STUDY ON THE RELATIONSHIP BETWEEN PLACE ATTACHMENT AND LANDSCAPE PREFERENCE IN AN URBAN PARK SETTING:A CASE STUDY OF TOYAMA PARK, SHINJUKU, TOKYO

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The connection between individuals and their environment has consistently captivated researchers across various disciplines. Place attachment measures people's emotional connection with particular places, whereas landscape preference gauges individuals' preferences for their surroundings. Drawing on theories in environmental psychology, this study took the users of Toyama Park as the research site , and used the structural equation modeling and in-depth interviews to understand the process of landscape preference's influence on place attachment in the urban park setting, and grasped the crowd differentiation of the influence pathways. Finally, from the perspective of landscape characteristics, suggestions are made to improve the level of place attachment of urban park users.

Key Words : *Place attachment, Landscape preference, Urban parks, Structural equation model, Questionnaire survey*

1.INTRODUCTION

1.1 Background

Place attachment, a key theory that explores the man-land relationship, is commonly described as a desirable positive emotional connection between individuals and places. Over the past few decades, scholars have discovered place attachment's contributions in helping combat climate change, boost tourism, promote environmentally friendly behavior, and more. Devine et al.[1)] investigated the importance of place attachment in understanding public response and emerged as a substantial, positive predictor of climate improvement project acceptance. At the same time, the exploration of the factors that influence place attachment is being emphasised. Tong.wet al.[2)]found that neighbourhood social relations and the size of the dwelling space influence place attachment to the territory in which people live.

Landscape preference is defined as the extent to which people like a landscape or find it attractive. It is a comprehensive process of perceiving, acquiring, processing, and evaluating environmental information, and the result reflects people's emotional attitude toward the landscape.

parks can enhance the sense of responsibility and closeness of recreationists to the parks. On the other hand, recreationists also can get a better emotional experience.

Landscape preference is a more direct expression of one's preference for the physical elements of a place. Place attachment shows a comprehensive emotional attitude toward a place's function, meaning, and value. Place attachment can be viewed as a progressive emotion of landscape preference. Thus, landscape preference is likely to influence the formation of place attachment. Thus, it is necessary to investigate how landscape preference affects the formation of place attachment.

Place attachment has been studied across a wide range of subjects, focusing on tourist areas, residential areas, recreational areas, and so on.

As the most significant green space in the city, urban parks assume the function of leisure and recreation for urban residents.

Although the covid-19 outbreak has moderated, the physical and psychological impact it brought to the people continues. People need to reconnect the social relationships that have been divided by the epidemic and recreate a healthy and positive spirituality. Urban parks would be the optimal place to move this process forward.

Accordingly,researching the relationship between place attachment and landscape preference in urban

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1.2 Research Objective

This study aims to explore the relationship between place attachment and landscape preference in an urban park setting.

In particular, how landscape preference influence place attachment and the pathways through which it does so. Simultaneously, comparative analyses will be conducted among users with different identities to yield more comprehensive research findings.

On the basis of findings, make suggestions for improving the level of place attachment of urban park users from the perspective of landscape elements.

The research sub-objectives are as follows:

(1)Exploring the status of place attachment and landscape preference in urban parks.

(2)Exploring how landscape preference affects place attachment and the pathways of its influence through quantitative and qualitative analyses.

(3)Since the users of Toyama park are mainly divided into two groups, students and residents, the results of the questionnaire will be compared and analysed to investigate whether the two groups will have an influence on each other's place attachment perceptions.

1.3 Literature Review

1.3.1 Existing literature

(1)Place attachment

In 1989, Williams and Roggenbuck defined the concept of place attachment as a human–place bond based on emotion, cognition, and practice. Place attachment is a multidimensional construct: the two-dimensional framework proposed by Williams is commonly used to assess place attachment, including place dependence and place identity[3].

Through multidisciplinary collaborative research and development, the place attachment theory has been continuously refined and other dimensions have emerged for different research contexts and objects.

(2)Landscape preference

The concept of landscape preference has its roots in environmental psychology and refers to an individual's subjective inclination or liking for particular aspects of a landscape. It involves the evaluation and selection of landscape features, such as natural elements or human-made elements , based on personal preferences, cultural influences, and individual experience.

Physical elements of the landscape serve as evaluation indicators of landscape preference, especially when the study object is not a larger geographic area but a smaller site area. Koun SUGIMOTO et al[4] used landscape elements as evaluation indicators when studying the public's landscape preference characteristics for urban parks. The evaluation indicators include animals, vegetation, management functions, water space, open space, etc.

(3)Place attachment and landscape preference

Most studies concluded that landscape preference positively influences place attachment, but the specific path of influence varies depending on the object, dimension and methods of the study. Therefore, it is not a general conclusion. It is necessary to select appropriate research dimensions for specific relationship analysis for different scale types of sites.

(4) Urban parks

A great deal of previous studies focused on the sub-division of place attachment and landscape preference in urban parks. Daniel et al[4] exam the relationship between place attachment and behavioral loyalty in urban parks and conducted that frequent use of specific parks contributes to stronger place attachment. Yasufumi TOYODA et al[5] revealed the association between attachment of neighborhood residents to an urban park and park use type, and conducted that residents who use parks more frequently and for longer periods of time tend to develop stronger place attachments.

Most studies have centred around exploring the elements that influence place attachment in urban parks, and most research on landscape preference in urban parks has been limited to how to conduct landscape preference evaluations. Fewer studies have explored the relationship between place attachment and landscape preference in urban parks.

1.3.2Research gap

Much of the current literature pays particular attention to factors affecting place attachment and the assessment of landscape preference. There is a gap in research exploring the relationship between these two elements. Secondly, place attachment and landscape preference are more abundantly researched in tourism, and there still needs to be more research on small-scale places. In addition, the selection of evaluation indicators varies. Especially for landscape preference, most studies focus on the emotional characteristics that people produce towards the landscape, and the utilization of landscape preference matrix assessment is the most common. The importance of the physical elements of the landscape for the evaluation of landscape preference has been neglected.

In terms of research methods, most previous studies have focused on scale method statistics and correlation analysis, with less qualitative research. Quantitative research can quantify place attachment

and landscape preference by reacting the level of both with numerical values. However, the significance and value of places vary from individual, and they cannot be directly quantified in statistics; therefore, qualitative studies are required to supplement the description.

2. TARGET SITE

2.1 Selection of Target site

Field research and short interviews revealed that most recreationists of Toyama park are residents and students of the neighboring schools. Under such circumstances, it is more likely that recreationists will have deep connection with the park, and there is a higher probability that they will develop a place attachment to the park.

At the same time, due to the differences in terrain within the park, Toyama Park has a rich composition of functional and landscape spaces.In addition, Toyama Park has been built for 70 years and needs to be appropriately updated.

In summary, analyzing the relationship between place attachment and landscape preference for Toyama Park is not only conducive to the regeneration of Toyama Park itself. Still, it can also serve as a reference for the regeneration of urban parks in other areas.

2.2 Outline of Toyama Park

Toyama Park located in Toyama 1,2,3 chome, Okubo 3-chome, Shinjuku, Tokyo(Fig2). It is situated in a residential and educational area. The park is divided into the Mt.Hakone area centered on Mt.Hakone and the Okubo area on the other side of Meiji-dori. The Mt.Hakone area surrounded by the Toei Toyama housing estate, and the Okubo area bordering the Waseda University Nishiwaseda Campus and the Toyama Campus. The spatial composition of the Toyama park and the main activity areas are shown in Figures1 and.3.

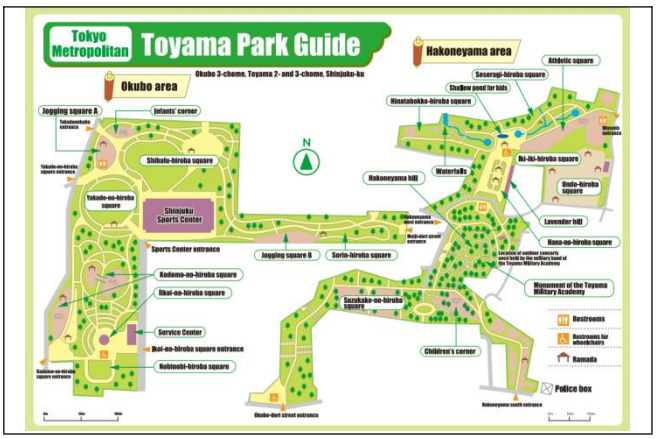

Fig.1 Location of Toyama park

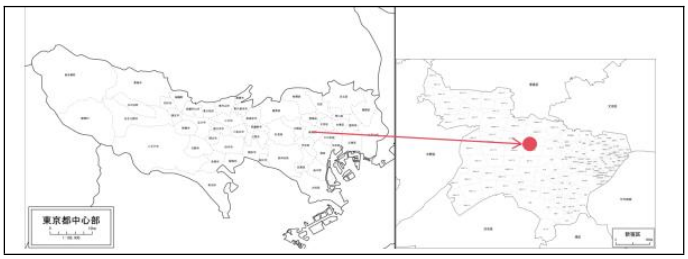

Fig.2 Map of Toyama Park

Fig.3 Main areas of Toyama park

3. METHODOLOGY

3.1 Analysis Methods

This study combines quantitative and qualitative research methods.

Structural Equation Modeling (SEM) will be used as the main way of quantitative analysis to validate and derive variable relationships based on the statistical results of the questionnaire. In-depth interviews will be conducted to gain a more comprehensive understanding of the influence of individual factors on place attachment, especially the individual's unique memories and emotions about the place.

3.2 Research Flow

The research process and steps are shown below(Fig 4).

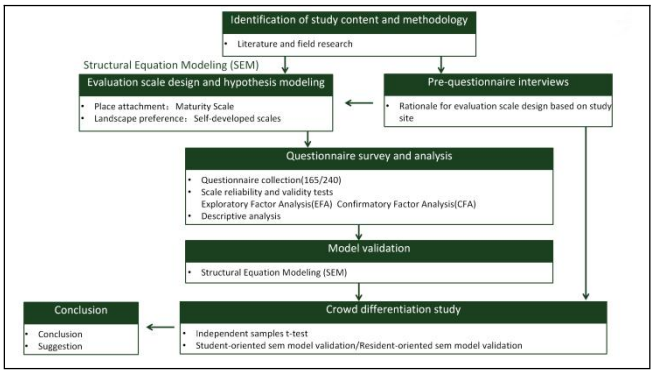

Fig.4 Research Flow

4. HYPOTHESIZED MODEL

4.1 Field Research and Pre-questionnaire Interview

Place attachment and landscape preference are complex variables composed of multiple simple emotional elements. Firstly, dimension splitting is needed. Second, appropriate explicit variables need to be selected for the split dimensions. Based on the results of the literature survey, the present study used a maturity scale to measure place attachment, which was categorized into three dimensions, place identity, place dependence, and Social bonding.

For landscape preference, due to the specificity of the target site, this study uses field research and pre-questionnaire interviews to find appropriate dimensions and explicit variables based on information such as users' behavioral characteristics and emotional feedback in the park.

The information from the interviews is shown below(Table1&2).

Table 1.Summary of pre-questionnaire interview

Items	Contents
Respondents	Users of Toyama park
Date	2023.9.29-10.12
Method	Offline
Numbers	42
Contents	Basic information Behavior-related questions Emotion-related questions Others

Table 2. Contents of pre-questionnaire interview

Dimensions	Contents
Basic information	Identity(Student or resident) Frequency Location(East part, west part or both) Time
Behavior-related questions	● Why do you use Toyama Park? ● What is your impression of the landscape at Toyama Park? ● Do you think any functional improvements could be made to Toyama Park?
Emotion-related questions	● Please describe your overall feelings about Toyama Park. ● Please share some of your good memories or bad experiences at the park.
Others	● Whether users with different identities will interact with each other.

4.2.1 Results

(1) Overview of respondents' park usage habits

A total of 42 samples were collected for this interview, and the basic information of the interviewees is shown below(Fig.5).

From the analysis of the basic information, it can be concluded that more than half of the users simultaneously make the east and west parts of User Toyama Park. The east and west parts of Toyama Park work together to fulfill the needs of users for different functional spaces.

It's worth mentioning that among the same types of users, there was not a large differentiation in the areas of use. In the case of resident users, there is a general tendency to use both east and west parts of Toyama Park. For student users, there is a general tendency to use specific spaces in specific parts of the park.

Therefore, it can be assumed that the differentiation of users' choices of areas to use in Toyama Park is correlated with the differentiation of users' identities. This correlation is more evident in the two identities of students and residents.

Fig.5 Basic information Statistical Chart

(2) Results of subjectivity issues

Keywords that significantly overlapped were extracted from the subjective descriptions of park usage behaviors provided by the respondents. The frequency of keyword occurrences was then tabulated and visually represented in a word frequency cloud(Fig.6&7).

Fig.6 Word frequency cloud of behavior-related questions

Fig.7 Word frequency cloud of emotion-related questions

Categorizing the above terms, it was found that park users' attention to park landscape elements is highly correlated with their behaviors in the park. The purposes for which park users make use of Toyama Park can be broadly divided into two categories: recreational and ornamental. Park landscape elements directly related to these two behaviors are natural elements and facilities. The users' emotional orientations towards Toyama Park were broadly positive. It is worth mentioning that in addition to the good experience of using the park with its beautiful natural landscape and rich facilities, some of the users establish emotional connections and social relationships with other users in the park, which contributes to their positive feelings. Furthermore, the state of policing and management of the park will also affect the emotional orientation of the users.

Based on the above results, the dimensions of landscape preference were derived: natural characteristics, artificial landscape characteristics and social environment.

4.2 Hypothesized model

Based on the theoretical research and interview results, a final version of the place attachment and landscape preference Scale was completed (Table3&4), containing 6 dimensions and 22 questions. The hypothesised model(Fig8) and Hypothesis(Table5) for the study was constructed based on the two evaluation scales.

Table 3.Place attachment evaluation scale

	Measurement problems
Place identity (PI)	PI1:This park means a lot to me. PI2:I love this park. PI3:This park is really special to me. PI4: I identify with this park.
Place dependence(PD)	PD1:I prefer to recreate in this park over the others PD2:Recreating at this park is more satisfying than at other parks. PD3:This park is my first choice for outdoor activities. PD4:I wouldn't choose any other park to replace this one.
Social bonding(SB)	SB1:I'll bring my friends to this park. SB2:I've made a special connection with the people who recreate here as well as this park. SB3:I have fond memories of this park.

Table 4. Landscape preference evaluation scale

	Measurement problems
Natural characteristics(NC)	NC1:I love/always pay attention to the colors/ seasonal aspect of the plants in this park.(plants) NC2:This park has a great variety of plants.(plants) NC3:Being around the animals in the park (birds, insects, etc.) makes me feel relaxed.
Artificial landscape characteristics(ALC)	ALC1:In this park, I can easily find resting places (seats, etc.) ALC2:In this park, I can easily find public facilities (toilets,etc.) ALC3:The paths in this park are well planned and unobstructed, and I can easily get where I want to go. ALC4:This park has abundant rest facilities and enough space for activities.
Social environment(SE)	SE1:It's not easy to get lost in the park. SE2:This park is well managed/maintained SE3:This park is safe, even if I'm alone in the park I don't feel scared. SE4:This park has a very good reputation among the people around me

Table 5. Hypothesis of this study

a) **Summary**	
H1	Landscape preference positively influences place attachment.
H2	Natural characteristics positively influences Place identity.
H3	Natural characteristics positively influences Place identity.
H4	Natural characteristics positively influences Place dependence.
H5	Artificial landscape characteristics positively influences Place identity.
H6	Artificial landscape characteristics positively influences Place dependence.
H7	Artificial landscape characteristics positively influences Social bonding.
H8	Social environment positively influences Place dependence.
H9	Social environment positively influences Social bonding.
H10	Social environment positively influences Place identity.
b) **Landscape preference**	
H6	Social environment and Natural characteristics interacting with each other.
H7	Natural characteristics and Artificial landscape characteristics interacting with each other.
H8	Social environment and Artificial landscape characteristics interacting with each other.

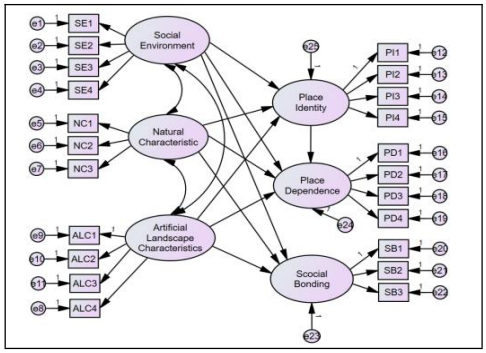

Fig.8 Hypothesized model of this study

5.MODEL VALIDATION AND DATA ANALYSIS

5.1 Questionnaire survey

The questionnaire content included basic information about the respondents as well as place attachment and landscape preference scales. The number of valid questionnaires in this survey was 240. The content of the questionnaire is as follows (Table6).

Table 6.Summary of questionnaire survey

Items	Contents
Respondents	Users of Toyama park
Date	2023.11.5-12.5
Method	Online and Offline (6.7%：93.3%)
Numbers	240(Students:Residents=120:120)
Contents	Basic Information Scale Landscape preference evaluation scale Place attachment evaluation scale

5.1.1 Descriptive analysis

The questionnaire respondents were concentrated in the age group of 19-45 years old, more than half of them lived within 2km from Toyama Park, more than half of them maintained the frequency of park use 1-5 times a week, the length of park use was concentrated in 1-2h, and the time of park use was concentrated in the afternoon (Table7).

The mean value of each question item of place attachment ranges between 3.47-4.17, with the lowest score of 3.47, indicating that the questionnaire respondents have a high degree of attachment to the park. The mean value of each question item of landscape preference ranges between 3.12-3.68, with the lowest score of 3.12, indicating that the questionnaire respondents have a high degree of landscape preference to the park.

Overall, in this study, the respondents showed a high level of positive emotions towards Toyama Park.

Table 7.Descriptive Statistical Analysis of demographic characteristics

		Frequency	Percent
Gender	Male	124	51.7
	Female	116	48.3
Age	12-18	8	3.3
	19-29	123	51.2
	30-45	72	30.0
	46-59	32	13.3
	≥60	5	2.1
Distance	≤1km	67	27.9
	1-3km	104	43.3
	＞3km	69	28.7
Frequency	3-5 times a week	100	41.7
	1-3 times a week	97	40.4
	1-3times a month	42	17.5
	1-3 times half a year	1	.4
Time spend	less than 1 hour	31	12.9
in the	1-2 hours	146	60.8
Toyama park	2-5 hours	63	26.3
Time	Morning(6am-10pm)	15	6.3
	Noon(10am-2pm)	32	13.3
	Afternoon(2pm-6pm)	177	73.8
	Night(6pm-5am)	16	6.7
Identity	Resident	120	50.0
	Student	120	50.0

Table 8.Descriptive Statistical Analysis of the Place attachment Scale

	PI1	PI2	PI3	PI4	PD1	PD2	PD3	PD4	SB1	SB2	SB3
Mean	4.17	4.10	3.76	3.78	3.57	3.52	3.63	3.47	3.78	3.83	4.00
Std. Deviation	.852	.872	.857	.787	.860	.732	.914	.833	.850	.822	.887
Variance	.725	.760	.734	.619	.740	.535	.836	.693	.723	.675	.787
Skewness	-1.023	-1.037	-.206	-.464	.010	-.137	.031	.172	-.187	-.230	-.907
Std. Error of Skewness	.157	.157	.157	.157	.157	.157	.157	.157	.157	.157	.157
Kurtosis	.867	.694	-.621	-.007	-.651	-.255	-.884	-.522	-.646	-.545	.845
Std. Error of Kurtosis	.313	.313	.313	.313	.313	.313	.313	.313	.313	.313	.313

Table 9.Descriptive Statistical Analysis of the Landscape Preference Scale

	NC1	NC2	NC3	AL1	AL2	AL3	AL4	SE1	SE2	SE3	SE4
Mean	3.37	3.29	3.29	3.24	3.29	3.12	3.28	3.48	3.57	3.46	3.68
Std. Deviation	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	4.00	4.00
Variance	.906	.904	.836	1.051	1.053	1.009	1.098	.950	.996	1.022	1.012
Skewness	.820	.817	.699	1.105	1.109	1.019	1.206	.903	.991	1.045	1.024
Std. Error of Skewness	.220	-.017	-.410	-.105	.031	-.097	-.056	-.264	-.481	-.408	-.535
Kurtosis	.157	.157	.157	.157	.157	.157	.157	.157	.157	.157	.157
Std. Error of Kurtosis	-.401	-.490	.960	-.856	-.996	-.471	-.743	-.304	-.193	-.331	-.230

5.1.2 Hypothesized model validation

The overall results of the model validation are shown in Figure 9 with Table 10. Out of the 9 hypothesized paths, 5 were validated as true.

All three dimensions of landscape preference contribute to increasing place attachment. However, natural and artificial landscape elements influence place attachment through place dependence and place identity. Natural landscape elements have a higher level of influence on place identity, and artificial landscape elements have a higher level of influence on place dependence. Social environment, on the other hand, influences place attachment through social bonding.

(1) Discussion

Both place identity and place dependence emphasize the use attributes of the place, which means that both emotions are based on physical space and personal behavior. The difference is that place identity is a mental reliance brought about by the use attributes of the place, whereas place dependence is a functional reliance brought about by the use attributes of the place. Social bonding, on the other hand, emphasizes the social attributes of the space, including the identity composition of the people within the place, the behavioral characteristics of the people, the atmosphere and comments of the place, and so on.

Toyama Park has a rich variety of seasonal plants. Cherry blossoms in spring and autumn foliage, as well as seasonal flowerbeds in the Mt.Hakone area managed by the Toyama Flower Club and Warm and Sunny Association, were frequently mentioned by respondents in the communication during the distribution of the questionnaire and in the pre-questionnaire interviews. When talking about the seasonal plants in Toyama Park, respondents always mentioned fond memories of enjoying the scenery with family and close friends. In this case, the natural landscape elements not only have ornamental value, but also create a spiritual link with people. Therefore, the natural landscape elements of Toyama Park contribute the most to the user's place identity enhancement.

Toyama Park has several children's play zones and activity plazas to meet the needs of users of different ages and statuses. The roads in the park provide access to the park and also support users who need to run or walk their pets. At the same time, the park's service center conducts regular inspections and upgrades of the facilities to ensure that the park operates well. Therefore, the artificial landscape elements of Toyama Park contribute the most to the user's place dependence enhancement.

Since the users of Toyama Park are mainly residents and students in the park's neighborhood, they have a high frequency of park use and use the park at more regular times. As a result, people may have frequent encounters and social connections with other users in the park. Some of the interviewees who bring their children to the park mentioned that friendships tend to be formed between children who often play in the same kids' play zone, and that communication and social relationships are also formed between accompanying parents. It is worth mentioning that many Waseda University students use Toyama Park, and some respondents felt that out of a favorable impression of the university student population, they had more positive feelings towards the park. Therefore, the social environment of Toyama Park contribute the most to the user's social bonding enhancement.

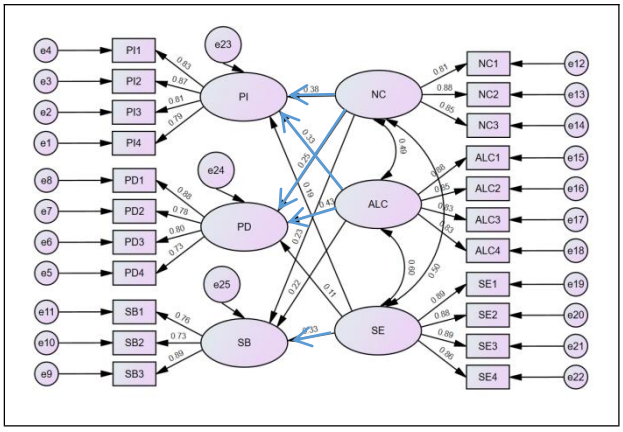

Fig.9 Standardized estimate model (summary)

5.1.3 Crowd Differentiation Study

During the field research and pre-questionnaire interviews, it was found that Toyama Park has a distinct user profile, with users mainly categorized as residents and students. There are differences in the behavioral characteristics of these two groups in the park. In order to further explore the real needs as well as emotional perceptions of the users of Toyama Park, a crowd differentiation analysis was conducted.

(1) Model validation

The overall results of the model validation are shown in Table11and12.

Natural characteristics and social environment significantly affect the level of place attachment in the residents. Artificial landscape characteristics significantly affect the level of place attachment in the students.

(2) Discussion

From the information obtained from the pre-questionnaire interviews, it can be inferred that students are more consistent in their behavior in

Table 10.Model validation path coefficients

Path			Estimate	S.E.	C.R.	P	Result
Place identity	<---	Natural characteristics	.319	.059	5.397	***	Pass
Place dependence	<---	Natural characteristics	.209	.061	3.431	***	Pass
Social bonding	<---	Natural characteristics	.246	.081	3.039	.002	
Place identity	<---	Artificial landscape characteristics	.223	.049	4.553	***	Pass
Place dependence	<---	Artificial landscape characteristics	.284	.054	5.241	***	Pass
Social bonding	<---	Artificial landscape characteristics	.191	.069	2.764	.006	
Place identity	<---	Social environment	.143	.052	2.745	.006	
Place dependence	<---	Social environment	.081	.055	1.460	.144	
Social bonding	<---	Social environment	.306	.076	4.039	***	Pass

Table 11.Model validation path coefficients (resident)

Path			Estimate	S.E.	C.R.	P	Result
Place identity	<---	Natural characteristics	.354	.076	4.665	***	Pass
Place dependence	<---	Natural characteristics	.196	.077	2.541	.011	
Social bonding	<---	Natural characteristics	.115	.104	1.106	.269	
Place identity	<---	Artificial landscape characteristics	.105	.062	1.683	.092	
Place dependence	<---	Artificial landscape characteristics	.144	.071	2.020	.043	
Social bonding	<---	Artificial landscape characteristics	.106	.098	1.079	.281	
Place identity	<---	Social environment	.149	.064	2.319	.020	
Place dependence	<---	Social environment	.170	.073	2.341	.019	
Social bonding	<---	Social environment	.348	.102	3.425	***	Pass

Table 12.Model validation path coefficients (Student)

Path			Estimate	S.E.	C.R.	P	Result
Place identity	<---	Natural characteristics	.244	.086	2.845	.004	
Place dependence	<---	Natural characteristics	.207	.090	2.304	.021	
Social bonding	<---	Natural characteristics	.347	.119	2.922	.003	
Place identity	<---	Artificial landscape characteristics	.275	.070	3.935	***	Pass
Place dependence	<---	Artificial landscape characteristics	.339	.076	4.467	***	Pass
Social bonding	<---	Artificial landscape characteristics	.169	.094	1.805	.071	
Place identity	<---	Social environment	.146	.076	1.931	.053	
Place dependence	<---	Social environment	-.016	.079	-.199	.842	
Social bonding	<---	Social environment	.287	.105	2.725	.006	

Toyama Park.

The student groups in Toyama Park can be mainly represented by Waseda University students as well as students from high school and above. The majority of students come to the park to participate in student clubs or classroom outdoor activities that take place in the park. Such outdoor activities generally have a fixed time and place, and in most cases, the people who participate in the activities are also fixed. As a result, students are more

influenced by the use attributes of the park than by the social attributes of the park. Since most of the activities take place in the park's plaza, rest facilities and sports facilities are more important to the students during the activities.

In contrast to students, the majority of residents do not follow a fixed schedule when using Toyama Park. Though, residents are also concentrated in a certain time frame for their activities as well as the frequency of their visits to the park. However, for the most part, their activities in the parks are not planned and purposeful, in other words, their behavior is uncertain compared to students. It also means that they will have more opportunities to notice natural landscape elements in the park and will be more likely to make social connections with other users of the park.

In conclusion, among the user groups of Toyama Park, the different purposes of use and the different behaviors of use have resulted in crowd differentiation in the emotional perception of the park. Also, this differentiation provides some concrete and scientific basis for park management and renewal. It is necessary to optimize the park management system for different crowd needs, such as the establishment of an active public participation management system to listen to the views of users with different identities.

6.CONCLUSION

6.1 Conclusion

This study utilized SEM analysis and in-depth interviews to explore the influence of landscape preferences on place attachment among Toyama Park users. Conclusions were drawn as follows:

(1) Emotional perception status: Toyama Park users have high levels of place attachment and landscape preference.

The mean values of the respondents' scores for each item of place attachment and landscape preference were positive. Therefore, in this study, Toyama Park users had high levels of place attachment and landscape preference for the park.

(2) Causality: Landscape preference has a positive effect on place attachment.

Both the model validation of the overall data and the model validation of the crowd separation obtained the results that some dimensions of landscape preference positively affect place attachment. The results are discussed in the following sub-points based on different dimensions and crowds.

a) The effect of natural characteristics on place attachment

The rich seasonal vegetation of Toyama Park connects the natural landscape with the users' fond memories, and thus the natural landscape elements can positively influence place attachment mainly by enhancing the users' sense of place identity. The park's regular plant viewing and planting activities give users some good engagement and activity experiences, and therefore the natural landscape elements contribute to promoting place dependence.

b) The effect of artificial landscape characteristics on place attachment

Toyama Park's rich amusement spaces meet the needs of users of different ages and identities and support a wide range of their behaviors and activities. Thus, artificial landscape characteristics positively influence place attachment through place identity and place dependence. However, there are some remaining issues with the rest facilities and roads. The roads in the park are complex, and some road corners are overgrown with vegetation, which affects visibility and creates a sense of uneasiness. The lack of open-space facilities also affects interpersonal communication among users.

c) The effect of social environment on place attachment

Users of Toyama Park are mainly residents and students from nearby schools. The stable composition of the identity of the people in the place is conducive to the construction of social relationships as well as the enhancement of people's trust in the place. Therefore, a good social environment contributes to promoting social bonding. However, as there are still some problems with the night-time management of the park, the irrational distribution of street lights and the lack of road signs make users have an anxious attitude towards the park at night. Therefore, the social environment did not have a positive impact on place identity and place dependence.

(3) Crowd Comparison: Influence pathways of landscape preference on place attachment are crowd-differentiated.

Students' behaviors and activities in Toyama Park are more regular, and residents' behaviors in Toyama Park are not as strongly scheduled. So, for residents, natural characteristics and the social environment positively influence place attachment by increasing their place identity and social bonding; for students, artificial landscape characteristics positively influence place attachment by increasing their place identity and place dependence.

6.2 Suggestions

In this study, different purposes of use and different use behaviors led to differences in users' emotional perceptions of Toyama Park. At the same

time, this differentiation brings some grounds for the management and renewal of the park.

(1)Natural characteristics aspect：

a) Enhance the maintenance and management of seasonal plants to protect them from frost and exposure.

b) Increase the variety of flowers and the scale of planting in interactive flowerbeds in accordance with the change of seasons, and organize regular flower planting and viewing events for the public.

c) Regularly prune the bushy plants on both sides of the road to ensure that walkers have a wide field of vision, and set up route signs in areas where the line of sight is easily blocked.

(2) Artificial landscape characteristics aspect ：

a)Keep the park amusement facilities regularly serviced and renewed.

b)Increase the number of rest facilities in crowded areas (e.g. children's activity areas)

(3)Social environment aspect：

a)Organize regular thematic events in the park (e.g. children's activities, plant viewing) to increase opportunities for interaction between users.

b)Adjust the intervals and light brightness of roadway lighting facilities to ensure safe walking at night.

c)Increased night patrols in parks and installation of distress devices

(4)From the perspective of crowd differences：

a)Increase the percentage of public participation in the management of the park and open more channels to obtain user input.

b)Aiming at the characteristics of the user needs of the two main groups in Toyama Park, residents and students, ensure that the open spaces where students gather for activities are sufficient, and that there are enough recreational facilities in the areas where residents gather for activities.

c)Rationalize the time of public activities in the park's open spaces to avoid the impact of public activities on users' activities.

6.3 Future Task

This study examined the role of users' landscape preferences in influencing place attachment in Toyama Park, and the variability of this influential relationship across two crowds: students and residents.

A more detailed population categorization study was not conducted due to limitations of the site and the sample size surveyed. Therefore, in future research, this issue could be viewed from a different perspective, such as studying users who do not have positive feelings towards the park. At the same time, as different regions and types of urban parks have different management systems and types of user groups, the conclusions obtained and suggestions made in this study need to be adapted to the actual situation of the parks when applied to other parks.

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