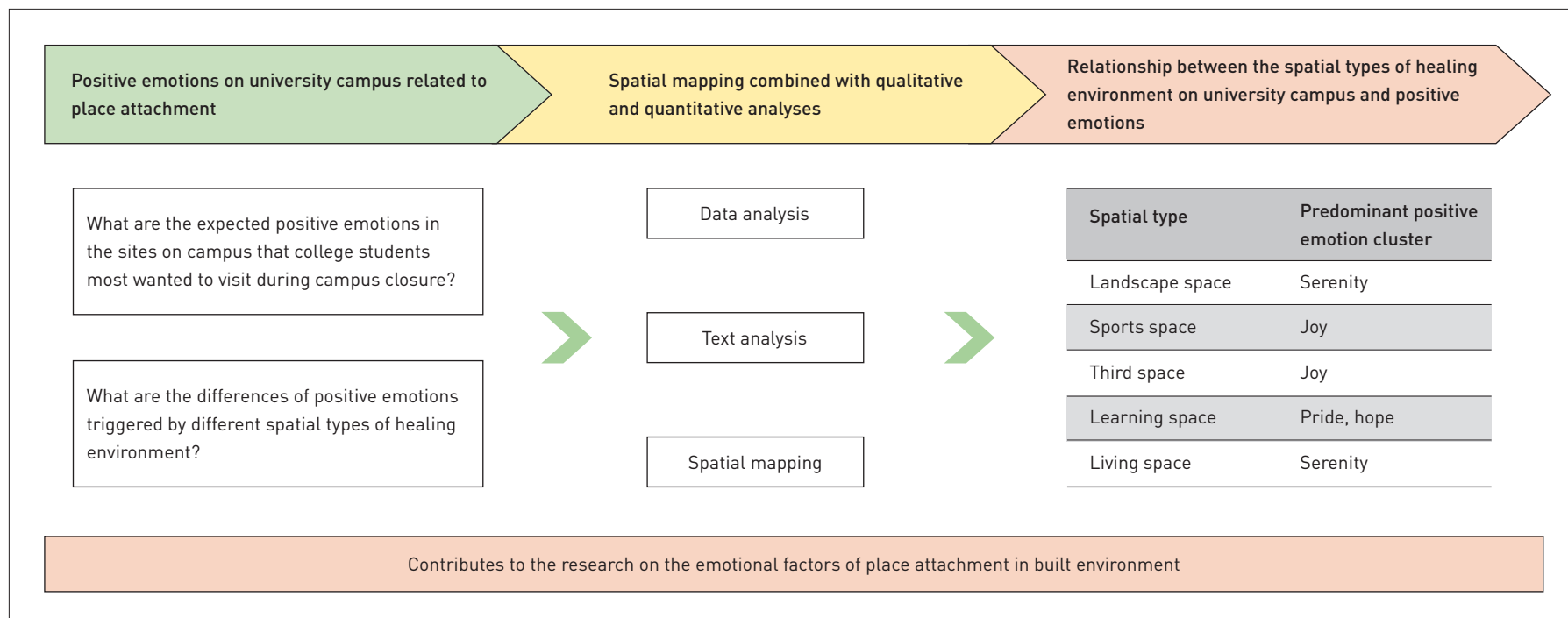
² Urban Renewal Center, National Modernization Institute, Tongji University, Shanghai 200092, China

*CORRESPONDING AUTHOR

Address: 1239 Siping Road, Yangpu District,
Shanghai 200092, China

Email: leiqingxu@163.com

GRAPHICAL ABSTRACT



HIGHLIGHTS

- Identifies the main clusters of positive emotions on university campus related to place attachment
- Non-natural places on university campus such as the third spaces have healing potential
- Promoting positive emotions through place-making is an important way to create a healing environment
- Contributes to the research on the emotional factors of place attachment in perspective of built environment

KEYWORDS

Place Attachment;
Restorativeness;
Healing Environment;
Positive Emotion;
Healing Built Environment;
University Campus;
Campus Closure

RECEIVED DATE

2023-03-23

Creation of healing environment on university campus can enhance college students' physical and mental well-being. In recent years, the emotional factors of place attachment have attracted more attention among healing environment research. However, the relationship between the spatial characteristics of different healing spaces and the aroused positive emotions remains unclear. This study investigated the places on the Siping Road Campus of Tongji University that college students most wanted to visit during campus closure and the expected activities and imagined feelings via questionnaires and interviews. Through data analysis with IBM SPSS, this study identified five clusters of positive emotions on university campus—joy, serenity, hope, pride, and interest, mapping them as well as corresponding activities with spatial types and facilities on the campus, and the healing environment spaces were divided into five types: landscape space, sports space, third space,

learning space, and living space. Furtherly the interview texts were coded via MAXQNA software, from which representative themes were selected to investigate the differences of positive emotion clusters in each space type. Finally, the study proposes that promoting positive emotions through place-making is an important way to create a healing environment. The findings of this study provide a reference for planning, design, and intervention measures of healing environment on university campus.

EDITED BY

Tina TIAN, Yinyu WANG, Yuting GAO

TRANSLATED BY

Yichen ZHOU, Tina TIAN, Yinyu WANG

1 Introduction

The college years matter a lot to an individual's transition from adolescence to early adulthood. Due to pressures from interpersonal relationships and academic and employment competition, college students face mental health problems, including depression and anxiety^{[1][2]}. During the campus closure during the outbreak of the COVID-19 epidemic, college students were more likely to feel anxiety, loneliness, or stress due to the restricted social activities^{[3]–[5]}. However, the closure did not affect students' and faculties' place identity, place dependence, and affective attachment to the campus^[6]. Place attachment and place memory can serve as restorative perceptions against stress and fatigue^{[7][8]}, being especially effective to alleviate depression and anxiety^[9].

Healing environment of university campuses enhance students' physical and mental health through physical, psychological, and social pathways^[10]. Students' most activities take place on campus, and the campus environment would closely influence students' academic performance and well-being^{[11][12]}. Many studies have demonstrated the benefits of green environments on university campuses, such as improved quality of life, increased positive emotions, reduced stress^[11], and restored attention^[13].

Improvements in land-use, road/street environment, and facility and amenity on campus can promote walkability and increase physical activity levels, thereby reducing students' risk of disease^[14]. In addition to the physical environments, factors of emotional perception and social environment have become hot topics in the research on campus healing environment in recent years. Scholars have argued that positive psychological interventions can enhance healing environment of university campuses^[15], and some others pointed out that positive emotional experience is key to the generation of place attachment on campus^[16]. However, current research, both domestically and internationally, has paid less attention to the process of formation and development of place attachment^[17], particularly the influence of emotions on the formation^[18]. Additionally, research on the relationship between positive emotions and healing environment is insufficient^[19], and the correlation of aroused positive emotions with material spatial characteristics of different healing spaces remains unclear.

Therefore, with the case study of the Siping Road Campus of Tongji University in Shanghai, China, this paper conducted a questionnaire survey of current students during campus closure in 2022. The survey included 1) the collection of the spatial data of locations/venues and the interview data, 2) spatial mapping

of positive emotions, and 3) analyses of interview text and its correction with spatial types. The study aimed to answer the following questions: 1) what are the expected emotions in the places that college students most want to visit during campus closure; and 2) what are the differences of positive emotions aroused by different spatial types of healing environments? The study intends to expand the theoretical research on place attachment and healing environment, and provide guidance for the design and construction of healing environment on university campuses.

2 Literature Review

2.1 Place Attachment

Yi-Fu Tuan described the term “Topophilia” in his work as one’s affective bond with the environment, such as the sense of attachment and belonging to a place^[20]. Place attachment refers to a complex phenomenon of person-place bonding, including affect, cognition, and practice^{[21][22]}. Person, process, and place are the three dimensions of the concept of place attachment^[23]. While existing research on place attachment has emphasized individual differences, the physical characteristics of place and the process of formation of place attachment have been largely ignored^{[24][25]}. Christopher Alexander has argued that “human feelings are mostly the same,”^[26] and it has also been proven that personality traits would not significantly influence one’s restorative experiences^[27]. Therefore, the process of place attachment and the spatial characteristics of physical places need to be explored in depth.

2.2 Positive Emotions

The process dimension of place attachment include affective, cognitive, and behavioral components^[23], with affect/emotion being particularly important to the formation of place attachment^{[24][28][29]}. In recent years, there has been an increase of research on emotional factors in the process of place attachment^[17]. Numerous studies have confirmed that positive emotions can promote the formation of place attachment^{[18][30]~[32]}. Positive emotions, positive social connections, and physical health influence each other in an upward-spiral dynamic^[33]. Positive emotions greatly influence one’s learning by attention, memory, and motivation^[34], and research has revealed that positive emotional experience is key to reducing stress and helping with recovery^[35].

Psychologist Barbara L. Fredrickson summarized 10 representative positive emotions of everyday life as joy, gratitude, serenity, interest, hope, pride, amusement, inspiration, awe, and love^[36]. The findings of functional Near-Infrared Spectroscopy

(fNIRS)^[37] and Electroencephalogram (EEG)^[38] studies have shown that the 10 emotions elicited by video clips can be interpreted as three clusters based on the fNIRS records: 1) encouragement, including gratitude, hope, pride, inspiration, and awe; 2) playfulness, including joy, interest, and amusement; and 3) harmony, including serenity and love.

2.3 Healing Environment

Health is “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”^[39]. Healing implies the departure from a condition of unhealthy or the possibility for recovering health^[40], and is a process of restoration at physical, mental and spiritual aspects^[41]. Much of the current research on healing environment on campus focuses on the benefits provided by natural environments. For example, green spaces on campus can promote students’ restorative perceptions and enhance their quality of life^[42]. In dormitory interiors, nature view windows also would lead to a boost in mental wellness of college students^[43]. Biodiversity on campus can also help college students recover emotionally via visual and auditory perceptions^[44].

Some scholars have proposed theories such as “therapeutic public spaces framework”^[45] and “socially restorative urbanism”^[46], summarized the Socially Restorative Urban Design Model^[47], and pointed out the healing potential of “Third Places”^[48]. “Third Places” refer to public places where people can socialize or gather with community members or groups outside the workplace and the home, providing informal social connections that promotes self-fulfillment and thus improves psychological well-being^{[49][50]}. Typical “Third Places” in cities include cafes, restaurants, etc.^{[49][50]}. These places can provide young people with more social capital and a sense of community, which can further improve mental health and well-being^[51].

In contrast to healthy campus research that focuses on safety and physical activities^{[52][53]}, the research on campus healing environment concerns more on socio-cultural, psycho-emotional, and other pathways that can promote the physical and mental health of college students^[10]. As university campuses assume social and cultural functions in the city, campus environments besides green spaces also have diverse healing potentials. Research has verified that for young people, public spaces such as community centers can enhance their sense of well-being better than natural landscapes^[54]. “Third Places” in campus (e.g., cafes, dessert shops, retail shops) can help college students restore physically and mentally and gain joyful emotions^[48].

3 Research Method

3.1 Study Area

Tongji University has four main campus areas, namely Siping Road Campus, Jiading Campus, Huxi Campus, and Hubei Campus, as well as several research bases in Lin-gang Special Area and other areas. Siping Road Campus, the study area of this research, consists of a major campus and three smaller campuses—Zhangwu Road Campus, Tieling Campus, and South Campus (Fig. 1). The Siping Road Campus accommodates teaching and administrative activities and daily life services. Enjoying rich historical and cultural heritages, the architectural and landscape styles of Siping Road Campus have been transformed over time. The other smaller campuses are mostly used for student dormitories.

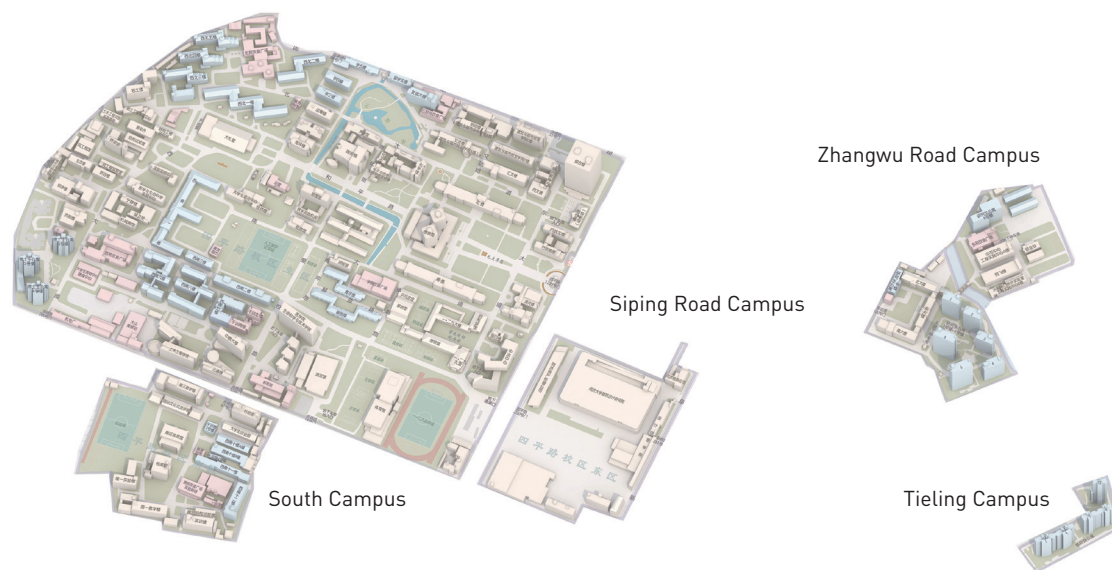
3.2 Research Design

From May 1 to 22, 2022, the research team recruited current students of Tongji University to participate in online questionnaires and interviews. Recruitment was spread via WeChat, online bulletins, etc. Under the impact of the epidemic, all the campuses had been in quasi-lockdown and started online teaching since mid-March, 2022; in early April, campus buildings began to close. Compared with non-epidemic days, during this period college students in Shanghai had less exercise, more screen browsing, worse sleep, and insufficient social interaction^[55]; the detection rates of sleep problems and related physical and mental disorders were also much higher^[56]. In existing studies to measure the level of recovery of attention and stress, stimuli sources are usually preset

to put respondents in a state of anxiety, stress, and mental fatigue^[8]. The campus closure in this study helped to avoid the uncertainty of this method.

The questionnaire survey covered the campuses of Siping Road, Jiading, Huxi, and Hubei, as well as Lin-gang research base^①. The respondents were undergraduates, master students, and PhD students from colleges of Architecture and Urban Planning, Civil Engineering, Environmental Science and Engineering, Physics Science and Engineering, Design and Innovation, Medicine, etc., in total of 188 (78 males and 110 females), aging from 17 to 30. GPS was utilized in the online questionnaire to obtain the respondents' geographic information and only current students located in the campuses were eligible for the online questionnaire.

When asked “if you had one hour of free time, where would you most like to go on campus,” respondents were required to mark one or two geographic locations on a map of the Siping Road Campus, and to provide an open-ended description of their expected activities, including the exact site, person involved, and specific behavior. Finally, in order to understand the relationship between emotional experience and healing environment, respondents were asked to “imagine the emotional experience of having visited the expected location and carried out the corresponding activities” and to select the corresponding emotions from the 10 categories of positive emotions listed—adopted Frederickson's categorization^[36] and were fine-tuned for a clearer Chinese expression—including entertainment and enjoyment, fun and curiosity, joy and happiness, love and trust, serenity and calmness, awe and shock, hope and optimism, gratitude and thankfulness, pride and confidence, and



① Although the respondents reside on different campuses, they study and work on the Siping Road Campus. In addition, the training program also requires students of other campuses, such as Jiading Campus and Lin-gang Research Base to study and do internship on the Siping Road Campus in their first and final terms. Therefore, all respondents can be regarded to have lived and learned on the Siping Road Campus for long enough, which means their emotional experience with the campus is reliable in this study.

1. Siping Road Campus of Tongji University (Source: Asset and Laboratory Management Office of Tongji University)

inspiration and motivation. Respondents also needed to explain why they would visit the site and what specific emotions they would feel. After filling out the questionnaire, each respondent was one-on-one interviewed for 3 ~ 5 minutes to give detailed descriptions of the specific activities, emotions, and the place. A total of 274 pieces of interview texts were collected for the study.

3.3 Data Analysis

In this study, IBM SPSS was used to perform cluster analysis on positive emotions to identify the predominant emotion categories. Based on the respondents' emotion data, the Siping Road Campus was divided into 20 m × 20 m grid cells via ArcGIS to calculate and visualize the frequency of different positive emotions in each cell. Then land use types and facilities (e.g., green space, water body, road, building, seating facility) in each cell were identified to overlap with the positive emotions and behavioral activities. Similar approaches have been used to map and quantify place perception^{[57]~[59]}, but have not been used for spatial analysis of positive emotions on university campuses. The grid cells with a higher frequency of positive emotions were considered "high-frequency emotion units." Meanwhile, all pieces of interview text were manually coded via MAXQNA software, from which representative themes were selected for ANOVA analysis in IBM SPSS to investigate the different impacts of activity type and spatial type on positive emotions.

4 Research Results

4.1 Clusters of Positive Emotions

In the study, the occurrence or absence of each category of positive emotions were used as cases for analysis in SPSS, where occurrence counted as "1" and absence as "0." All the 10 categories of positive emotions were analyzed as variables in a cluster analysis (using the intergroup linkage clustering method), and the results are shown in Figure 2. The horizontal coordinate represents the distance between categories, the smaller the value, the shorter the distance and the easier they are to be regarded as one cluster. Finally, by estimating the optimal number of clusters and referring existing classification of positive emotions, the research used the distance 12 as the cut-off point, and the 10 categories of positive emotions were classified into 5 clusters.

- 1) Joy: entertainment and enjoyment, joy and happiness.
- 2) Serenity: serenity and calmness.
- 3) Hope: hope and optimism, inspiration and motivation.
- 4) Pride: awe and shock, gratitude and thankfulness, pride and confidence, love and trust.

And 5) interest: fun and curiosity.

The frequency of each positive emotion cluster was analyzed, and the results (Fig. 3) show that, during the campus closure, joy (37%) and serenity (24%) were the most positive emotions respondents expected to have in healing environment they imagined, followed by hope (18%), pride (15%), and interest (6%).

4.2 Activities in Campus Healing Environments

Shown in Table 1, the activity types respondents wished most to carry out were scenery viewing (31.8%) and leisure and entertainment (31.4%), followed by exercise and sports (15.3%), learning (9.5%), social interaction (6.9%), and catering (5.1%).

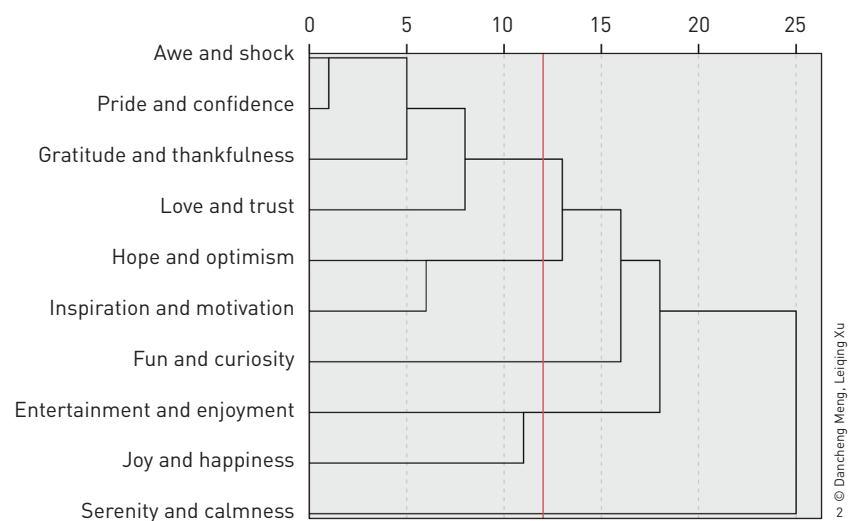
4.3 Differences of Positive Emotions Between Spatial Types

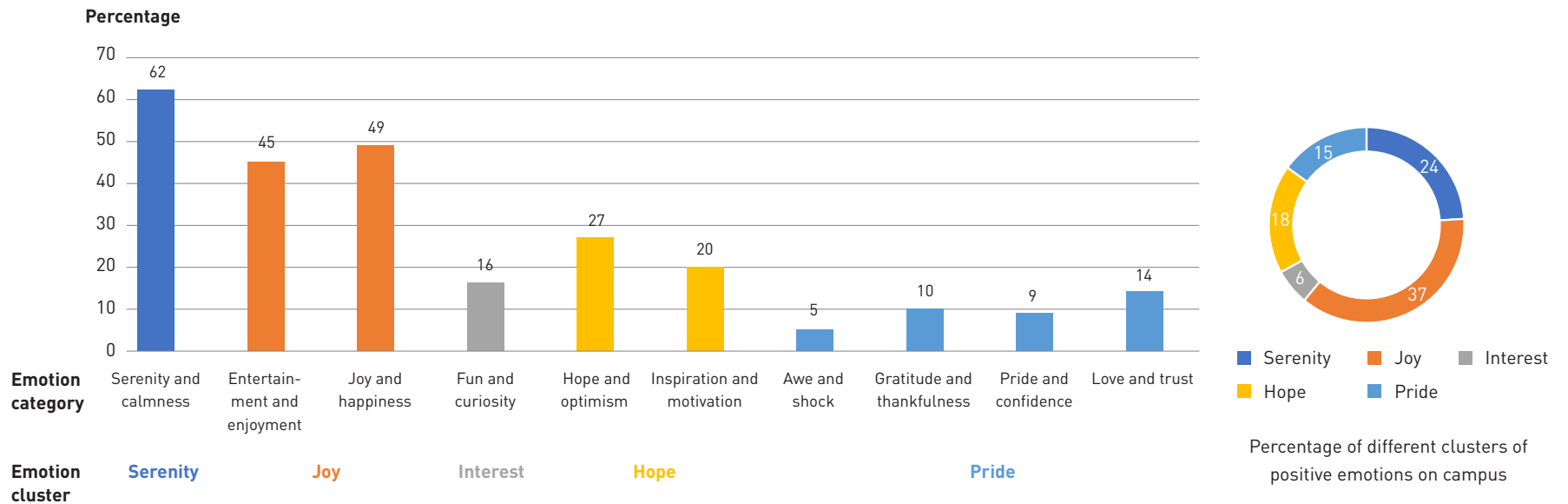
Figure 4 displays the frequency of each cluster of positive emotions in the grid cells. Blue color represents lower frequency and red color represents higher frequency. Based on the results of text analysis and spatial mapping combined with existing studies on spatial types of healing environment on campus^{[27][60]~[62]}, the spatial types within the study area were classified into five types: landscape space, sports space, third space, learning space, and living space.

1) Landscape space includes the places featured with greenery and waterfront landscapes, such as Sanhaowu, landscapes on both sides of Heping Road, the Swing Garden, and the Cherry Blossom Road (Aixiao Road).

2) Sports space mainly refers to the sites/venues used for exercise or sports activities. Sports sites include the 129 Sports

2. Spectrogram of positive emotion categories in cluster analysis





3. Analysis of different clusters of positive emotions on campus

Ground, artificial-turf soccer field, tennis courts, volleyball courts, basketball courts, and the fitness track along the river on Zhangwu Road Campus; sports venues include swimming pool, badminton hall, rock-climbing hall, table tennis hall, etc.

3) Third space, drawn on the concept of the “Third Place”^[48], mainly referring to the places where students can enhance social

contacts and have informal social activities, such as coffee bars, retail pavilions, and food plazas. Among the food plazas, the Xiyuan Canteen is the most popular, followed by Beiyuan Canteen and Xueyuan Canteen. Other third spaces in the study area include Tongji Bakery on Aixiao Road, Shanhaowu Landscape Dining Hall, the coffee bar in Building C of the College of Architecture and Urban

Table 1: Analysis of types of expected activities in campus healing environments

| Type of expected activity | Percentage | Activity theme and examples (numbers indicate the referring times) |
|---------------------------|------------|--|
| Scenery viewing | 31.8% | Being in a daze (15); Sunbathing (15); Patting cat (14); Lying down (11); Blowing in the wind (5); Woods (6); Looking at river (3); Viewing from the roof of a building (3); Feeding fish (1); Looking at geese (1); Enjoying flowers (1); Looking at bamboos (1); Leaning against a rocky pillar on a hillside (1) “Basking in the sun on the lawn of the Swing Garden” “Lying on the lawn of Lovers’ Slope watching people come and go” “Going to the roof of the building to have a nice view” |
| Leisure and entertainment | 31.4% | Walking (53); Swinging (12); Exhibitions (4); Board games (4); Playing piano (3); Listening to music (1); Singing (1); Shopping (1); Photography (1); Playing computer games (1) “Taking graduation pictures on Cherry Blossom Road (Aixiao Road) with classmates” “Board games and singing” “Playing the ‘Cities: Skylines’ game using the desktop computer I left in the Black Building” |
| Exercise and sports | 15.3% | Running (19); Ball sports (13); Swimming (5); Skateboarding (3); Fitness (1) “Going skateboarding in the basement parking area” “Going to the school gym to work out and stretch” “Long-time campus closure makes me more yearning for outdoor activities like moving around or playing ball with friends” |

Continued

Table 1: Analysis of types of expected activities in campus healing environments

| Type of expected activity | Percentage | Activity theme and examples (numbers indicate the referring times) |
|---------------------------|------------|--|
| Learning | 9.5% | Reading (11); Studying (9); Experiments (5); Working (5); Back to laboratory (1); Writing paper (1) “Visiting the public spaces in the college renovated by myself” “Experiencing library life for the last time” “Sitting by the window on the ninth floor of the library, where the atmosphere is perfect for studying” |
| Social interaction | 6.9% | Chatting (14); Meeting seniors and juniors (1); Visiting teachers and classmates (1); Dating (1); Playing with classmates (1); Club activities (1) “Making some mocha for my lab sisters” “Trying to find a place with a nice view, and it would be better if the place allows for intimate talks with friends” “Chatting with friends about daily life in the Swing Garden” |
| Catering | 5.1% | Eating ice cream (1); Eating popsicle (1); Drinking fruit juice (1); Drinking coffee (1); Drinking milk tea (1); Eating McDonald’s (1); Eating barbecue (1); Eating hot-sour rice noodle (1); Having a sip of wine (1); Eating bread (1); Eating fried chicken legs (1); Having a late-night snack (1); Having a meal (1); Eating fruit (1) “Going to the bakery for bread” “Going to the Beiyuan Canteen to eat fried chicken legs”; “Eating pickled-vegetable rice noodles at Chongqing noodles restaurant” |

4. Overall distribution of positive emotions and the corresponding spatial types

Landscape space

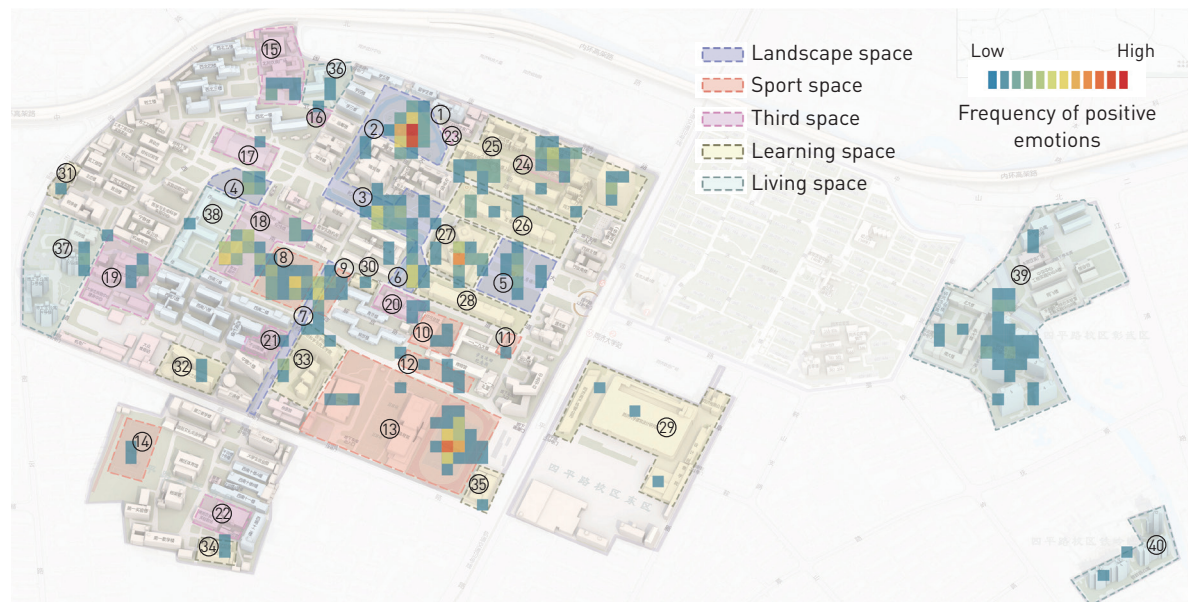
- ① Sanhaowu
- ② Sanhaowu Garden
- ③ Heping Road Sequoia Forest
- ④ Small garden
- ⑤ Front lawn of the Library
- ⑥ Lovers’ Slope
- ⑦ Aixiao Road

Sports space

- ⑧ Artificial lawn
- ⑨ Tennis court
- ⑩ Table tennis hall, rock climbing hall, and tennis court
- ⑪ Badminton hall
- ⑫ Basketball court
- ⑬ Natatorium, football stadium, basketball stadium, gymnasium, and 129 Sports Ground
- ⑭ Playground

Third space

- ⑮ Beiyuan Canteen
- ⑯ Education Supermarket
- ⑰ Auditorium
- ⑱ Student Activity Center, Music Plaza, Education Supermarket, and Swing Garden
- ⑲ Xiyuan Canteen
- ⑳ Xueyuan Canteen
- ㉑ Tongji Bakery on Aixiao Road
- ㉒ Nanyuan Canteen



- ㉓ Sanhaowu Coffee Bar
- ㉔ Manner Coffe Bar

Learning space

- ㉕ College of Architecture and Urban Planning
- ㉖ North Teaching Building
- ㉗ Library
- ㉘ South Teaching Building
- ㉙ Design Institute, College of Design and Innovation
- ㉚ College of Surveying and Geo-informatics
- ㉛ Scientific Research Center

- ㉜ College of Civil Engineering
- ㉝ School of Medicine
- ㉞ Experiment Building
- ㉟ Tongji University Press

Living space

- ㊱ Building 2, Northwest District
- ㊲ Doctoral student apartment
- ㊳ First Building in Southwest District
- ㊴ Dormitory of Zhangwu Road Campus
- ㊵ Dormitory of Tieling Campus

Planning, and the Education Supermarket.

4) Learning space mainly includes the places used for research, study, and administrative activities, such as laboratories, libraries, studios, and office buildings of each college.

5) Living space refers to the places where students live and rest, mainly the dormitories.

The percentage of each cluster of positive emotions in each grid cell was calculated, and the one-way ANOVA was utilized to analyze the differences of positive emotion clusters aroused by varied spatial types. The results showed that joy, serenity, and

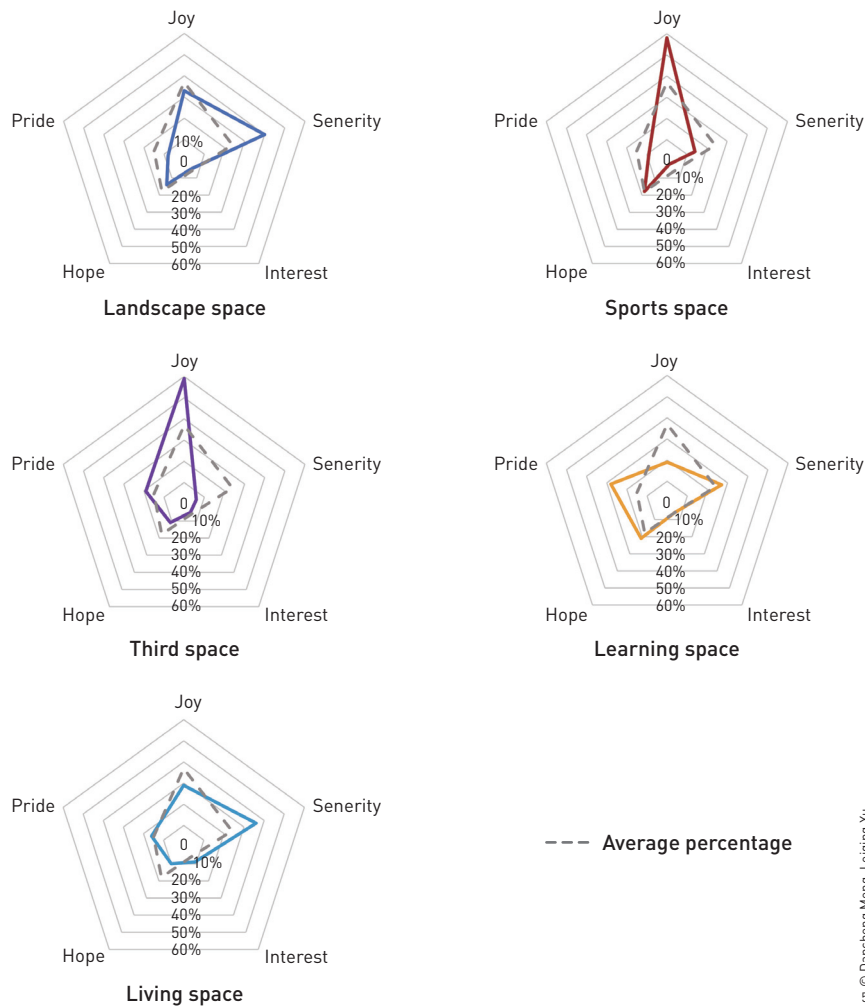
pride emotions have significant differences among all spatial types (Table 2). Then the average percentages of each emotion cluster in different spatial types were calculated via SPSS. Overall, in landscape spaces and living spaces, the percentages of serenity emotion were significantly higher than its average percentage among all spatial types; in sports spaces and third spaces, the percentages of joy emotion were significantly higher than its average percentage among all spatial types; and in learning spaces, pride and hope emotions had higher percentages than their average percentages among all spatial types (Fig. 5).

Table 2: One-way ANOVA results of emotion clusters and spatial types

| Emotion cluster | Source of variation | Sum of squares | Degree of freedom | Mean of square | F | Sig. |
|-----------------|---------------------|----------------|-------------------|----------------|--------|---------|
| Joy | Between groups | 5.415 | 4 | 1.354 | 15.857 | 0.000** |
| | Within group | 21.171 | 248 | 0.085 | | |
| | Total | 26.586 | 252 | | | |
| Serenity | Between groups | 4.410 | 4 | 1.103 | 15.583 | 0.000** |
| | Within group | 17.546 | 248 | 0.071 | | |
| | Total | 21.956 | 252 | | | |
| Hope | Between groups | 0.288 | 4 | 0.072 | 1.580 | 0.180 |
| | Within group | 11.314 | 248 | 0.046 | | |
| | Total | 11.602 | 252 | | | |
| Pride | Between groups | 1.515 | 4 | 0.379 | 8.346 | 0.000** |
| | Within group | 11.257 | 248 | 0.045 | | |
| | Total | 12.772 | 252 | | | |
| Interest | Between groups | 0.072 | 4 | 0.018 | 1.144 | 0.336 |
| | Within group | 3.888 | 248 | 0.016 | | |
| | Total | 3.960 | 252 | | | |

NOTE

** indicates $p < 0.01$.



5. Analysis of the differences of positive emotions in each spatial type

Table 3: Positive emotions corresponding to different spatial types of campus healing environment

| Spatial type | Predominant positive emotion cluster |
|-----------------|--------------------------------------|
| Landscape space | Serenity |
| Sports space | Joy |
| Third space | Joy |
| Learning space | Pride Hope |
| Living space | Serenity |

NOTE

For each spatial type, the positive emotion cluster whose frequency is significantly higher than the average was identified as the predominant.

5 Discussion

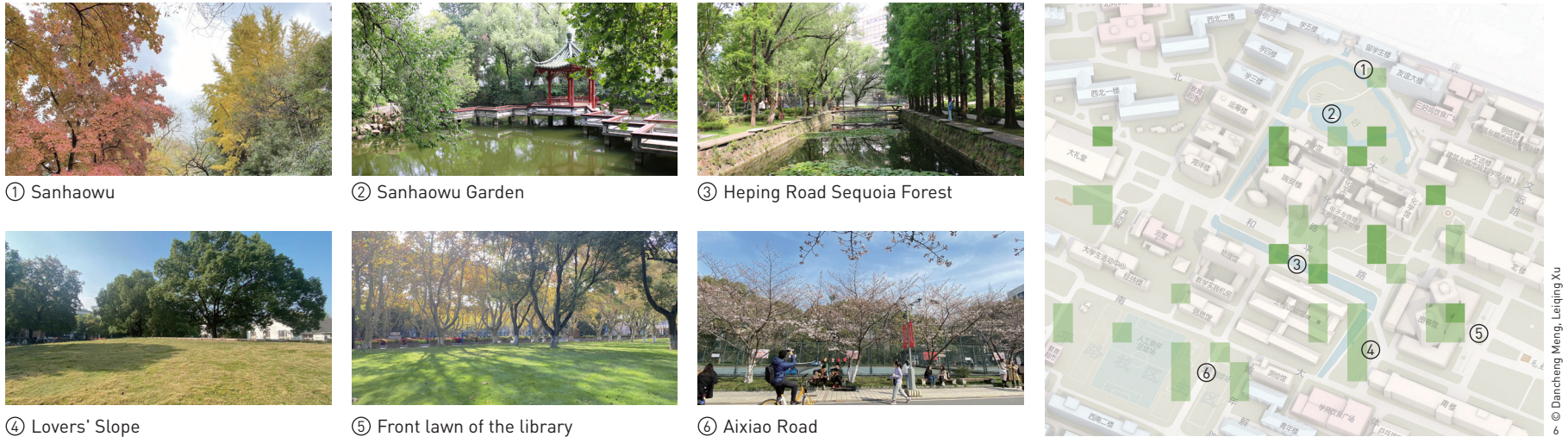
5.1 Healing Environment for Positive Emotion Enhancement

Building on existing theories, this study explores the relationships between positive emotions and the types of activities expected to be carried out on campus, and between different spatial types of campus healing environments. The predominant positive emotion clusters in each spatial type are listed in Table 3, and the following sections will examine those in representative spatial types, including landscape, third, and learning spaces.

5.1.1 Landscape Space: Promoting Serenity Emotion

Landscape spaces can provide the most diverse positive emotions. Behaviors such as viewing and relaxing in landscape spaces can arouse higher serenity emotions (Fig. 6). It confirms the research findings on the healing environment of the Nanjing University campus that the students were most inclined to natural and calm places for relaxation and recovery^[63]. Peaceful and quiet places are an important type of space to offer healing experience^[64]. In such spaces, the self-recovery behaviors such as “being in a daze” and “scenery viewing,” as well as similar behaviors such as mindfulness and meditation, are helpful to enhance positive emotions^{[19][65]}.

In addition, the unique sensory experience of campus landscape would bring the feeling of pleasure that promotes students to form a connection with the place and benefits their physical and mental health. “Waterfront,” “bamboo forest,” and “lakeside pavilion” were often mentioned in respondents’ descriptions. The water system sources from Sanhaowu, goes along the Heping Road, and eventually flows into the terraced-spring pond on the southwest side of the library. Although the water area is relatively small, the Sequoia forest (*Metasequoia glyptostroboides*) and other various flowers and trees on both sides enrich the landscape effect. The seats on the waterfronts allow students for leisure and relaxing activities. Slight topographical changes of the Lovers’ Slope provide opportunities for students to rest either lying or sitting. These sensory experiences help trigger positive emotions and enhance place attachment^[31]. Besides, fish, cats, birds, hedgehogs, and other animals were also frequently mentioned. This study reveals that patting cat has a strong correlation with the emotions of joy and interest—the joy and interest emotions aroused by this behavior was 39.6% and 26.6%, respectively (Table 4), both higher than the average values. Touching connects people to places, alleviates stress, and promotes happiness^[66]. This explains why many respondents reported that they wanted to feed or pet



6. Serenity emotion in the landscape spaces (demonstrating with the landscape spaces in Sanhaowu, Heping Road, and Aixiao Road). The darker the green, the higher the serenity emotion.

the wild animals on campus. Animal companionship can provide a psychologically healing experience for college students^[67], and the findings of this study furtherly complement this conclusion.

5.1.2 Third Space: Promoting Joy Emotion

The contribution of social interaction and social connection to positive emotions, health, and well-being has been validated in the field of neuroscience^[19]. Such a “collective restoration” promotes joy emotion by creating chance encountering with someone else and maintaining interpersonal relationships with acquaintances^[68]. Social inclusion, mutual help, and community engagement help with

collective healing^[69]. Among the interventions to enhance young people’s physical and mental health, the most important is social interaction with family and friends to have an increased connection to place^[70].

Third spaces on the campus provide opportunities for club events, creative and recreational activities, dining and catering, which support social connection and emotional bonding, playing an important role in promoting joy emotion (Fig. 7). For example, students often take a nap, relax, or socialize on the benches on both sides of Aixiao Road, or hold artistic activities around the piano in the lobby of Building C (of College of Architecture and

Table 4: Statistics of the relationship between the behavior of patting cat with different positive emotions (N = 14)

| Emotion cluster | Times of each emotion cluster mentions | Minimum | Maximum | Mean | Standard deviation | Median |
|-----------------|--|---------|---------|-------|--------------------|--------|
| Joy | 16 | 0.000 | 1.000 | 0.396 | 0.257 | 0.367 |
| Serenity | 7 | 0.000 | 1.000 | 0.183 | 0.275 | 0.056 |
| Hope | 3 | 0.000 | 0.333 | 0.040 | 0.103 | 0.000 |
| Pride | 7 | 0.000 | 0.500 | 0.115 | 0.172 | 0.000 |
| Interest | 9 | 0.000 | 1.000 | 0.266 | 0.290 | 0.225 |



① Xiyuan Canteen



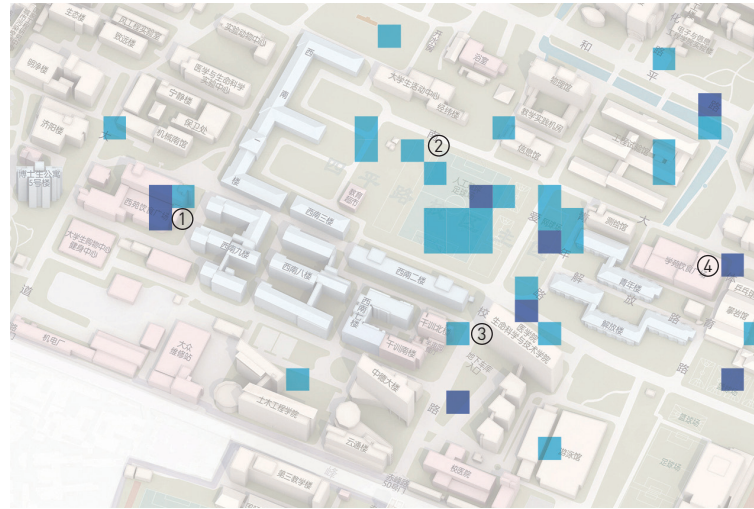
② Student Activity Center, Music Plaza, and Education Supermarket



③ Tongji Bakery on Aixiao Road



④ Xueyuan Canteen



7. Joy emotion in the third spaces (demonstrating with the areas of Xiyuan Canteen, Xueyuan Canteen, Student Center, and Education Supermarket). The darker the blue, the higher the joy emotion.

© Dancheng Meng, Leiqing Xu

Urban Planning), such as playing instruments, listening to music, and singing, which are beneficial to their health during campus closure^[71].

In addition to landscape spaces such as Swing Garden and Aixiao Road, third spaces such as canteens, cafes, bakeries, and shops are all important places for social interactions and bring about joy emotion for students. This is consistent with the research conducted in the University of Southern California in the United States^[56], which found that dining facilities in campus environment, such as food markets and food vendors can bring about positive emotional experiences like public parks do. Having tasty food was mentioned the most frequently by respondents in third spaces (14 times), and dining halls and cafes were usually mentioned together with social activities, which suggests that such places are the most popular in third spaces^[27].

5.1.3 Learning Space: Promoting Emotions of Pride and Hope

Pride emotion is more often found in learning spaces. Even during the campus closure, most students still wanted to continue their research or learning, such as “reading,” “studying,” and “doing experiments” (Fig. 8). This kind of healing favors individual’s growth through continuous self-transcendence, which strengthens one’s sense of mission and value, as well as self-confidence and self-esteem^[72].

Personal memories and personalized experiences on campus also brought about healing experiences. For example, respondents expressed that their nostalgia for “the renovated public space of the Party Branch Office,” which may be stemmed from their experience of participating in the renovation of the campus environment. Another respondent also expressed hope emotion by imagining “going back to the college, especially the terrace that is so atmospheric.” This



① College of Architecture and Urban Planning



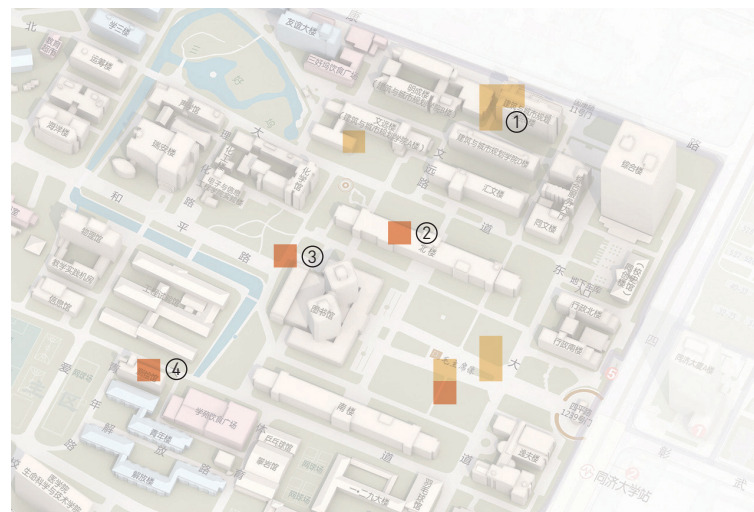
② Teaching building



③ Library



④ College of Surveying and Geo-informatics



8. Pride emotion in the learning spaces (demonstrating with the areas of library, teaching building, and some college buildings). The darker the orange, the higher the pride emotion.

© Dancheng Meng, Leiqing Xu

suggests that significant experiences related to place can contribute to forming unique meaning of place^[73].

5.2 Improvement Strategies for Campus Healing Environment

Based on the results of this study on the relationship between different types of healing environments and positive emotions, this paper proposes the following strategies for improving campus healing environments via the enhancement of positive emotions. In campus renewal and planning practice, primarily, it should attach more importance of the third spaces by integrating them into students' daily life, so as to stimulate joy emotion, cultivate place attachment, and improve mental health. For example, create social spaces for students in combination with dining halls, cafes, and canteens; design spaces for gatherings and group activities in places such as student centers and small squares. In landscape design, more attention should be put on how to enhance students' multi-sensory experience and allow for stress-reducing activities such as meditation, mindfulness, and relaxation to stimulate emotions of joy and serenity. The operation and maintenance of campus landscape spaces should emphasize promoting ecological diversity and animal companionship. For learning spaces, the administrators should allow students to join micro-renewals of the campus to establish their connection with campus spaces and facilities in a more spontaneous way, thereby increasing their pride and the sense of belonging and identity.

5.3 Shortcomings and Prospects

There are several shortcomings of the study. First, in terms of the research design, the respondents were asked to imagine the places that they most expected to visit on the campus during the closure, as well as the expected activities and corresponding emotions. In existing research, this approach places more emphasis on personal memories and subjective feelings within the framework of restorative theories^{[7][8]}. But the research design of this study may cause some subjective bias because of the respondents' non-reality experience and the disparity of their personal perception and knowledge of the place. Second, the study did not measure the intensity and the dimensions of place attachment, because face-to-face research could not be conducted during the campus closure. Third, the healing effect of campus environment on students may differ in terms of gender, age, and the time of living. Therefore, the mediating role of place attachment between the campus physical environment and positive emotions should be further explored with comparative analysis. For future research, brain science and neuroscience could be introduced to obtain more accurate

emotional perception data; the influence of individual's personal factors should be considered for more accurately quantifying the relationship between the healing benefits of positive emotions and spatial elements; and scales to measure place attachment, as well as correlation analysis on emotion, space, and activity types should be adopted to furtherly explore the dimensions of emotional perceptions for place attachment. In addition, future research should be extended into the field of urban spatial typology to improve the theory and practice of healing environment.

6 Conclusions

Upon theories of place attachment, this study explored the relationship between positive emotions and healing environments during campus closure, and furtherly established the relationship between campus healing environments and positive emotions. In this study, the healing environments in the Siping Road Campus of Tongji University was divided into five types: landscape spaces, sports spaces, third spaces, learning spaces, and living spaces. Joy and serenity are the most representative emotions among the five clusters of positive emotions. Different types of activities arouse varied positive emotions, providing a theoretical basis for the improvement of campus healing environments through promotion of positive emotions. To create a healing environment can not only rely on medical and healthcare facilities, but also emphasize place-making that promotes positive emotions. Landscape design and planning practices for positive emotion enhancement from social, environmental, and cultural perspectives can truly help address mental health crises.

ACKNOWLEDGMENTS

The authors would like to express their sincere gratitude to the anonymous peer reviewers for their time and effort. Their suggestions have greatly benefited this paper.

REFERENCES

- [1] Beiter, R., Nash, R., McCrady, M., Rhoades, D., Linscomb, M., Clarahan, M., & Sammut, S. (2015). The prevalence and correlates of depression, anxiety, and stress in a sample of college students. *Journal of Affective Disorders*, (173), 90–96.
- [2] Fang, Y., Wang, L., & Chen, Z. (2023). 2022 Survey report on the mental health of Chinese college students. In: X. Fu, K. Zhang, X. Chen, & Z. Chen. (Eds.), *Report on National Mental Health Development in China (2021–2022)* (pp. 70–99). Social Sciences and Academic Press.
- [3] Green, P. (2020). Risks to children and young people during covid-19 pandemic. *BMJ*, (369), m1669.
- [4] Hawes, M. T., Szenczy, A. K., Klein, D. N., Hajcak, G., & Nelson, B. D. (2022). Increases in depression and anxiety symptoms in adolescents and young adults during the COVID-19 pandemic. *Psychological Medicine*, 52(14), 3222–3230.
- [5] Lee, J. (2020). Mental health effects of school closures during COVID-19. *The Lancet Child & Adolescent Health*, 4(6), 421.
- [6] Huang, Y., Finsterwalder, J., Chen, N., & Crawford, F. R. L. (2022). Online student engagement and place attachment to campus in the new service marketplace: An exploratory study. *Journal of Services Marketing*, 36(4), 597–611.
- [7] Ratcliffe, E., & Korpela, K. M. (2016). Memory and place attachment as predictors of imagined restorative perceptions of favourite places. *Journal of Environmental Psychology*, (48), 120–130.
- [8] Ratcliffe, E., & Korpela, K. M. (2018). Time- and self-related memories predict restorative perceptions of favorite places via place identity. *Environment and Behavior*, 50(6), 690–720.
- [9] Meagher, B. R., & Cheadle, A. D. (2020). Distant from others, but close to home: The relationship between home attachment and mental health during COVID-19. *Journal of Environmental Psychology*, (72), 101516.
- [10] Liang, H., Wang, X., Wang, S., Chen, Z., & Gao, X. (2023). International research progress and enlightenment of healing-oriented university campus supportive environment construction based on knowledge mapping analysis. *New Architecture*, 1–16.
- [11] Hipp, J. A., Gulwadi, G. B., Alves, S., & Sequeira, S. (2016). The relationship between perceived greenness and perceived restorativeness of university campuses and student-reported quality of life. *Environment and Behavior*, 48(10), 1292–1308.
- [12] Hughes, G., & Spanner, L. (2019). *The University Mental Health Charter*. Student Minds.
- [13] Lu, M., & Fu, J. (2019). Attention restoration space on a university campus: Exploring restorative campus design based on environmental preferences of students. *International Journal of Environmental Research and Public Health*, 16(14), 2629.
- [14] Nordbø, E. C. A., Nordh, H., Raanaas, R. K., & Aamodt, G. (2018). GIS-derived measures of the built environment determinants of mental health and activity participation in childhood and adolescence: A systematic review. *Landscape and Urban Planning*, (177), 19–37.
- [15] Feng, C., Yan, Y., & Xu, H. (2018). Leisure involvement and social support—The approaches of healthy landscape design for university campus based on positive psychological intervention. *Chinese Landscape Architecture*, 34(9), 33–38.
- [16] Yu, Y., Zhang, Q., Shen, W., & Zhong, M. (2021). Female college students' place attachment on the campus: A study using photovoice method. *Shanghai Urban Planning Review*, (4), 72–78.
- [17] Jiang, H., & Shao, L. (2022). Formation process of place attachment to public space from the perspective of existential phenomenology. *Architectural Journal*, (S2), 233–238.
- [18] Hosany, S., Prayag, G., Van Der Veen, R., Huang, S., & Deesilatham, S. (2017). Mediating effects of place attachment and satisfaction on the relationship between tourists' emotions and intention to recommend. *Journal of Travel Research*, 56(8), 1079–1093.
- [19] Alexander, R., Aragón, O. R., Bookwala, J., Cherbuin, N., Gatt, J. M., Kahrilas, I. J., Kästner, N., Lawrence, A., Lowe, L., Morrison, R. G., Mueller, S. C., Nusslock, R., Papadelis, C., Polnaszek, K. L., Helene Richter, S., Siltan, R. L., & Styliadis, C. (2021). The neuroscience of positive emotions and affect: Implications for cultivating happiness and wellbeing. *Neuroscience & Biobehavioral Reviews*, (121), 220–249.
- [20] Tuan, Y. (1990). *Topophilia: A Study of Environmental Perceptions, Attitudes, and Values*. Columbia University Press.
- [21] Altman, I., & Low, S. (1992). *Human Behavior and Environment* (Vol. 12). Plenum Press.
- [22] Rollero, C., & De Piccoli, N. (2010). Place attachment, identification and environment perception: An empirical study. *Journal of Environmental Psychology*, 30(2), 198–205.
- [23] Scannell, L., & Gifford, R. (2010). Defining place attachment: A tripartite organizing framework. *Journal of Environmental Psychology*, 30(1), 1–10.
- [24] Lin, G., Wu, A., & Cai, K. (2019). Research on place attachment: Concept, progress and trend. *Chinese Landscape Architecture*, 35(10), 63–66.
- [25] Lewicka, M. (2011). Place attachment: How far have we come in the last 40 years? *Journal of Environmental Psychology*, 31(3), 207–230.
- [26] Alexander, C. (2002). *The Nature of Order: An Essay on the Art of Building and the Nature of the Universe* (Vol. 1). Center for Environmental Structure.
- [27] Subiza-Pérez, M., Pasanen, T., Ratcliffe, E., Lee, K., Bornioli, A., de Bloom, J., & Korpela, K. (2021). Exploring psychological restoration in favorite indoor and outdoor urban places using a top-down perspective. *Journal of Environmental Psychology*, (78), 101706.
- [28] Morgan, P. (2010). Towards a developmental theory of place attachment. *Journal of Environmental Psychology*, 30(1), 11–22.
- [29] Williams, D. R., & Roggenbuck, J. W. (1989, October 20–22).

- Measuring Place Attachment: Some Preliminary Results* [Paper presentation]. NRPA Symposium on Leisure Research, San Antonio, TX, United States.
- [30] Io, M. (2018). The relationships between positive emotions, place attachment, and place satisfaction in casino hotels. *International Journal of Hospitality & Tourism Administration*, 19(2), 167–186.
- [31] Kastenholz, E., Marques, C. P., & Carneiro, M. J. (2020). Place attachment through sensory-rich, emotion-generating place experiences in rural tourism. *Journal of Destination Marketing & Management*, (17), 100455.
- [32] Loureiro, S. M. C. (2014). The role of the rural tourism experience economy in place attachment and behavioral intentions. *International Journal of Hospitality Management*, (40), 1–9.
- [33] Kok, B. E., Coffey, K. A., Cohn, M. A., Catalino, L. I., Vacharkulksemsuk, T., Algoe, S. B., Brantley, M., & Fredrickson, B. L. (2013). How positive emotions build physical health: Perceived positive social connections account for the upward spiral between positive emotions and vagal tone. *Psychological Science*, 24(7), 1123–1132.
- [34] Li, L., Gow, A. D. I., & Zhou, J. (2020). The role of positive emotions in education: A neuroscience perspective. *Mind, Brain, and Education*, 14(3), 220–234.
- [35] Sternberg, E. M. (2009). *Healing Spaces: The Science of Place and Well-Being*. Belknap Press of Harvard University Press.
- [36] Fredrickson, B. L. (2013). Positive emotions broaden and build. In: *Advances in Experimental Social Psychology* (Vol. 47, pp. 1–53). Elsevier.
- [37] Hu, X., Zhuang, C., Wang, F., Liu, Y., Im, C., & Zhang, D. (2019). fNIRS evidence for recognizably different positive emotions. *Frontiers in Human Neuroscience*, (13), 120.
- [38] Hu, X., Yu, J., Song, M., Yu, C., Wang, F., Sun, P., Wang, D., & Zhang, D. (2017). EEG correlates of ten positive emotions. *Frontiers in Human Neuroscience*, (11), 26.
- [39] World Health Organization. (n.d.). *Constitution of the World Health Organization*. World Health Organization.
- [40] Hartig, T., & Marcus, C. C. (2006). Essay: Healing gardens—Places for nature in health care. *The Lancet*, (368), S36–S37.
- [41] Huang, S., & Xu, L. (2017). A preliminary study of the development and application of research on healing environment and healing architecture. *Architecture & Culture*, (10), 101–104.
- [42] Gulwadi, G. B., Mishchenko, E. D., Hallowell, G., Alves, S., & Kennedy, M. (2019). The restorative potential of a university campus: Objective greenness and student perceptions in Turkey and the United States. *Landscape and Urban Planning*, (187), 36–46.
- [43] Yusli, N. A. N. M., Roslan, S., Zaremohzzabieh, Z., Ghiami, Z., & Ahmad, N. (2021). Role of restorativeness in improving the psychological well-being of university students. *Frontiers in Psychology*, (12), 646329.
- [44] Ha, J., & Kim, H. J. (2021). The restorative effects of campus landscape biodiversity: Assessing visual and auditory perceptions among university students. *Urban Forestry & Urban Greening*, (64), 127259.
- [45] Zhou, P., Grady, S. C., & Rosenberg, M. W. (2021). Creating therapeutic spaces for the public: Elderly exercisers as leaders in urban China. *Urban Geography*, 44(1), 59–82.
- [46] Thwaites, K., & Simpson, J. (2020). Socially restorative urbanism: Principles and practice for socio-spatial urban design. *Landscape Architecture*, 27(9), 89–101.
- [47] Xu, L., & Yan, Y. (2019). Restorative spatial planning practice in response to isolation, segregation, and inequality. *Landscape Architecture Frontiers*, 7(6), 24–37.
- [48] Lee, N. (2022). Third place and psychological well-being: The psychological benefits of eating and drinking places for university students in Southern California, USA. *Cities*, (131), 104049.
- [49] Oldenburg, R., & Brissett, D. (1982). The third place. *Qualitative Sociology*, (5), 265–284.
- [50] Oldenburg, R. (1989). *The Great Good Place: Cafés, Coffee Shops, Community Centers, Beauty Parlors, General Stores, Bars, Hangouts, and How They Get You Through the Day*. Paragon House.
- [51] Littman, D. M. (2022). Third places, social capital, and sense of community as mechanisms of adaptive responding for young people who experience social marginalization. *American Journal of Community Psychology*, 69(3–4), 436–450.
- [52] Li, J., Gu, Y., & Lei, C. (2022). The healthy design strategy of campus environment renewal: A case study of main campus in Soochow University. *Huazhong Architecture*, 40(1), 64–68.
- [53] Wang, M., & Mei, H. (2020). Evidence-based design of perceived campus environment in cold regions for winter health behavior promotion: An empirical study in 9 campuses in northeast China. *Architectural Journal*, (S1), 87–91.
- [54] Benita, F., Bansal, G., & Tunçer, B. (2019). Public spaces and happiness: Evidence from a large-scale field experiment. *Health & Place*, (56), 9–18.
- [55] Liu, X., Wu, J., Yang, H., Zhao, F., Qin, Y., Wu, J., Yan, H., Xu, Y., & Zhang, L. (2023). Caregiver perceptions of children's and adolescents' psychosocial functioning during the stringent COVID-19 lockdown restrictions in Shanghai: Cross-sectional study. *JMIR Public Health and Surveillance*, (9), e43689.
- [56] Zeng, Z., Wang, L., Huang, L., Huang, K., Zhou, Y., & Tao, Y. (2023). Analysis on medical students' psychosomatic health status and its influencing factors during the COVID-19 lockdown in a particular university in Shanghai. *Zhejiang Medical Education*, 22(1), 30–36.
- [57] Soares, I., Venhorst, V., Weitkamp, G., & Yamu, C. (2022). The impact of the built environment on creativity in public spaces of Dutch university campuses and science parks. *Journal of Urban Design*, 27(1), 91–109.
- [58] Samuelsson, K., Giusti, M., Peterson, G. D., Legeby, A., Brandt, S. A., & Barthel, S. (2018). Impact of environment on people's everyday experiences in Stockholm. *Landscape and Urban Planning*, (171), 7–17.

- [59] Kajosaari, A., & Pasanen, T. P. (2021). Restorative benefits of everyday green exercise: A spatial approach. *Landscape and Urban Planning*, (206), 103978.
- [60] Du, Y., Zou, Z., He, Y., Zhou, Y., & Luo, S. (2022). Beyond blue and green spaces: Identifying and characterizing restorative environments on Sichuan Technology and Business University campus. *International Journal of Environmental Research and Public Health*, 19(20), 13500.
- [61] Soares, I., Weitkamp, G., & Yamu, C. (2020). Public spaces as knowledgescapes: Understanding the relationship between the built environment and creative encounters at Dutch University campuses and science parks. *International Journal of Environmental Research and Public Health*, 17(20), 7421.
- [62] Peker, E., & Ataöv, A. (2020). Exploring the ways in which campus open space design influences students' learning experiences. *Landscape Research*, 45(3), 310–326.
- [63] Dou, P. (2022). Evidence-based healing campus design: Biophilic design as an emerging strategy for enhancing environment. *Time + Architecture*, (5), 20–27.
- [64] Nordh, H., Evensen, K. H., & Skår, M. (2017). A peaceful place in the city—A qualitative study of restorative components of the cemetery. *Landscape and Urban Planning*, (167), 108–117.
- [65] Ibes, D. C., & Forestell, C. A. (2022). The role of campus greenspace and meditation on college students' mood disturbance. *Journal of American College Health*, 70(1), 99–106.
- [66] Howes, D. (2014). Introduction to sensory museology. *The Senses and Society*, 9(3), 259–267.
- [67] Yan, B., Wu, J., & Quan, M. (2023). Better to have some tea: The “healing” psychological experience of contemporary youth. *China Youth Study*, (7), 93–103.
- [68] Hartig, T., Catalano, R., Ong, M., & Syme, S. L. (2013). Vacation, collective restoration, and mental health in a population. *Society and Mental Health*, 3(3), 221–236.
- [69] Kohrt, B. A., Ottman, K., Panter-Brick, C., Konner, M., & Patel, V. (2020). Why we heal: The evolution of psychological healing and implications for global mental health. *Clinical Psychology Review*, (82), 101920.
- [70] Pykett, J., Campbell, N., Fenton, S., Gagen, E., Lavis, A., Newbigging, K., Parkin, V., Williams, J., & Members of the Institute for Mental Health Youth Advisory Group. (2023). Urban precarity and youth mental health: An interpretive scoping review of emerging approaches. *Social Science & Medicine*, (320), 115619.
- [71] Finnerty, R., Marshall, S. A., Imbault, C., & Trainor, L. J. (2021). Extra-curricular activities and well-being: Results from a survey of undergraduate university students during COVID-19 lockdown restrictions. *Frontiers in Psychology*, (12), 647402.
- [72] Insel, T. R. (2022). *Healing: Our Path From Mental Illness to Mental Health*. Penguin Press.
- [73] Manzo, L. C. (2005). For better or worse: Exploring multiple dimensions of place meaning. *Journal of Environmental Psychology*, 25(1), 67–86.
- [74] Wang, S., & Mei, H. (2020). Study on the factors affecting the restoration of university campus space in winter cities. *Architectural Journal*, (S1), 82–86.
- [75] Yan, N., & Halpenny, E. A. (2022). Tourists' savoring of positive emotions and place attachment formation: A conceptual paper. *Tourism Geographies*, 24(2–3), 369–389.
- [76] Park, C. W., MacInnis, D. J., Priester, J., Eisingerich, A. B., & Iacobucci, D. (2010). Brand attachment and brand attitude strength: Conceptual and empirical differentiation of two critical brand equity drivers. *Journal of Marketing*, 74(6), 1–17.
- [77] Van Cappellen, P., Rice, E. L., Catalino, L. I., & Fredrickson, B. L. (2018). Positive affective processes underlie positive health behaviour change. *Psychology & Health*, 33(1), 77–97.
- [78] Marujo, H. A., & Neto, L. M. (2020). *Positive Countries and Communities: Cross-Cultural Perspectives and Qualitative Research Orientations in Positive Psychology* (J. Wu, Trans.). Southwest China Normal University Press.
- [79] Whitlock, J., Wyman, P. A., & Moore, S. R. (2014). Connectedness and suicide prevention in adolescents: Pathways and implications. *Suicide & Life-Threatening Behavior*, 44(3), 246–272.
- [80] Campos, B., Shiota, M. N., Keltner, D., Gonzaga, G. C., & Goetz, J. L. (2013). What is shared, what is different? Core relational themes and expressive displays of eight positive emotions. *Cognition & Emotion*, 27(1), 37–52.
- [81] Xu, L. (2016). Restorative environment, health and green urbanism. *South Architecture*, (3), 101–107.
- [82] Meng, D., & Xu, L. (2022). Retrospect and prospect of frontier research on healing architecture and healing environment based on bibliometrics method. *Architectural Journal*, (S1), 170–178.
- [83] Csikszentmihalyi, M. (1990). *Flow: The Psychology of Optimal Experience*. Harper Perennial.
- [84] Gee, N. R., Griffin, J. A., & McCardle, P. (2017). Human–animal interaction research in school settings: Current knowledge and future directions. *AERA Open*, 3(3), 1–9.
- [85] Alves, S., Betrabet Gulwadi, G., & Nilsson, P. (2022). An exploration of how biophilic attributes on campuses might support student connectedness to nature, others, and self. *Frontiers in Psychology*, (12), 793175.
- [86] Luo, S., Shi, J., Lu, T., & Furuya, K. (2022). Sit down and rest: Use of virtual reality to evaluate preferences and mental restoration in urban park pavilions. *Landscape and Urban Planning*, (220), 104336.
- [87] Subiza-Pérez, M., Korpela, K., & Pasanen, T. (2021). Still not that bad for the grey city: A field study on the restorative effects of built open urban places. *Cities*, (111), 103081.
- [88] Angela Duckworth. (2016). *Grit: The Power of Passion and Perseverance* (H. Hong, Trans.). Commonwealth Magazine Publishing.
- [89] Miller, B. F. (2022). Making progress on mental illness: A former NIH leader advocates more holistic approaches to mental health care. *Science*, 375(6582), 728.

场所依恋与疗愈环境： 封闭校园中积极情绪与空间类型关系研究

孟丹诚¹，徐磊青^{1,2*}

1 同济大学建筑与城市规划学院，上海，200092

2 同济大学国家现代化研究院城市更新中心，上海，200092

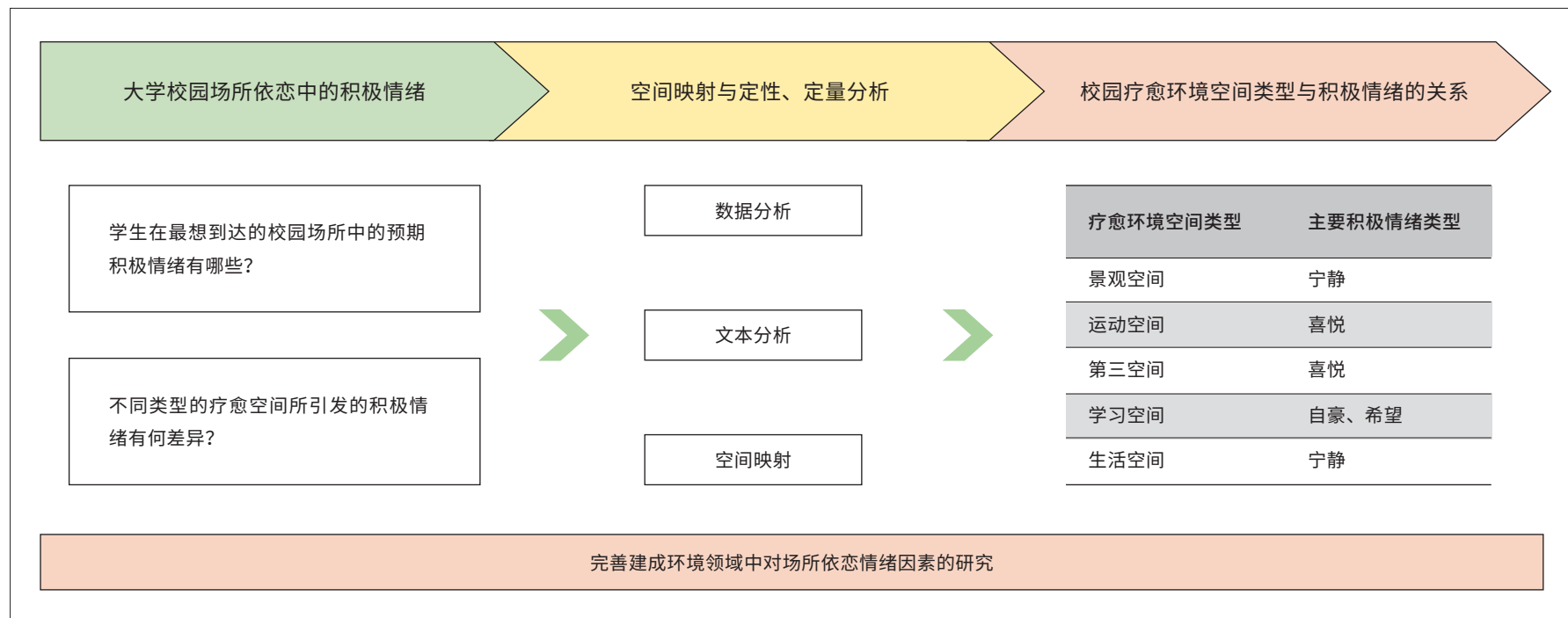
*通讯作者

地址：上海市杨浦区四平路1239号

邮编：200092

邮箱：leiqingxu@163.com

图文摘要



文章亮点

- 确定了大学校园场所依恋中的主要积极情绪类型
- 发现了大学校园中第三空间等非自然场所同样具有疗愈潜力
- 提出促进积极情绪的场所营造是构建疗愈环境的重要途径
- 完善了建成环境领域中对场所依恋情绪因素的研究

关键词

场所依恋；
恢复性；
疗愈环境；
积极情绪；
疗愈建成环境；
大学校园；
校园封闭

摘要

大学校园疗愈环境的营建有利于提升大学生身心健康。近年来，场所依恋的情绪因素在疗愈环境研究领域引起了较多关注。然而，不同疗愈空间的物质空间特征和积极情绪表现的关系尚不完全清晰。本研究通过问卷调查和访谈的方式调研了在同济大学四平路校区校园封闭期间学生们最期望到访的校园场所，并且想象相关

活动和情绪体验。研究使用IBM SPSS对积极情绪进行聚类分析,并确定校园场所中的主要积极情绪类型为喜悦、宁静、希望、自豪和兴趣。研究同时将用地性质及场地中的设施与积极情绪、行为活动进行空间映射,并将大学校园疗愈环境的主要类型划分为景观空间、运动空间、第三空间、学习空间和生活空间,而后借助MAXQNA软件对访谈文本内容进行编码与主题分析,同时对比分析了各空间类型中的积极情绪差异。最后,研究提出,促进积极情绪的场所营造是创造疗愈环境的重要途径,本研究的结论可为疗愈校园规划设计及干预措施提供参考。

收稿时间

2023-03-23

编辑

田乐,王胤瑜,高雨婷

翻译

周奕辰,田乐,王胤瑜

1 引言

大学阶段是青春期向成年早期过渡的关键时期。由于人际关系、学业竞争与就业压力,大学生面临着心理健康的挑战,包括抑郁、焦虑等^{[1][2]}。新冠肺炎疫情期间,由于学校关闭,大学生的社会接触减少,更容易感到焦虑、孤独或压力^{[3]-[5]}。但校园封闭并未影响师生对校园的场所认同和场所依恋^[6]。在压力、疲劳状态下,场所依恋和场所记忆能够起到疗愈作用^{[7][8]},尤其能够有效减少抑郁、焦虑^[9]。

大学校园疗愈环境通过生理、心理和社会途径提升大学生身心健康^[10]。大学生大部分活动都在校园内开展,校园环境与学生学术表现、福祉等密切相关^{[11][12]}。已有较多研究证明了校园绿色环境的益处,例如生活质量提升、积极情绪增加、压力减小^[11],以及注意力恢复^[13]。通过对校园中土地利用、道路环境和设施用地进行改善,能够提升校园环境可步行性并提高大学生体力活动水平,从而降低其患病风险^[14]。除了物理环境影响因素外,情绪感知因素与社会环境因素近年来逐渐成为校园疗愈环境领域探讨的热点。虽然已有学者论证了积极心理学理论用于提升校园健康环境的干预途径^[15],也有学者指出校园场所依恋的产生离不开积极的情感体验^[16],然而,国内外有关场所依恋的研究较少关注其形成与发展的过程^[17],尤其是情绪对于场所依恋形成的影响作用^[18]。与此同时,积极情绪与疗愈环境的关系研究尚处于起步阶段^[19],不同疗愈空间的积极情绪表现和物质空间特征之间的关系尚不完全清晰。

因此,研究以中国上海市同济大学四平路校区为例,在2022年疫情封控时期对在校学生进行问卷调研,包括1)空间位置数据和访谈数据的收集;2)积极情绪的空间映射;3)访谈数据的文本分析及与空间类型的关联分析。研究旨在探索以下问题:1)大学生在封闭校园内最想到达

的场所中的预期情绪有哪些?2)不同空间类型的疗愈环境所引发的积极情绪有何差异?研究旨在拓展场所依恋与疗愈环境的理论研究,为大学校园疗愈环境营造提供设计指导依据。

2 文献综述

2.1 场所依恋

段义孚在其著作中描述了“恋地情结”(Topophilia)一词,指人与地方之间存在的深厚的情感联系,如地方所带来的依附感和归属感^[20]。“场所依恋”(place attachment)指人与场所的联系,包括情绪、信仰、行为活动等^{[21][22]}。人、发展过程和场所是场所依恋这一概念的三个维度^[23]。既有场所依恋研究重视场所依恋中的个体差异,场所物质特征及场所依恋的发展过程却在很大程度上被忽略^{[24][25]}。然而,正如克里斯托弗·亚历山大所言,“人们的经验感受大致是相同的”^[26];也有研究表明,人格特质在恢复性体验中没有发挥重要作用^[27]。因此,关于场所依恋的发展过程和场所的物质空间特征有待深入探索。

2.2 积极情绪

场所依恋的发展过程维度包括情绪、认知和行为^[23],其中情绪对于形成场所依恋尤为关键^{[24][28][29]}。近年来,针对场所依恋发展过程中情绪因素的研究兴趣有所增加^[17]。诸多研究表明,积极情绪对场所依恋的形成有着正向的影响^{[18][30]-[32]}。积极情绪、积极社会关系与身体健康在螺旋式上升动态中互相影响^[33]。积极情绪影响着学习的重要方面,例如注意力、动机、记忆^[34];积极情绪体验也是减压并促进恢复的关键途径^[35]。

心理学家芭芭拉·L·弗雷德里克森总结了10类在日常生活中具有代表性的积极情绪,分别为喜悦、感激、宁静、兴趣、希望、自豪、娱

乐、灵感、敬畏和爱^[36]。功能性近红外光谱成像^[37]和脑电图^[38]研究结果显示,特定视频片段带来的上述10类情绪根据大脑的波段可以分为三组:1)鼓舞情绪,包括感激、希望、自豪、灵感和敬畏;2)嬉戏情绪,包括喜悦、兴趣和娱乐;3)和谐情绪,包括宁静和爱。

2.3 疗愈环境

健康包括身体、精神和社会层面的完全健康,并不仅仅指没有疾病^[39]。疗愈意味着从偏离健康的状态中进行恢复或寻求改善^[40],是身体、心灵和精神层面恢复的过程^[41]。目前校园疗愈环境研究多集中于自然环境带来的益处。例如,校园中的绿地可促进学生的恢复性感知、提升生活质量^[42]。在宿舍内,亲近自然的窗景也对大学生的心理健康有着促进作用^[43]。校园中的生物多样性在视觉、听觉等感知层面同样有助于大学生的情绪恢复^[44]。

已有学者提出了“疗愈性公共空间框架”(therapeutic public spaces framework)^[45]、“社会恢复性城市主义”(socially restorative urbanism)^[46]等理论,并总结了社会恢复性城市设计模型^[47],指出了“第三场所”的疗愈潜力^[48]。“第三场所”(Third Place)指可供人们社交或聚会的公共场所,它不同于家庭和学校或工作单位,而面向社区居民或兴趣团体,提供社会联系并营造非正式的社交感,促进自我实现从而改善心理健康^{[49][50]}。城市中典型的“第三场所”包括咖啡馆、餐厅等^{[49][50]},这些空间能够为年轻人提供更多社会资本和社区意识,进而提高其心理健康与福祉^[51]。

相较于健康校园研究所注重的保障安全及促进体力活动等层面^{[52][53]},校园疗愈环境研究较为关注社会文化、心理情绪等可促进大学生身心健康的途径^[10]。由于大学校园在城市中承担着社会、文化的职能,校园中除绿地外的场所也具有多样的疗愈潜力。对年轻人而言,社区中心等公共活动空间相比自然景观空间更能够提升幸福感^[54]。校园中的第三场所(如咖啡店、甜品站、零售店)有助于大学生身心恢复并获得愉悦的情绪^[48]。

3 研究方法

3.1 研究区域

同济大学共分为四个主要校区:四平路校区、嘉定校区、沪西校区、沪北校区,并在临港等地拥有研究基地。本次研究区域为四平路校区,分为主校区和其他规模较小的校区,包括彰武路校区、铁岭校区以及南校区(图1)。四平路主校区承担着教学、行政办公、日常生活服务的职能;作为历史文化底蕴最为深厚的主校区,校园内的建筑、景观风格也随着时代发展不断演变。其他规模较小且分散的校区大多以学生宿舍为主。

3.2 研究设计

2022年5月1~22日,研究团队招募同济大学的在校学生参与在线问卷及访谈。招募信息通过微信、在线公告等方式进行发布。受上海疫情影响,从2022年3月中旬开始,同济大学各校区陆续实行准封闭管理并转为线上授课;4月初,校园楼宇进入不同程度的封控。相较于正常时期,上海市大学生在此期间运动减少、屏幕浏览次数增多、睡眠状况变差、社会交往缺失^[55];睡眠问题、相关身心障碍检出率远高于正常时期^[56]。在已有的研究中,为了测量注意力和压力的恢复水平,通常采用预设刺激源的方法,让受访者处于焦虑、压力和精神疲倦的状态^[8],而本研究的开展时机避免了该方法的不确定性。

问卷调查覆盖四平路校区、嘉定校区、沪西校区、沪北校区、临港研究基地^①,涉及建筑与城市规划、土木工程、环境科学与工程、物理科学与工程、设计创意、医学等多个学院,涵盖本科生、硕士研究生、博士研究生。受访者共计188人(男性78人,女性110人),年龄17~30岁不等。在线问卷通过GPS定位确定受访者的地理位置信息,仅在校同学可以参与作答。

受访者在被问到“假如此时有1个小时自由活动时间,您最想要前往校园的哪个地方”时,需要一并在四平路校区的地图上标记出1~2个地理位置;然后,受访者被要求对期望开展的活动进行开放式的描述,包括地点、人物和具体的行为;最后,为了解情绪体验与疗愈环境的关系,受访者被要求“想象已经到访并开展相应活动的情绪体验”,并从列出的10类积极情绪中选择相应的情绪——沿用了弗雷德里克森总结的10种情绪分类方法^[36],并根据中文语境对表达方式进行了微调——包括娱乐与享乐、有趣与好奇、喜悦与开心、爱与信任、宁静与平静、敬畏与震撼、希望与乐观、感激与感恩、自豪与自信、鼓舞与激励。受访者还被要求回答到访此地的原因,以及具体的情绪感受。在填写调查问卷后,研究人员还会对每位受访者进行3~5分钟的一对一半结构化访谈,以获得有关活动、情绪和场所的具体描述。研究共收集到访谈文本274份。

3.3 数据分析

本研究使用IBM SPSS对积极情绪进行聚类分析,以确定主要情绪大类。基于受访者提供的情绪数据,在ArcGIS中将四平路校区划分为20m×20m的网格单元,从而计算每个单元网格中积极情绪出现的数量并进行可视化。研究同时将用地性质及场地中的设施(如绿地、水面、道

① 尽管受访学生居住在各自校区,但学习和工作仍然在四平路校区。此外,由于学校培养方案设计,来自嘉定校区、临港研究基地等其他校区的学生,入学第一年和最后一年要求在四平路校区进行学习及就业实习。因此,研究团队认为全校所有校区的学生都曾在四平路校区有较长时间的生活学习体验,对四平校区的情感体验都是具有说服力的。

路、校园建筑、座椅设施等)与积极情绪、行为活动进行空间映射。类似的方法已被用于映射和量化场所感知^{[57]-[59]},但尚未被用于分析大学校园中的积极情绪空间。积极情绪出现频率较高的单元被视作“高频情绪单元”。同时,研究团队借助MAXQNA软件对274份访谈文本内容进行手动编码,并从编码系统中选择有代表性的主题进行分析;而后通过IBM SPSS进行方差分析,以研究活动类型、空间类型对于积极情绪的影响差异。

4 研究结果

4.1 积极情绪大类

研究以10类积极情绪的分别出现情况作为SPSS中分析的个案,出现记录为“1”,未出现则记录为“0”。将10类积极情绪作为变量进行聚类分析,采用组间联接的聚类方式,结果如图2所示。横坐标代表情绪类别之间的距离,数值越小,距离越短,越容易被划分为一类。最终,根据图形估计最优聚类数量及既有积极情绪分类,以距离12为切点,10类积极情绪被划分为5个大类。

1) 喜悦:娱乐与享乐、喜悦与开心。

2) 宁静:宁静与平静。

3) 希望:希望与乐观、鼓舞与激励。

4) 自豪:敬畏与震撼、感激与感恩、自豪与自信、爱与信任。

5) 兴趣:有趣与好奇。

将各大类积极情绪进行频率分析,结果如图3所示。在校园封闭期间,同学们在其想象所处的疗愈环境中主要预期获得喜悦(37%)和宁静(24%)情绪,随后依次为希望(18%)、自豪(15%)和兴趣(6%)。

4.2 校园疗愈环境中的活动

同学们最主要希望开展的活动类型为观景放松(31.8%)和休闲娱乐(31.4%),随后依次为体育运动(15.3%)、学习(9.5%)、社交互动(6.9%)和饮食(5.1%)(表1)。

4.3 不同类型空间的积极情绪差异

图4代表着单元网格中各大类积极情绪的出现频率。蓝色代表频率较低,红色代表频率较高。依据文本分析和空间映射的结果,结合既有疗愈校园空间类型的研究^{[27][60]-[62]},本研究将涉及积极情绪的空间类型划分

表 1: 校园疗愈环境中的预期活动类型分析

| 预期活动类型 | 占比 | 主题与示例(数字表示提及频次) |
|--------|-------|--|
| 观景 | 31.8% | 发呆(15);晒太阳(15);撸猫(14);躺(11);吹风(5);树林(6);看河(3);楼顶看风景(3);喂鱼(1);看鹅(1);赏花(1);观竹(1);倚在山坡石柱(1) “在秋千园的草坪晒晒太阳”; “躺在情人坡草坪上看来来往往的人”; “去楼顶看风景” |
| 休闲娱乐 | 31.4% | 散步(53);荡秋千(12);看展(4);桌游(4);弹琴(3);听音乐(1);唱歌(1);购物(1);摄影(1);玩电脑游戏(1) “在樱花大道上拍照,和同学一起拍毕业照”; “桌游+唱歌”; “使用我落在黑楼的台机,玩‘城市天际线’游戏” |
| 体育运动 | 15.3% | 跑步(19);球类运动(13);游泳(5);玩滑板(3);健身(1) “我想去地下车库滑滑板”; “想去学校健身房健身并拉伸”; “疫情封控在宿舍久了,更加向往户外空间,想自由活动,结伴打球” |

续表见下页

表 1: 校园疗愈环境中的预期活动类型分析

| 预期活动类型 | 占比 | 主题与示例 (数字表示提及频次) |
|--------|------|---|
| 学习 | 9.5% | 看书 (11) ; 学习 (9) ; 做实验 (5) ; 干活 (5) ; 回实验室工作 (1) ; 写论文 (1) “看一看学院中亲自改造的公共空间” ; “最后体验一下图书馆生活” ; “想要坐在图书馆九楼窗边, 去图书馆学习有氛围” |
| 社交互动 | 6.9% | 聊天 (14) ; 会见学长学弟 (1) ; 看望老师同学 (1) ; 谈恋爱 (1) ; 找同学们玩 (1) ; 社团活动 (1) “给实验室的姐妹们泡几杯摩卡” ; “想找个风景好的地方, 稍微有私密性但也有人气的地方和朋友聊天” ; “在秋千园中和朋友一起聊聊最近的日常” |
| 饮食 | 5.1% | 吃冰淇淋 (1) ; 吃雪糕 (1) ; 喝果汁 (1) ; 喝咖啡 (1) ; 喝奶茶 (1) ; 吃麦当劳 (1) ; 吃烧烤 (1) ; 吃酸辣米线 (1) ; 小酌 (1) ; 吃面包 (1) ; 吃炸鸡腿 (1) ; 吃夜宵 (1) ; 吃正餐 (1) ; 吃水果 (1) “去面包房享用面包” “去北苑食堂吃炸鸡腿” ; “吃重庆小面家的酸菜米线” |

为以下5类: 景观空间、运动空间、第三空间、学习空间, 以及生活空间。

1) 景观空间包含校园内绿色植物和滨水景观为主要的空间, 如三好坞、和平路两侧景观、秋千花园、樱花大道等。

2) 运动空间主要指进行体育活动的场地或场馆。运动场地包含一二·九运动场、人工草坪足球场、网球场、排球场、篮球场、彰武路校区的沿河健身跑道等; 体育场馆包括游泳馆、羽毛球馆、攀岩馆、乒乓球馆等。

3) 第三空间借鉴了“第三场所”的概念^[48], 主要指校园内供大学生增进社会联系、进行非正式社交活动的场所, 如咖啡吧、点心亭、饮食广场等。饮食广场中以西苑食堂为代表, 北苑、学苑次之; 还包含樱花大道上的爱校路面包房、三好坞景观餐厅、建筑与城市规划学院C楼的咖啡吧, 以及教育超市。

4) 学习空间主要包含科研、学习和办公的空间, 如实验室、图书馆、工作室、院系办公楼等。

5) 生活空间指学生们日常起居休憩的场所, 主要指宿舍。

研究将各大类积极情绪在每个网格单元中的占比进行统计, 并利用单因素方差分析不同空间类型中各大类积极情绪的差异性。结果显示, 喜悦、宁静、自豪情绪在各空间类型中均呈现出显著性差异 (表2)。通过SPSS计算各大类情绪在不同空间类型中的占比平均值, 总体而言, 景

观空间、生活空间带来的宁静情绪显著高于总体空间中的平均值; 运动空间、第三空间带来的喜悦情绪显著高于总体空间中的平均值; 学习空间带来的自豪和希望情绪高于总体空间中的平均值 (图5)。

5 讨论

5.1 基于积极情绪提升的疗愈环境

研究在已有理论上, 分析了积极情绪与在校园中预期开展活动类型、与不同空间类型的校园疗愈环境的关系。各空间类型中的主要积极情绪如表3所示, 下文针对代表性空间类型——景观空间、第三空间、学习空间——中的主要积极情绪进行详细分析。

5.1.1 景观空间: 促进宁静情绪的提升

校园景观空间能够提供最多、最广泛的积极情绪。在景观空间中的观赏、放松等行为能够带来较高的宁静情绪 (图6), 这印证了南京大学校园疗愈环境的研究结果——学生们最倾向在自然而平静的场所进行放松舒缓^[63]。安静是疗愈体验的重要部分^[64], “发呆”“看风景”等活动偏向个体情绪的自我调节, 与之相似的正念、冥想行为都能够增强积极情绪^{[19][65]}。

表 2：情绪类型与空间类型的单因素方差分析结果

| 情绪类型 | 变量来源 | 平方和 | 自由度 | 均方 | F | 显著性 |
|------|------|--------|-----|-------|--------|---------|
| 喜悦 | 组间 | 5.415 | 4 | 1.354 | 15.857 | 0.000** |
| | 组内 | 21.171 | 248 | 0.085 | | |
| | 总计 | 26.586 | 252 | | | |
| 宁静 | 组间 | 4.410 | 4 | 1.103 | 15.583 | 0.000** |
| | 组内 | 17.546 | 248 | 0.071 | | |
| | 总计 | 21.956 | 252 | | | |
| 希望 | 组间 | 0.288 | 4 | 0.072 | 1.580 | 0.180 |
| | 组内 | 11.314 | 248 | 0.046 | | |
| | 总计 | 11.602 | 252 | | | |
| 自豪 | 组间 | 1.515 | 4 | 0.379 | 8.346 | 0.000** |
| | 组内 | 11.257 | 248 | 0.045 | | |
| | 总计 | 12.772 | 252 | | | |
| 兴趣 | 组间 | 0.072 | 4 | 0.018 | 1.144 | 0.336 |
| | 组内 | 3.888 | 248 | 0.016 | | |
| | 总计 | 3.960 | 252 | | | |

注

**表示 $p < 0.01$ 。

不仅如此，校园景观环境独特的感官体验能带来愉悦感，促进大学生形成与地方的联系，疗愈身心。“水边”“竹林”“湖心亭”在受访者的描述中常常被提及。水系从三好坞引出，顺着和平路流淌，最终汇聚于图书馆西南侧叠泉池塘。虽然水系的面积较小，但两侧水杉林等花草树木丰富了景观的层次；水系两侧的座椅可供同学们进行休闲、放

松活动。情人坡场地中的轻微地形变化为同学们或躺或坐的休息提供了机会，这些感官体验有利于积极情绪的触发并增强场所依恋^[31]。此外，鱼、猫、鸟、刺猬等动物，常被受访者提到。在本研究中，通过描述统计分析，发现“撸猫”行为所带来的喜悦（39.6%）、兴趣（26.6%）情绪（表4）分别高于这两类情绪的整体平均值。触摸将人与地方联系在一

表 3: 不同校园疗愈环境对应的积极情绪

| 校园疗愈环境 | 主要积极情绪类型 |
|--------|----------|
| 景观空间 | 宁静 |
| 运动空间 | 喜悦 |
| 第三空间 | 喜悦 |
| 学习空间 | 自豪 希望 |
| 生活空间 | 宁静 |

注

每个空间类型中，显著高于平均值的积极情绪大类被确认为该空间类型中的主要积极情绪类型。

起，缓解压力，促进幸福感^[66]。这也解释了为何校园中的野生动物成为较多受访者希望喂食和抚摸的对象。动物陪伴能为大学生带来治愈的心理体验^[67]，本研究的结论补充了动物陪伴的益处。

5.1.2 第三空间：促进喜悦情绪的提升

社会交往和社会联系对于积极情绪、健康和福祉的贡献，已经在神经科学领域得到了验证^[19]。这类“集体疗愈”通过创造陌生人的偶遇和

维持熟人之间的持久关系来促进人们的喜悦情绪^[68]。社会包容、互帮互助、接触社会有助于促进群体疗愈^[69]。在提升年轻人身心健康的干预措施中，最重要的是与亲人和朋友进行社交互动，以获得与场所的联系^[70]。

校园中的第三空间提供了社团活动、创意娱乐、美食品尝的机会，提供社会联系和情感支持，在塑造喜悦的积极情绪方面发挥着重要作用（图7）。例如，樱花大道两侧的长椅方便了大学生小憩、休闲娱乐、社交。“（建筑与城规学院）C楼大厅中的钢琴旁”具有同样的价值，在这里同学们可以开展演奏、听音乐、唱歌等艺术活动，在校园封闭期间对学生的健康有益^[71]。

诸如食堂、咖啡厅、面包房、超市等第三空间，与秋千花园、樱花大道这类景观空间一起进一步成为重要的社会校园互动载体，并作为学生们喜悦情绪的重要来源。这与于美国南加州大学开展的调研结果一致^{[48][56]}，即校园中的餐饮设施和公共公园一样，能够带来积极的情感体验。在第三空间中与“吃美食”相关的主题被受访者提及的频率最高（14次），且餐厅和咖啡馆通常与社交活动一同被提及，这也表明饮食场所在第三空间中的受欢迎程度最高^[71]。

5.1.3 学习空间：促进自豪和希望情绪的提升

自豪情绪较多出现于学习空间中。即便在校园封闭时期，部分大学生们还是希望重返科研工作或进行自我提升，如进行“看书”“学习”“做实验”等活动（图8）。这类疗愈偏向于个体在持续不断的自我超越中完成自我实现，提升个体的使命感、价值感，增强自信、自尊^[72]。

校园中有关于空间的特殊记忆、个性化的体验同样也带来了特别的疗愈体验。如有受访者表达了对于“党支部改造后的雅憩公共空间”的思念之情，而这可能与受访者参与校园环境的改造经历有关。也有受访

表 4: 撸猫行为与各大类积极情绪关系的统计结果比较 (N=14)

| 情绪类型 | 提及该类情绪的频次 | 最小值 | 最大值 | 平均值 | 标准差 | 中位数 |
|------|-----------|-------|-------|-------|-------|-------|
| 喜悦 | 16 | 0.000 | 1.000 | 0.396 | 0.257 | 0.367 |
| 宁静 | 7 | 0.000 | 1.000 | 0.183 | 0.275 | 0.056 |
| 希望 | 3 | 0.000 | 0.333 | 0.040 | 0.103 | 0.000 |
| 自豪 | 7 | 0.000 | 0.500 | 0.115 | 0.172 | 0.000 |
| 兴趣 | 9 | 0.000 | 1.000 | 0.266 | 0.290 | 0.225 |

者表示“想回学院，在学院的露台才是最有氛围的地方”，获得了希望情绪。这表明与场所有关的重要经验有助于营造出场所的独特意义^[73]。

5.2 校园疗愈环境提升策略

基于本研究的结果，根据不同疗愈环境类型与积极情绪的关系，本文提出以下面向积极情绪提升的校园疗愈环境建设策略。在校园更新和规划中，首先应注重第三空间的配置，将其融入学生的日常生活，以激发喜悦情绪、更好地培育场所依恋，并改善心理健康。例如，结合餐厅、咖啡馆、食堂创造适合大学生的社交空间；在大学生活动中心和小型广场等场所设计适合聚会和团体活动的空间。在景观设计方面，注重同学们的多感官体验，在设计时考虑冥想、正念和放松等减压活动的开展需求，以激发喜悦和宁静的情绪。在校园景观空间运营和维护中应注重生态多样性和动物陪伴的亲近措施。对于学习空间，学校管理者可以鼓励学生参与微更新和改造途径，让学生更为自主地建立与校园空间和设施的联系，从而提高自豪感，增强归属感和认同感。

5.3 不足与展望

研究存在以下几点不足之处。第一，在研究设计方面，要求受访者在校园封闭时期想象校园中最期望到访的场所，并且想象相关活动和情绪体验。在既有的恢复性研究中，该方法较为强调恢复性理论的框架中的个人记忆和主观感受^{[71][8]}。本研究设计由于并非到访当地进行现实体验，存在一定的主观偏差，且很大程度上依赖于受访者对场所的认知和了解。第二，由于校园封闭时期不能开展面对面的调研，因此研究未对场所依恋的强度和维度进行测量。第三，校园环境对大学生的疗愈作用可能在性别、年龄、居住时间上存在差异，需在对比分析基础上，进一步探究场所依恋在校园物质环境与积极情绪之间的中介作用。此外，未来研究有待通过结合脑科学、神经科学等方法获得更精确的情绪感知数据；考虑个体因素的影响，更为精确地量化研究积极情绪带来的疗愈效益与空间要素的关系；结合场所依恋水平量表与情绪、空间和活动进行相关分析，完善场所依恋的情绪感知维度的研究。此外，未来研究有待扩展至城市空间类型学领域，完善疗愈环境的理论和实践。

6 结语

研究基于场所依恋理论，探讨了封闭校园中的积极情绪与疗愈环境的关系，进而建立了校园疗愈环境和积极情绪的关系。研究将同济大学四平校区中的校园疗愈环境分为5个类型：景观空间、运动空间、第三空间、学习空间和生活空间。喜悦与宁静是五大类积极情绪中最具代表性的情绪。不同的活动类型引起了不同种类积极情绪的产生，为校园疗愈

环境提升提供了基于积极情绪视角的理论依据。除医疗、保健设施外，促进积极情绪的场所营造也是实现疗愈环境的重要途径。基于社会、环境和文化的综合视角，围绕积极情绪提升开展的相应景观设计和规划实践，能够更为有效地应对心理健康的危机。

致谢

作者真诚感谢匿名同行评议专家所付出的时间和精力，评审专家对本文的修改意见使本文获益匪浅。

图 1. 同济大学四平路校区（来源：同济大学资产与实验室管理处）

图 2. 积极情绪的聚类分析谱系图

图 3. 校园中各积极情绪大类分析

图 4. 积极情绪的总体分布及主要空间类型

图 5. 不同空间类型中积极情绪的差异分析

图 6. 景观空间中的宁静情绪（以三好坞、和平路、樱花大道的景观空间为例）。绿色颜色越深，表示宁静情绪的频次越高。

图 7. 第三空间中的喜悦情绪（以西苑食堂、学苑食堂、学生活动中心及教育超市为例）。蓝色颜色越深，表示喜悦情绪的频次越高。

图 8. 学习空间中的自豪情绪（以图书馆、教学楼及部分学院楼宇为例）。橙色颜色越深，表示自豪情绪的频次越高。