

Digital aesthetics and the (re)production of graffiti landscape: a case study of Guangzhou, China

In China, graffiti landscapes were born in a different context than in the West and are gradually becoming a means of urban and rural renewal. They form visual images of digital space through media communication, giving rise to a variety of aesthetic experiences. Taking Guangzhou, China, as a case study, this paper analyzes the spatial perception and aesthetic mechanisms of digital graffiti landscapes applying visual research methods such as photo evaluation and eye-tracking, using images of graffiti landscapes on social media as the base material. It was found that people's spatial perceptions of different types of graffiti landscapes differed. The aesthetic emotions of graffiti viewers with personal practice experiences are stronger than those who have not been to the case site. These differences are influenced by multi-scale factors. In the localized perspective of Chinese graffiti, the neuroscientific approach of eye-tracking technology and the bottom-up aesthetic observation provide references for the (re)production of urban and rural landscapes.

Keywords: Graffiti landscape; digital; aesthetics; spatial perception; visual analysis

Introduction

In Western countries, graffiti is often defined as a visual political means of dispossession and resistance, where citizens declare their spatial rights by expressing rejection and emotional expression of unequal treatment through graffiti and tagging (Yoon, 2020). A visual political reminder is presented (Hansen, 2021) as a means of debating social meaning (Buentello García & Rice, 2022), embodying the power play between social subjects (Iveson & McAuliffe, 2022). In contrast, the context in which urban graffiti was born in China is different from that in the West, as it did not emerge from issues of race, religion, politics, or inequality, but was closely linked to China's unique political, economic, and cultural system (Agustin & Chan, 2022). In China, graffiti has always

taken the form of a reflection of the will of the government, and the space in which it is placed has always been managed in a top-down manner. As early as the early years of the country, wall painting began to be a widely used form of propaganda in rural areas as a tool to mobilize the masses militarily, shape national consciousness, and disseminate information about the current situation. After the reform and opening up, Western street culture was introduced to China, and the combination of Western graffiti style and traditional Chinese aesthetics formed a cultural landscape that combined East and West (Zhang & Chan, 2022). Starting in 2000, two important Chinese graffiti exchange forums, CSN and GNC, presented Chinese graffiti to the world as an artistic exchange for the first time (Wei & Liu, 2018) Graffiti has become a mainstream art form in China.

With the rapid development of cultural industries and the deepening of cultural system reform, culture and art are gradually becoming new production factors to be incorporated into the development of Chinese urban and rural economies (Montalto et al., 2019), and the construction of place by graffiti is gradually emerging (Sitas, 2020). The economic benefits and commercial value behind graffiti are being recognized, making it one of the most important ways to revitalize urban and rural spaces (Parker & Khanyile, 2022). Collaboration between the government, capital, and graffiti artists has transformed graffiti from a spatially productive method representing social disorder to an art form with ornamental value (Shand, 2020). In recent years, the sources of spatial production of graffiti landscapes in China have become more and more diversified. Firstly, urban renewal in China presents an unprecedented large scale and high speed, and some old city spaces express local culture through graffiti landscapes in the renewal process. Secondly, a large number of disused factories have been revitalized into cultural and creative industrial parks by inserting functions, changing spatial forms and environmental appearance, and the shaping of graffiti landscapes is one of the key ways (Chen & Qi,

2021). At the same time, modern graffiti art has returned from the city to the countryside, and the countryside has also embarked on a graffiti beautification movement in order to beautify the living environment (Wang et al., 2022). The graffiti produced in different contexts will show significant differences, and the localized aspects of urban graffiti in China need to be thoroughly explored and analyzed.

Under the continuous penetration of information technology, the widespread use of Internet media has created carriers and channels for the dissemination of these urban and rural graffiti landscapes (Li & Yang, 2022). With the construction of linguistic and visual resources in cyberspace by tourists as well as residents (Wang & Feng, 2021), these graffiti landscapes are rapidly becoming emerging online hotspots. People generate perceptual experiences by visually interacting with real spaces (Wang et al., 2020) and jointly access virtual visual constructions on social media. They transform visual images and emotional experiences into texts, videos, and pictures that are surrounded by a wide range of people through big data algorithms and online distribution, triggering recording and sharing behaviors for cultural understanding, recognition, or emotional resonance in their circles (Che, Yang & Li, 2022). In this process, the production of visual images is actually a process of encoding and relaying spatial perceptions and landscape experiences (Pink, 2011), and visual images on new media such as photographs are vehicles for viewers to relay their perceptions, becoming objects with subjectivity, relevance, and sociocultural properties (Edwards & Hart, 2004).

On the other end, through the capture of visual images on online media, online audiences generate emotional moments that evoke the perception of urban and rural geographic spaces (Liu, 2022). In this process of visual dialogue, the public, social media, and geographic space work together to construct images of place as a new Chinese aesthetic and socio-ritual culture (De Seta & Proksell, 2015). The fusion of space,

emotion, and imagery and its translation into forms such as photographs for dissemination in cyberspace, while the media accelerates the spread of emotions and the formation of opinions (Su, 2021), is in fact a coexistence in a geographical sense, and the process the image of place spreads (Stylianou-Lambert, 2012). With the rise of online communication and popularity, digital place symbols are established, driving the reproduction of place and also stimulating economic development (Yi et al., 2021).

In this new mode of visual narrative and landscape experience, aesthetic practices become an essential dimension of the perception of graffiti space (Arnold, 2019), which encourages creative ways of looking at the landscape, noting more keenly how the place is presented and transformed (Patterson, 2016). The urban and rural graffiti landscape in cyberspace creates an emergent aesthetic form that is alien to tradition in its short, concise, and lived-in representation, connecting local spaces and aesthetics, recording the aesthetic preferences of the publisher (Langemeyer, Calcagni & Baró, 2018) in order to evoke public empathy and resonance. People's ability to increase their level of understanding of the design and transformation of external reality through their aesthetic behavior helps to expand the attractiveness of places at the perceptual level (Xenakis & Arnellos, 2017). However, this aesthetic response can also present differences depending on the type of landscape and the personal characteristics of the participants (Chon & Scott Shafer, 2009). In the process of urban and rural renewal and transformation, the effectiveness of social participation is measured through perceptual behaviors (Hwang & Kim, 2015). These direct spatial perceptions and aesthetic preferences arise as a result of the interaction between people and physical space, and become a novel means of public engagement to advise cultural landscape planning (Tieskens et al., 2018). Thus, by understanding people's aesthetic mechanisms for local spaces, the construction and

dynamic management of physical spaces in urban and rural areas will become evidence-based.

However, once a graffiti landscape has established a positive online communication image with digital visual elements, it is generally considered a successful landscape. Digital symbolic consumption spreads place branding through online social media, creating new lifestyles and consumer propositions (Che, Yang & Li, 2022). But when people stop examining and exploring their own spatial perceptions in favor of blind "check-in", we need to reflect on what digitalization has brought us. In China, the relationship between graffiti and the city seems to be harmonious, with managers giving the graffiti landscape a formal and legitimate space to live, but its bottom-up perceptual experience is also ignored. In this context of graffiti, which is distinct from Western graffiti, we wonder:

- Does this composite of online images and aesthetic experiences actually produce a positive spatial perception?
- Are there differences in the aesthetic perceptions brought about by digital graffiti landscapes from different local contexts?
- Is there an impact on the aesthetic perception of people who have witnessed digital graffiti landscapes?

Therefore, we take the representative graffiti landscape in Guangzhou, the origin of graffiti art in China, as the object of our study. Based on a series of visual analysis methods, we study people's visual perception of digital graffiti landscape and explore the digital aesthetic mechanism, in order to provide a reference for sustainable urban and rural landscape (re)production.

Study area and materials

Guangzhou is one of the origins of graffiti art in China (Wei & Liu, 2018). After 1990, the implementation of the city's state-owned land transfer system promoted the operation and renewal of urban land, creating the conditions for the birth of graffiti, which began to appear in a sporadic fashion. After the 2011 Asian Games, Guangzhou was widely reported abroad for its creative graffiti, and the government began to build creative cultural parks to provide space for graffiti to develop. Nowadays, the graffiti landscape produced by Guangzhou's urban and rural renewal is gradually becoming a popular space on the Internet. The continuous development of graffiti in Guangzhou and its integration with local cultural and social elements has given rise to diverse types of graffiti landscapes, including urban-cultural types, urban-creative types, and rural-art types. In urban historical districts, graffiti landscapes are a showcase of the city's history and culture, writing the city's historical stories through brand symbols such as intangible cultural heritage; some graffiti landscapes grow in creative cultural parks, expressing creativity through cartoon and animation elements with uniform themes and bright hues; and in villages, graffiti becomes one of the means of village renewal and renovation, as a way to artistically decorate old walls.

We selected a representative digital graffiti landscape in Guangzhou through the Chinese social media "Xiaohongshu". Xiaohongshu is a social media for daily life with over 100 million users, and the number of users is still growing rapidly. Becoming a popular digital landscape online requires not only a photo of the landscape to be posted on the web but also a certain level of attention to attract people to see it in person. The number of likes of the posted content is the most direct indicator to characterize its attention. Therefore, the research materials were obtained as follows: (1) Searching for "Guangzhou graffiti" on "Xiaohongshu", we obtained 15 notes with more than 1000 likes.

(2) The photos were screened to remove those that were not of the right size, blurred, had too many text elements, and those with a large number of people, people looking directly at the camera, and graffiti covering the whole surface, which might affect the landscape experience. (3) After further selection by experts with backgrounds in urban-rural and landscape planning, 26 graffiti photographs with appropriate image structures were finally identified as the visual analysis materials for the study. These photos involve five locations: urban-cultural type (Fuxue West Street in Beijing Road, 6 photos), urban-creative type (B.I.G. Haizhu Bay Creative Park, 2 photos; O2 Creative Park, 6 photos; Vip Creative Park, 6 photos), and rural-art type (Nanbeitai Village, 6 photos). They are presented in geographic space as shown in Figure 1.



Figure 1. Case area location and photo materials

Methodology

Photo evaluation

After obtaining 26 images of digital graffiti landscapes in Guangzhou as the basic research material, we first conducted a questionnaire survey on the Internet to collect

people's subjective aesthetic assessments of these graffiti landscapes through a photo evaluation method (Russell, War & Pratt, 1981). The emotions that arise when people feel, perceive, and evaluate the attractiveness of a place are called aesthetic emotions (Carlson and Berleant, 2004), a process that awakens the nervous system and stimulates positive expressions of pleasure in individuals (Russell & Snodgrass, 1989). This pleasurable emotion also stimulates their motivation to visit and has a significant impact on their choice and recommendation of the destination to others (Giné, Albert & Buendía, 2021). Accordingly, we selected the respondents' pleasure in viewing the images, their attraction to the landscape, and their willingness to participate as indicators of their aesthetic emotions during the process. Specifically, participants were asked to view each of the 26 graffiti-related images and rate their pleasure, attraction to the landscape, and willingness to participate on a 5-point Likert scale ranging from 1 "very low" to 5 "very high". The higher the participant's rating of the image, the more pronounced the positive aesthetic emotion in perceiving the digital graffiti landscape. A total of 52 aesthetic evaluations of the graffiti landscape were collected through the release of an online questionnaire. The design of the scale passed the reliability test (Cronbach's $\alpha = 0.936 > 0.6$). We counted these results to gain a preliminary understanding of whether this composite of online images and aesthetic experiences can actually produce positive spatial perceptions.

Eye-tracking experiment

After completing the photo evaluation, we used neuroscientific methods to tap into people's implicit aesthetic attitudes to make more accurate judgments. Eye-tracking techniques objectively translate subjects' perceived emotions of the landscape into intuitive eye-movement data for processing and analysis (Dupont, Antrop & Van Eetvelde, 2014). Using eye-movement metrics such as gaze duration, gaze frequency and

pupil diameter size (Table 1), we were able to infer subjects' visual perceptions while viewing the images (Guo et al., 2018; Kanovský et al., 2022) as a basis for scientific analysis of their aesthetic experiences that were not expressed through their behavior. Therefore, we designed an eye-tracking experiment in our study, in which subjects were recruited to view the previous 26 images about the graffiti landscape and primary eye-tracking data such as gaze duration, gaze frequency, and pupil diameter were collected using an eye-tracker model Tobii pro fusion (120hz). Because the mean pupil diameter varied among participants, we calculated a z-Score of pupil diameter between stimulus intervals to represent the variation in pupil diameter of participants in the statistics that follow. After the eye-movement indexes were collected, the subjects were promptly asked about their specific feelings towards the experimental stimulus materials utilizing an interview to assist in the analysis of the data results to explore the deeper aesthetic mechanisms of the landscape.

Table 1. Main acquisition indicators for eye-tracking experiment

Indicator	Content	Meaning
Gaze duration	Visual dwell time in each stimulus material	The longer the time, the more cognitive effort, the more focused the attention
Gaze frequency	Ratio of gaze duration to number of gaze points	The higher the frequency, the greater the interest in the image as a whole
Pupil diameter	Size of contractable pupil diameter on the iris of the eye	The more pronounced the change, the stronger the emotional arousal

We conducted a formal eye-tracking experiment in March 2022 and invited a total of 24 subjects to participate, all of whom were valid samples, and the basic profiles of the subjects are shown in Table 2. To control for the effects of variables such as age, occupation, income, and educational background on the experimental results (Dupont,

Antrop & Van Eetvelde, 2014), the experimental participants were college students, with a balanced ratio of men and women, with a high level of education and aesthetic viewing needs, as well as with a high capability of aesthetic and discriminatory skills, while being the main group for "check-in" in the digital pop space. Among them, 11 have visited the locations in the study image materials. We divided these experimental participants into two groups: those who had been to the case sites and those who had not, and observed whether there were differences in the aesthetic experiences of the subjects in the two groups, and asked about the reasons for this phenomenon through interviews. We coded the subjects according to their gender, such as M1 if the subject order was number one and the gender was male, and F1 for the same reason for females.

Table 2. Basic information of the subjects

Information	Group	Number	%
Gender	Male	13	54%
	Female	11	46%
Age	18-25	24	100%
Whether having visited the study site	Yes	11	46%
	No	13	54%
Major	Urban, Rural and Landscape Planning	13	54%
	Else	11	46%

Results and Discussion

Differences in aesthetic attitudes between urban and rural graffiti landscapes

Externally expressed attitude

From the results of the photo evaluation (Table 3), we can initially assess the differences in people's aesthetic attitudes toward different types of graffiti landscapes. In terms of the rating of pleasure level, B.I.G. Haizhu Bay Creative Park is the highest, and O2 Creative

Park is the lowest in comparison, but overall it is still the urban-creative type of graffiti landscape that inspires the highest pleasure emotion. The rating of the degree of being attracted to the landscape is close to the rating of the degree of pleasure, while the overall rating of the willingness to participate is relatively slightly lower than the first two. However, the ratings for all dimensions in Nanbeitai village were lower than the other types of graffiti landscapes, so the aesthetic emotions reflected by the rural-art graffiti landscapes were less positive than those of the urban graffiti landscapes.

Table 3. Statistics of photo evaluation results

Location	Mean		
	Pleasure	Attraction to the landscape	Willingness to participate
Fuxue West Street	3.698	3.607	3.316
B.I.G. Haizhu Bay Creative Park	4.346	4.279	4.029
O2 Creative Park	3.282	3.272	3.147
Vip Creative Park	3.814	3.721	3.429
Nanbeitai Village	3.625	3.423	3.108

After passing the homogeneity-of-variance, we conducted an ANOVA test on the differences between the different types using SPSS software (Table 4). It can be found that there is a significant difference in the evaluation of people's attraction to the urban-cultural type and the urban-creative type than the rural-art type of graffiti landscape. In terms of willingness to participate, people showed the strongest willingness to participate in the urban-creative type of graffiti landscape, followed by the urban-cultural type and finally the rural-art type, with significant differences in the aesthetic attitudes triggered by the three types. However, the three do not have significant differences in terms of the degree of pleasure. Preliminarily, there are significant differences in people's perceptions of urban and rural graffiti landscapes, and they have more positive aesthetic evaluations of urban graffiti landscapes than rural graffiti landscapes.

Inner hidden attitude

Furthermore, through eye-tracking experiments, we obtained data on subjects' eye activity when viewing the three categories of graffiti landscapes (Table 4). The smaller values of gaze duration and z-score of pupil diameter reflect the lower attractiveness of the rural-art graffiti and the opposite for the urban-cultural type. Looking again at the gaze frequency index, rural graffiti landscapes instead increased the frequency of subjects' sight searches. After passing the homogeneity-of-variance, we did the same ANOVA test for these three groups of results (Table 4). The results show that there are significant differences in subjects' gaze duration and pupil diameter for each picture of these three types of graffiti landscapes, but not in gaze frequency. It reveals a significant difference between the subjects' cognitive effort and their emotional arousal for different types of landscapes, but their overall interest in urban and rural graffiti landscapes did not vary considerably.

In the post hoc test of ANOVA, there was a significant difference in the duration of subjects' gaze on urban-cultural type and rural-art type ($p=0.003<0.01$), and the aesthetic cognitive effort was greater for the former than the latter. In terms of pupil diameter, the difference between the urban-creative type and rural-art type was not significant, while the difference between the urban-cultural type, urban-creative type, and rural-art type was significant ($p=0.011<0.05$, $p=0.000<0.001$), indicating that the graffiti landscape reflecting urban-cultural had the highest aesthetic emotional arousal.

Table 4. Differences in the aesthetic attitudes of different types of graffiti landscapes

Dimension	Mean			<i>F</i>	<i>p</i>
	Urban-cultural type	Urban-creative type	Rural-art type		
Pleasure	3.698	3.662	3.625	0.399	0.671

Attraction to the landscape	3.607	3.757	3.423	3.397	0.034*
Willingness to participate	3.316	3.535	3.108	6.153	0.002**
Gaze duration (s)	10.555	9.522	8.386	4.572	0.011*
Gaze frequency (pcs/s)	99.320	98.398	99.595	0.675	0.509
Pupil diameter (mm)	3.179	3.091	3.035	6.501	0.002**
Z-score of pupil diameter	0.232	-0.020	-0.184	6.501	0.002**

Notes: * $p < 0.05$, ** $p < 0.01$

Differences in aesthetic perception under embodied practice

When one is situated in a landscape, aesthetics, as a particular form of human understanding of the world, is in fact a perceptual process of embodied practice. Embodied practice emphasizes the interactivity of body and environment, which are both important components of cognition (Ye, 2014) and thus cognitive processes and mental states are deeply rooted in the interaction between body and world (Lorimer, 2005). In our eye-tracking experiment, there were two groups that had been to and had not been to the case sites. Among them, field perception of graffiti landscapes brings about bodily experiences embedded in the environment, in which various human senses such as sight, hearing, and touch work together to potentially influence people's cognition, emotion, and behavior (Koc & Ringberg, 2019). People transmit information from visual interactions with the outside world to the brain through the visual system, auditory system, and nervous system, and break it down to form perceptions and experiences (Hu & Lin, 2012). After passing the homogeneity-of-variance, we further compared the data from the two experimental groups who had been and had not been to the case sites by ANOVA test

(Table 5) to explore the differences in the perception of digital graffiti landscape under the influence of embodied practices.

The test results showed that there were significant differences between the two groups on the three variables of gaze duration, gaze frequency, and pupil diameter for each picture. With respect to gaze duration, subjects who had not been to the study site showed a greater cognitive effort for the stimulus material than those who had. Since the subjects who had not been to the study site were seeing the graffiti landscape pictures for the first time, they needed to spend more attention to observe the landscape and perceive the space, i.e., it took them longer to form a complete aesthetic perception. In terms of gaze frequency, subjects who had been to the study site were more interested in the stimulus material than those who had not. As for the z-score of pupil diameter, the emotional arousal of the image material was stronger for the subjects who had been to the case site. Overall, it is likely that the embodied experience of three-dimensional space increases the aesthetic motivation for two-dimensional images and has an impact on the aesthetic perception of graffiti landscapes on online platforms.

Table 5. Differences in aesthetic perception brought about by embodied practice

Dimension	Mean		<i>F</i>	<i>p</i>
	Have been to the case sites	Never been to the case sites		
Gaze duration (s)	7.411	11.265	67.943	0.000***
Gaze frequency (pcs/s)	97.341	100.195	9.625	0.002**
Pupil diameter (mm)	3.207	3.007	56.914	0.000***

Z-score of pupil diameter	0.315	-0.266	56.914	0.000***
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Notes: ** $p < 0.01$, *** $p < 0.001$

We selected two subjects of the same age, gender, and professional background, FM 23 and FM 14, to observe the process of a picture of graffiti in Fuxue West Street for comparative analysis (Figure 2). The contrast was that subject FM 23 had been to the case site in the picture, while FM 14 had not. It can be found that although different participants may have used similar observation strategies, the influence of personal experience on landscape perception comes into effect during visual observation, as evidenced by different pupil diameter changes, gaze durations, and gaze counts between participants. Due to the lack of basic knowledge of the case sites, FM23 had to spend longer observation time and more gaze counts to become familiar with and understand the graffiti landscape in the pictures. This variation was more visually reflected in the cognitive load represented by the different pupil dilation. As can be seen in the comparison in Figure 2, the pupil diameter size of FM14 is larger than that of FM23, and its pupil changes are more pronounced, with a higher proportion of the observation time spent in pupil dilation throughout the process, and aesthetic emotions are more likely to be evoked.

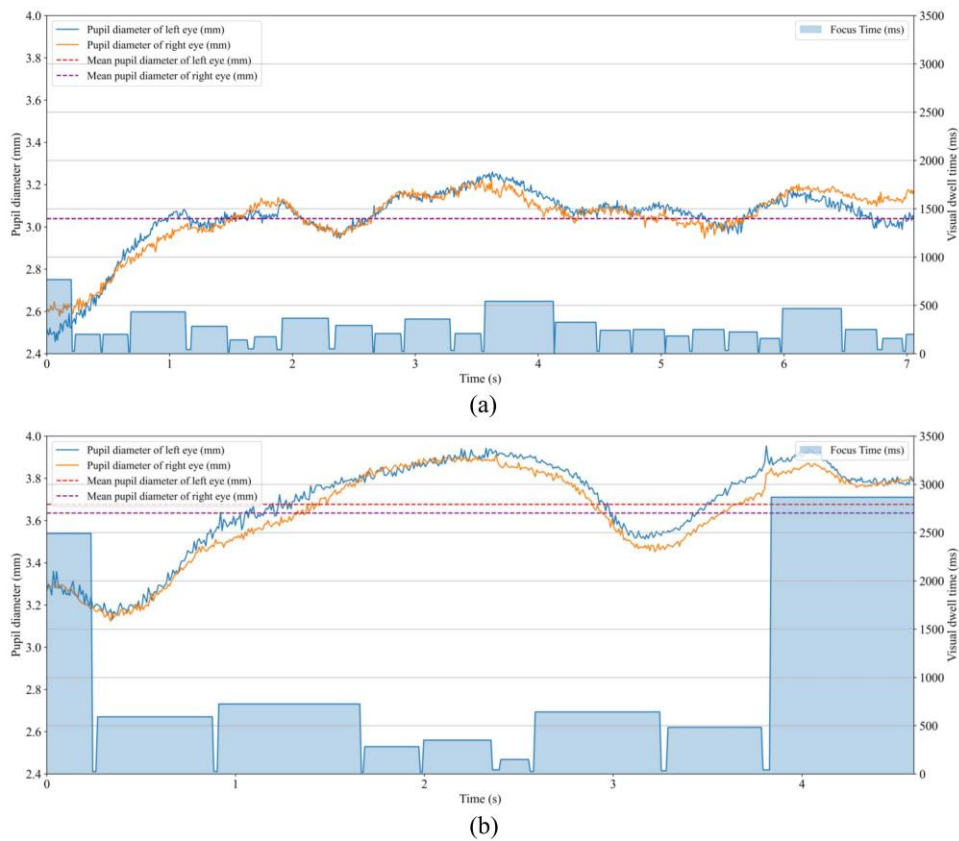


Figure 2. Pupil change and sight dwell time of participants FM23(a) and FM14(b) (dwell time >100ms is considered as gaze), taking one of the pictures of Fuxue West Street as an example

Aesthetic mechanism of digital graffiti landscape

Different types of graffiti landscapes shape the aesthetic perceptions of the experiencers through both online and offline approaches. In the process of viewing graffiti landscapes in the field, people generate visual, tactile, and auditory embodied perceptions and experiences of the space, and record their feelings through media means such as photography and video recording. Texts, pictures, and videos conveyed on the Internet are regenerating and creating digital graffiti spaces, which are constantly being constructed, interpreted, and reshaped, promoting the local symbolization of the landscape. At the same time, these recorded contents visually interacted with other unpracticed groups on the Internet, acquiring information about the digital graffiti

landscape through visual stimulation, and then decomposing these different types of landscape information into different types of aesthetic perceptions through brain processing, resulting in different degrees of aesthetic emotions. Readers who are attracted to online images, on the other hand, may then consume the graffiti landscape in the field to reinforce local symbols. In the previous data analysis, we found that the subjects were able to generate more positive aesthetic emotions when viewing urban graffiti landscapes than rural graffiti, and that these aesthetic emotions influenced their motivation to visit the field. The experience of being in the field also led to differences. Such differences are influenced by multi-scale factors such as the elements and content of the graffiti itself, the interaction with the surrounding environment, and whether or not it is embedded in urban and rural history and culture. We present this through the mechanism diagram in Figure 3 and interpret it in the context of the interviews below.

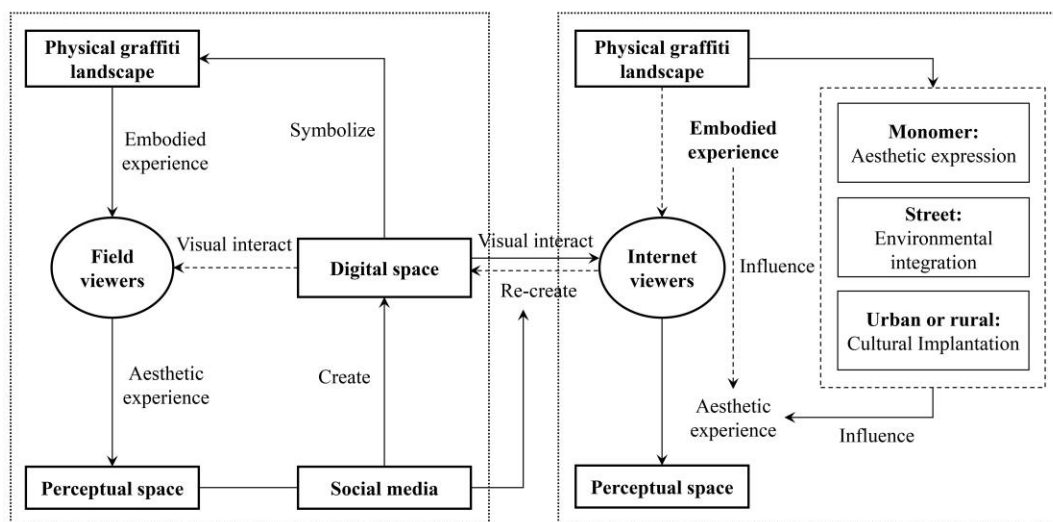


Figure 3. Aesthetic mechanism of digital graffiti landscape

The aesthetic expression of graffiti

The variation in environmental context and graffiti painters from the Western graffiti landscape that gave birth to it leads to the fact that urban and rural graffiti in China will be different in terms of type, style, function, and meaning, with fewer political and power

implications. As a result, the choice of graffiti content and style is more a matter of local initiative. Focusing on the graffiti landscape itself, the shaping of its themes and the selection of its elements directly contribute to people's aesthetic perceptions. In our survey, for participants who watched three sets of images, compared to rural graffiti landscapes without rules, urban graffiti landscapes with a unified style theme were more likely to produce beautification effects and create a sense of beauty for viewers. For example, urban-creative graffiti landscapes express creativity through cartoon and animation elements with a unified theme, making it easier to form a coherent aesthetic feeling; whereas in the rural graffiti landscape of Nanbeitai village, the graffiti elements in each picture are independent of each other and do not have a certain main connection to coordinate the drawing style. In addition, the differences in color patterns also give rise to different perceptions, affecting visual perception and emotional intensity. In the inter-contrast of graffiti landscapes in the urban-creative type, respondents perceived contrasting color schemes to be more eye-catching and to generate a higher willingness to engage (Figure 4(a)). Conversely, darker colors play a negative role here (Figure 4(b)).



Figure 4. Color pattern of graffiti landscape

Integration with the surrounding environment

The graphic content of graffiti landscapes is an important factor in making them popular in cyberspace, but the aesthetic emotions that people feel towards them do not only come from the graffiti images themselves, but also from the environmental factors associated

with them. Of course, this factor is also closely related to whether people have visited these digital spaces in person. For subjects who had not visited the case sites, the graffiti landscapes they saw were only the images presented one by one in the experiment, and the content of these images was limited, often showing only the graffiti landscapes confined to a single building in the street environment, without being able to communicate with the surrounding environment. Thus, the aesthetic perception of such subjects is more difficult to evoke, but it does not mean that their attention to elements of the surrounding environment is absent. Their attention to this aspect could only be transferred to the interaction between the graffiti elements and the architectural elements presented in the picture, such as whether the windows were integrated into the graffiti. In addition, the lack of aesthetic perception resulting from being physically embedded in the case site causes them to associate previous negative cognitive experiences in the same type of locations, leading them to develop negative aesthetic emotions towards these graffiti landscape images. They more often perceive the atmosphere and images created by these graffiti landscapes as monotonous, unattractive, and not necessarily interacting well with the surrounding environment.

In contrast, for subjects who had embodied practical experience in the field environment, the aggregation of the same thematic graffiti elements in the area was effective in enhancing their positive perception of the graffiti space. They would automatically present the entire neighborhood or street landscape in their minds when viewing these experimental images, mobilizing their environmental perception of the area as a whole, thus matching the real experience. Moreover, in the interviews, all subjects with embodied experiences almost unanimously chose yes when asked if they were willing to recommend, and the reason for their recommendation came from their own positive cognitive practices. The effective interaction between body and space allowed

the subjects who visited the study site to have a more positive aesthetic evaluation of the graffiti landscape, not only by visually perceiving the color and style of the graffiti itself, but also by recalling the positive information generated by the interaction with body and space, which influenced their behavioral intentions and aesthetic emotions.

Implantation of urban and rural culture

From the cultural significance embedded in the graffiti landscape, it may also convey a larger scale of urban and rural historical context. Among the graffiti case landscapes we screened, the subjects had the highest cognitive load on the graffiti landscape of Fuxue West Street, which reflects urban culture, and also had richer aesthetic emotions evoked. Regardless of whether or not they have embodied practical experience, viewers have more positive aesthetic emotions and spatial perceptions of digital graffiti landscapes that contain historical and cultural features. In their view, in such graffiti landscapes, the building facades generated by graffiti practices are full of changing social scenes and spatial stories, contributing to the production, maintenance, and continuation of local culture. For example, the graffiti expression in Fuxue West Street incorporates elements such as the Manchurian window and the lion dance (Figure 5), which are remarkably important cultural symbols in Guangzhou, evoking the urban memories of the participants. For those subjects who have seen a lot of graffiti landscapes, the homogeneity of graffiti landscapes can create a negative cognitive load. Graffiti landscapes in the urban-cultural category combine elements of Guangzhou's history and culture with modern environmental elements to form a unique and lastingly attractive landscape, which compared to the other two types can generate more aesthetic identity.

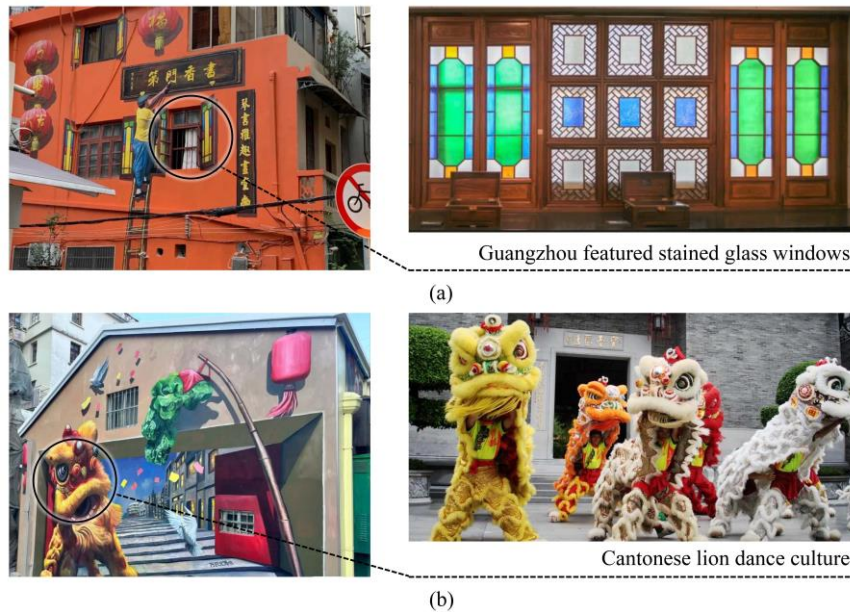


Figure 5. Urban cultural elements embedded in the graffiti landscape

The subject's perception of historical and cultural elements actually reflects the biggest problem of the current graffiti landscape. The uniformity and impersonality of popular spaces on the Internet have become stereotypes in people's minds, and most landscapes incorporate the same preferences and ideas of different designers, seriously interfering with the construction of the aesthetic subject's emotions. With the trend of urban renewal becoming inevitable, planning designers have adopted a new kind of superficial strategy, ignoring the unique characteristics of places and choosing a flow-oriented approach to renewal. The urban and rural renewal lots such as old cities, old factories, and old villages represent the local characteristics and collective memory of a certain historical period, and also nurture the cultural identity of the place. When examined from the aspect of historical memory, these historical and cultural elements are sealed fond memories and historical information for the older generation, and a source of understanding of the historical and cultural background for the younger generation. As a means of urban renewal, graffiti should become a "living museum" of urban and rural history, bringing history back to life.

Conclusions and Recommendations

Based on visual analysis methods such as photo evaluation and eye-tracking experiment, this study takes five urban and rural graffiti landscape cases in Guangzhou as research objects and graffiti landscape pictures with more than 1000 likes on Xiaohongshu as experimental materials to study people's visual cognitive process and aesthetic perception of digital graffiti landscape and explore the aesthetic mechanism. We found that people's emotional experiences and spatial perceptions of digital graffiti landscapes were influenced by different types of graffiti landscapes and whether they were practiced in the field. People have a more positive aesthetic perception of urban graffiti landscapes that contain historical and cultural elements and images with unified themes and coordinated colors, while they have a more negative impression of rural graffiti landscapes that are rough and lack themes. We also verified this phenomenon in the analysis of eye-tracking experimental data. At the same time, the interest and attraction of the subjects who had visited such graffiti landscapes were stronger than those who had not. In contrast, the aesthetic emotion and spatial perception of subjects who had not been there were greatly diminished due to the influence of other popular online spaces such as serious homogeneity.

Currently, graffiti landscape has become an influential component of urban and rural life, urban and rural landscape, industrial economy, and cultural image. The formation of urban and rural graffiti space is a process of interaction of capital, institutional and social elements. The background of urban and rural development in different periods and the development bias of different regions have formed a graffiti space landscape dominated by different elements. The construction and expansion of urban and rural built-up environments provide ample spatial carriers for graffiti, and the use and popularity of media and the Internet allow graffiti culture to spread rapidly. While the urban and rural

planning process is increasingly focused on socialization and public participation, the aesthetic mechanism of graffiti landscape provides an idea of how to guide the public to express their civic power in the process of participating in urban revitalization. In the prevailing digital economy, emerging graffiti landscapes attract the attention of online viewers, but they may not always form a positive aesthetic perception and constitute a virtuous communication cycle. Therefore, at the conclusion of the study, we try to discuss the strategies for constructing such urban and rural landscapes.

Graffiti walls establish a good visual factor on the internet to increase visibility, attract traffic and revitalize economic space, but the spatial perception and aesthetic experience generated by the viewing subject may not always meet expectations. People have a negative cognitive load on the broken historical and cultural content and the non-integrated, homogeneous material landscape, which also leads to a low willingness to participate, a digital fad that will eventually dissipate in the future. Therefore, when renewing material spaces such as abandoned walls into graffiti landscapes, the landscape design should be combined with multi-scale elements. From the artistic attributes of graffiti, graffiti content can build a richer color system, matching the landscape theme with color to create interactive graffiti content that creates an immersive experience. From the point of view of the environmental attributes of graffiti, all kinds of elements in the environment should be reasonably laid out to create a consistent regional style of environmental atmosphere, so that the graffiti landscape into the urban and rural environment, to strengthen the overall landscape environment for people's attractiveness. From the perspective of the cultural attributes of graffiti, the local construction of graffiti should also be fully considered, focusing on the combination of drawing content with local cultural and historical elements to preserve and transmit urban memory.

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