

## Article

# Do Local Landscape Elements Enhance Individuals' Place Attachment to New Environments? A Cross-Regional Comparative Study in China

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**Abstract:** Globalization and urbanization have made many Chinese cities lose their distinct characteristics and have led to emotional sense of loss for individuals. Place attachment, as encompassing place dependence and place identity, is the positive emotion that describes the psychological connections between people and a certain place. Many studies have indicated that people develop place attachment toward a certain place by long-term interaction with that place. However, few studies have demonstrated that place attachment might also be evoked by a landscape that looks familiar, but with which a person has not had long-term interactions. It is important to understand the role of place attachment in urban design, as neglecting place attachment can have a negative impact on the outcomes of urban planning and urban design. In this study we explored the contributions of local landscape elements to people's place attachment to a new physical environment by means of a cross-regional comparative study. Three groups of respondents living in three different areas of China were chosen, and a photo-based approach was used to examine the association between local landscape elements and place attachment. The results indicate, first, that local landscapes positively contribute to residents' place attachment. Next, an individual's place attachment to new environments can be enhanced by adding familiar local landscape elements. Findings suggest that planners and designers can build stronger place attachment by integrating landscape elements that are familiar to people. This can have implications, for example, when creating links between newcomers and the new environments to which they have moved.

**Keywords:** landscape elements; local landscape; new environments; place identity; urban design

## 1. Introduction

Due to the rapid economic development and industrialization over the last forty years, the rate of urbanization of China has risen to 58.52% from 17.92% since 1978 [1]. In this process, many cities destroyed their historic areas and lost some of their specific and distinct characteristics. Similar architectural styles and urban design have resulted in the impression of 'thousands of cities with the same face' and 'somewhere in time' stronger than ever before. Despite its many positive contributions, for example from an economic and cultural perspective, urbanisation has the potential to destroy places and

the relationships between people and place. Strong relationships between people and place are conceptualised in place attachment or sense of place [2]. Place attachment is a term that refers to a complex emotional and psychological relationship between people and their environments, although it has been defined in many different ways, such as in relation to sense of place, place bonding and place identity [3,4]. It is generally believed that place attachment provides individuals with many benefits, such as fostering greater human resilience towards environmental risks [5], improving perceived quality of life [6], and increasing social well-being [7]. In particular, place attachment may contribute to fostering individual, group, and cultural self-esteem [8,9] in a time of increased mobility, globalization, greater uniformity, and loss of cultural specificity. Therefore, numerous empirical and review research papers have been published on this topic, which illustrates its importance, especially during continuing globalization.

In March 2014, China launched the New-Style Urbanization Plan (2014–2020), aiming to push the country's urbanization towards a more human-oriented and environmentally friendly path [10]. Therefore, preserving collective memories and place identity, and creating recognizable and distinctive urban environments for sustainable and vibrant urban neighbourhoods have become a topic of concern for Chinese urban planners and architects. However, so far only few studies have been undertaken in China related to the relationship between urban landscape characteristics and place attachment, and we still have limited knowledge about the mechanisms of place attachment.

As mentioned above, there are many terms describing people's bonding with meaningful places. However, the concept of place bonding has been widely described as linked to place attachment (e.g., [4,11,12]). The term "place attachment" is also used here, referring to the positive emotional bonds between an individual and a spatial setting, as place attachment remains the most popular term and it is difficult to distinguish these different concepts related to people–place relationships [13]. Some researchers have suggested that place attachment can be identified and measured by the construct of place dependence and place identity [12,14]. Place dependence is considered as a form of functional attachment and reflects the settings' ability in providing features and conditions that facilitate users' goals or desired activities [11,15]. Place dependence often leads to deeper bonding by satisfying individuals' needs, compared to those places where fewer needs are met [16]. Place identity refers to emotional bonding, which combines individuals' attitudes, thoughts, values, beliefs, meanings, and behavioural tendencies [17]. As such, it often fosters one's feelings of belonging to the place where one lives, works and plays [18].

A number of studies have tried to identify predictors that affect the cause and level of place attachment (e.g., [19–23]). Common factors have been identified, including personal experience and use of the environment, socio-demographic, social, psychological and cultural interpretations, and physical environment characteristics [24,25]. Phenomenologists argue that place attachment is based on experiences and dynamic processes [26]. Place attachment can be developed through the process of body-ballet, moving the body through space and time, and using language to express our sensory experiences [27], while it may be disrupted by changes in life course or changes in place [28]. Research has further demonstrated that socio-demographic, social, psychological, and cultural factors all contribute to place attachment, and it can be concluded that residence length [19–22], familiarity [29], home ownership [19,30], strength of community ties [21], and sense of security [19–21] can all foster place attachment, while the relation between mobility [23], education and age [22], and place attachment remains unclear, as these factors affect place attachment sometimes in a positive way and sometimes negatively, according to past studies. In addition, it should be also noted that several studies did not find a significant relationship between length of residence and place attachment [18,30,31].

With regard to the factor of the characteristics of the physical environment, individuals tend to have a stronger attachment to a place with good environmental qualities, such as with natural elements, distinctive physical terrain, or good urban design [32]. People have also indicated that a lack of perceived incivilities [19–21], the presence of quiet areas, of aesthetically pleasant buildings, and the presence of green areas [33] can affect neighbourhood attachment. Although social factors were

considered to be the most consistent predictor of place attachment in most studies, sometimes physical factors may play a more important role [2]. Particularly, studies claimed that physical factors were more important for attachment to a city [31,34,35], such as the city's historical character or the amount of the respective city's green areas [2]. However, social factors were more important for attachment to home and neighbourhood.

Although most studies of place attachment to date have been conducted by geographers and environmental psychologists [36], landscape architects are also concerned with observing the phenomenon of the interaction between individuals and their environments, especially in order to apply the resulting insights during design and planning. Larson et al. [37] explored the relationship between socio-demographics, personal wellbeing, and sense of place among residents who live near the Great Barrier Reef. Involvement in community activities, country of birth, and residence length were all found to be important factors that need to be incorporated into the community planning and resource management planning process. Some urban planners have shown that the renewal of old cities through urban design [38] and the conservation of historical and traditional properties can increase place attachment [39,40]. Hester [41], a landscape architect who devoted nearly 50 years to community design work, consistently succeeded with community design efforts through a robust participatory design process, which included a specific mapping procedure called the sacred structure, which makes place attachment explicit, spatial, and legitimate. The author claims that collective attachment to place induced the most positive influence on community design. However, the phenomenon still exists that community planners often attach importance to participation and empowerment but neglect emotional connections with local communities [42]. Thus it is still a major challenge to make sense of place in landscape planning and management [43].

Local landscape is often considered to contribute to the identity of a city and an individuals' sense of well-being [41,44,45]. Local landscapes reflect the lifestyles and cultural awareness of local residents, and people can capture the characteristics of cultural identity through this [45]. It is believed that long-term interactions with living environments generate a sense of familiarity with local landscape elements, which may ultimately lead to reinforcing place attachment, according to past studies [29,46]. Studies have also demonstrated that historical landmarks [46,47] and regional landscape elements [48] may serve to maintain people's attachment to their living places. When people are leaving their place, they tend to find a new place similar to where they lived before [49], or they decorate the new environments with old items [50]. For instance, American Mormons living in Mexico have attempted to maintain their bonds with their homeland by adding familiar landscape elements to their settlements [51], and immigrants usually name places and design buildings in a way that reflects their heritage [52].

Only few empirical studies have tried to explore the relationship between local, familiar landscape elements and place attachment. In Chen and Kuo's study [29], individuals' bonds to a new place never visited before were stronger after familiar landscape elements were added. However, their study focused more on place bonding rather than on place attachment, and the two environments used were totally different (with one relating to an urban landscape and the other mainly a rural landscape or natural landscape views). Thus the potential of local landscape elements as a basis for environmental design to enhance place attachment needs further exploration. This need is particularly relevant for urban designers and city planners in China, where the challenge is to plan and design rapidly growing cities while adhering to the New-Style Urbanization Plan of China and its call for uniqueness and identity.

## 2. Aims and Hypothesis

With the aim of providing evidence for urban planners and designers that is useful in creating cultural urban environments with recognized and distinctive qualities, the present research addresses the importance of local landscape elements and place attachment in the urban planning and design context. The objective of this study is to identify the role of local, familiar landscape elements in

individuals' place attachment to a new environment. Two alternative overall hypotheses were explored: individuals' place attachment to a new environment can be enhanced by adding familiar elements associated with their 'home' environment to the local landscape, or individuals' place attachment to a new environment is not impacted by adding local landscape elements from other areas. Both rural and urban landscapes are considered.

Inspired by Cheng and Kuo's research [29], which included Macau and Taiwan as study areas, we added Fuzhou as a study area while also including Macau and Taiwan. Fuzhou is quite similar to Taiwan in terms of landscape, for example. By including both Fuzhou and Taiwan, we can test the significance of place attachment of similar environments (Fuzhou and Taiwan) by adding different local landscape elements. The local landscape elements of Fuzhou and Taiwan contain natural landscape elements and human-made landscape elements which are quite similar, while the new environments of Fuzhou and Taiwan are also quite similar. In contrast, the local landscape elements of Macau only contain human-made landscape elements inspired by the area's Portuguese heritage and are very different from those in Fuzhou and Taiwan. Respondents who lived in the three different environments (Macau, Fuzhou or Taiwan) were supposed to have stronger place attachment to new places that were quite similar to where they lived previously. This effect would be even stronger after adding local landscape elements. Specifically, the following hypotheses were proposed to guide the research:

**Hypothesis 1a (H1a).** *Macanese respondents have a significantly stronger place attachment to new places similar to Macau than new places similar to Fuzhou and Taiwan.*

**Hypothesis 1b (H1b).** *Fuzhouese respondents have significantly stronger place attachment to new places similar to Fuzhou and Taiwan than new places similar to Macau.*

**Hypothesis 1c (H1c).** *Taiwanese respondents have significantly stronger place attachment to new places similar to Taiwan and Fuzhou than new places similar to Macau.*

**Hypothesis 2a (H2a).** *After adding local landscape elements, Macanese respondents have a stronger place attachment to places similar to Macau than before, whereas Fuzhouese and Taiwanese respondents perceive no difference between the treatments.*

**Hypothesis 2b (H2b).** *After adding local landscape elements, Fuzhouese respondents have a stronger place attachment to those places that are similar to Fuzhou than before, whereas Macanese and Taiwanese respondents perceive no difference between the treatments.*

**Hypothesis 2c (H2c).** *After adding local, familiar landscape elements, Taiwanese respondents have a stronger place attachment to those places which are similar to Taiwan than before, whereas Macanese and Fuzhouese respondents perceive no difference between the treatments.*

### 3. Methods

#### 3.1. Preparatory Work: Identify Local Landscape Elements and Collect Pictures

We began by identifying the local landscape elements in the three areas. The initial local landscape elements of Macau and Taiwan were obtained from some related studies (e.g., [29,46,53,54]). These local landscape elements were identified by 67 Macanese and 77 Taiwanese to ensure that they reflected their own environments. The initial local landscape elements of Fuzhou were obtained from a questionnaire survey, which asked 55 Fuzhouese to provide the own local landscape elements that determined their own environments. After that, these photos were sent to 10 Macanese, 10 Taiwanese and 20 Fuzhouese respectively to judge whether these local landscape elements were representative. With the two rounds of revisions and based on the principle of the feasibility of incorporation into other photos, fifteen local landscape elements (five for each area, see Table 1) were ultimately selected.



**Table 1.** Local landscape elements of the three areas.

Macanese Local Landscape Elements	Fuzhouese Local Landscape Elements	Taiwanese Local Landscape Elements
Plant arrangement	Street trees (Banyan)	Farmland
Street furniture	Alley style	Farm pond
Street signboard	Wall style	Night market lantern
Pavement style	Special plants (Jasmine)	Special painting
Building colour	Traditional building	Traditional building

Similar landscape pictures to the three areas but from other countries were chosen as new environments for the respondents. The pictures were collected from the Internet. The pictures were selected based on two primal principles. Firstly, the original pictures should be from foreign countries to reduce the possibility that respondents may know the place. Secondly, the original pictures from foreign countries should be similar to the three areas so that it would be feasible to synthesize the local landscape elements. After that, a similar procedure as with the identification of local landscape elements was conducted to make sure these photos would not be recognized as Macau, Fuzhou or Taiwan. As a result, fifteen original foreign pictures were selected and fifteen synthesized pictures were produced (adding local landscape elements into the original foreign pictures, using PhotoShop). Figures 1–3 present the 30 landscape pictures (both original and synthesized pictures) and the local landscape elements.

**Figure 1.** Cont.





Figure 1. Pictures before/after synthesizing (Macau Group).



Figure 2. Cont.





Figure 2. Pictures before/after synthesizing (Fuzhou Group).

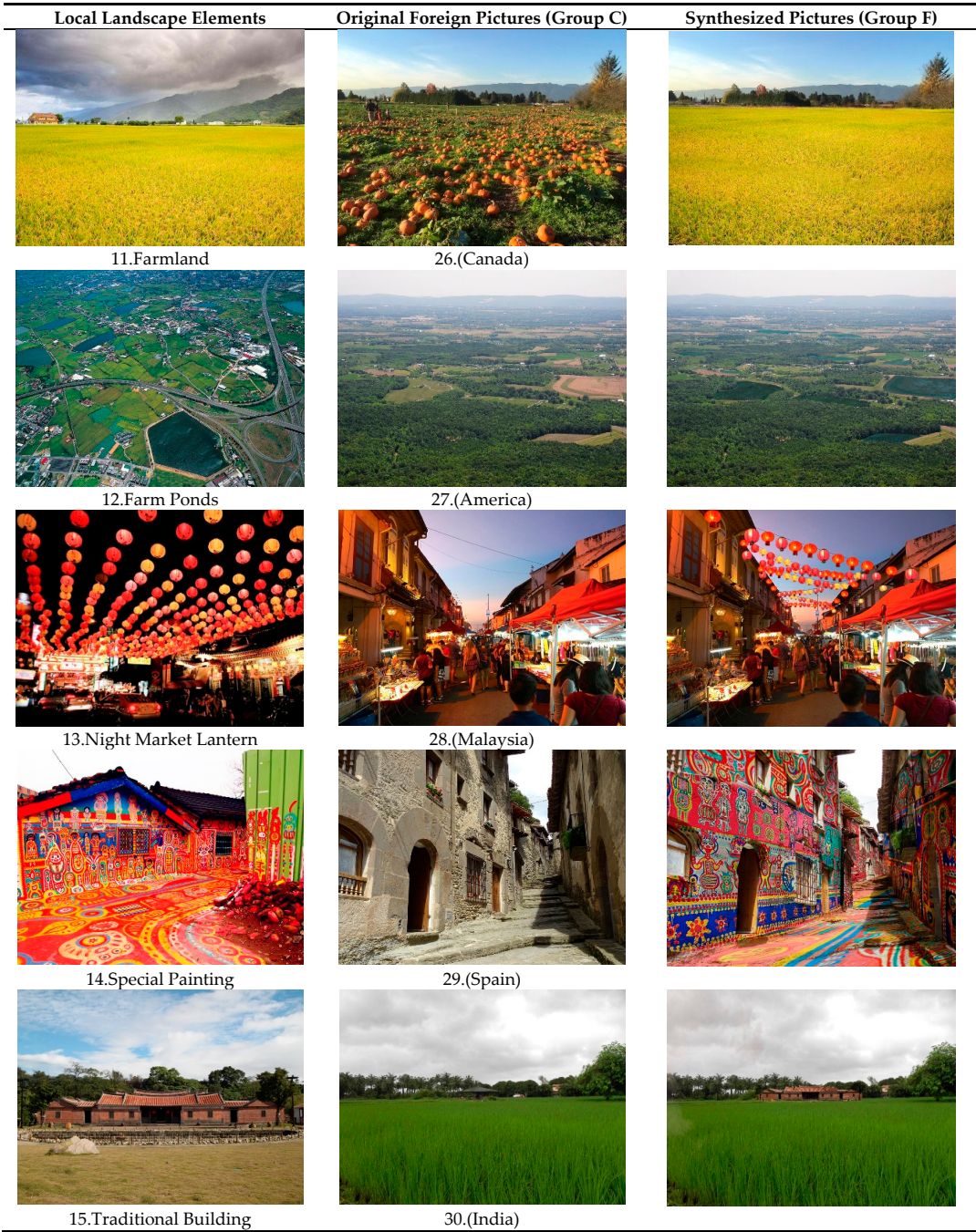


Figure 3. Pictures before/after synthesizing (Taiwan Group).

### 3.2. Background of the Study Areas

Macau, Fuzhou and Taiwan were the three selected study areas in the research. The three areas share the same language, so there was no need to translate the questionnaire into different languages. Although the three areas are all adjacent to the sea, the local landscapes in the three areas are quite different. Macau, a city beside Zhuhai, has been a part of China since ancient times. However, the Portuguese ruled Macau from 1557 until the sovereignty over this territory was returned to China in 1999. Due to over 400 years of Portuguese rule, the Portuguese have had a strong influence on Macanese culture and the Macanese urban landscape is quite similar to Portugal, as reflected in pavements, plazas, street names, architectural styles and so on. All these special landscape elements have become a symbol of Macau, which makes Macau quite unique compared to other cities in China.

Fuzhou, a city located in the southeast coastal area of China, is the capital city of Fujian Province and faces towards the Taiwan Province across the sea. It is at the feet of mountains and faces the sea surrounded by hills and has a humid subtropical climate. Fuzhou is called as “the City of Banyans” for it has planted many Banyan trees in city areas since the Song Dynasty. It is also considered to constitute the Mindong cultural area, which is distinct from the mainstream inland cultures of central China, while with having its own special local landscape. The “Three Lanes and Seven Alleys” is perhaps most famous historical urban landscape; it comprises an ancient city block located at the centre of Fuzhou City and is a well-preserved architectural complex of the Ming and Qing Dynasty.

Taiwan Province, located on the south-eastern coast of China, was controlled by Chinese for the first time after the Ming loyalist Chenggong Zheng defeated the Dutch garrisons in 1662. Although mainland China had contact with Taiwan for thousands of years, numerous Han residents immigrated into Taiwan only since Qing dynasty, bringing across Chinese culture, the Chinese architectural style, and Chinese customs. However, Taiwan was ceded to Japan for 50 years since 1895, which heavily influenced Taiwanese culture. As a result, sometimes the current architecture styles combined both Chinese traditional features and Japanese characteristics. The island has many high mountains and subtropical forests. In addition, the richness in the agricultural landscape in Taiwan’s rural areas, with the cultivation of rice, tea and betel nuts are distinct characteristics of Taiwan.

### 3.3. Experimental Design and Survey Process

A photo-based approach, which has been widely used in individuals’ place attachment assessments [4,55,56], was adopted to explore whether or not local landscape elements can enhance individuals’ place attachment in a new environment. Respondents were asked to evaluate their place attachment after watching a group of five pictures and the same procedure was repeated six times with six different groups of pictures.

The questionnaire used in this study was divided into two parts. The first part focused on the respondents’ demographic information and questions were asked related to long-term residency and gender. As residency length was regarded as an import predictor of place attachment [19,20], we asked “Have you lived Macau/Fuzhou/Taiwan more than 15 years”. If the participants responded that he or she had not lived in the respective place more than 15 years, then the interviewer moved to the end of the survey, and respondents were excluded from the study. The second part of the survey was designed to measure respondents’ place attachment toward the six groups of pictures (see Tables 2–4) using the 10-item Place Attachment Scale developed by Williams and his colleagues [12,15], and which was modified by us for a previous study in China [57] to include place dependence and place identity dimensions. The Place Attachment Scale has been widely used as an instrument for measuring individuals’ attachment with a certain place. A recent study using the 10-item Place Attachment Scale in a Chinese context was found to be adequately reliable [56]. The six groups of pictures (five pictures in each group) were in a random sequence and presented at 600 × 800 pixels. Participants evaluated the Place Attachment Scale on a 7-point scale, ranging from 1 (not at all) to 7 (very much so).

Data were collected from 25 December 2017 to 1 January 2018, and from 5 March to 10 March 2018 in Macau; from 12 January to 19 January 2018 in Fuzhou; and from 4 March to 17 March 2018 in



Taiwan. We distributed our questionnaires in urban parks, urban squares and urban streets. The target participants were those people who visited these places. The questionnaire was presented on a Tablet PC because of its ability to present high-quality pictures and the convenience for participants to answer the questionnaire. After getting the respondents' consent, some instructions were provided, and the participants were asked to respond to the questionnaire on site. We collected a total number of 391 valid responses from three areas. The data were analysed using analysis of variance (ANOVA) and *t*-test using SPSS 19.0.

## 4. Results

### 4.1. Demographic Background of Respondents

Of the 391 valid responses obtained, 136 responses were from Macanese, 129 responses were from Fuzhouese, and 126 responses from Taiwanese respondents. Respondents included slightly more women than men (203 vs. 188). For more details, see Table 2.

**Table 2.** Demographic backgrounds of respondents.

		Macanese(136)		Fuzhouese(129)		Taiwanese(126)	
		N	%	N	%	N	%
Gender	Male	66	48.53%	59	45.74%	63	50.00%
	Female	70	51.47%	70	54.26%	63	50.00%

### 4.2. Comparison of Place Attachment towards Original Pictures by Area

ANOVA was used to identify the respondents' place attachment toward the three groups of original pictures. As shown in Table 3, for both the Macanese and Taiwanese the average ratings across the three groups of original pictures were significantly different (Macanese: place dependence [F(2405) = 41.382,  $p < 0.000$ ], place identity [F(2405) = 39.214,  $p < 0.000$ ]; Taiwanese: place dependence [F(2375) = 3.444,  $p < 0.05$ ], place identity [F(2375) = 4.236,  $p < 0.05$ ]). Post hoc comparisons (see Table 4) using Tukey's Honestly Significant Difference (HSD) test indicated that the Macanese perceived no difference in place dependence and place identity between Group B and Group C and there was no significant difference between Taiwanese place attachment toward Group A pictures and Group B pictures, although the other comparisons suggested that respondents tended to have a stronger place dependence and place identity related to their own context than with other pictures. As for Fuzhouese, no significant difference was found between individuals' place attachment toward the three groups of pictures (place dependence ([F(2384) = 0.408,  $p = 0.665$ ], place identity [F(2384) = 0.078,  $p = 0.925$ ]), which was beyond our expectation. The results fully supported our H1a hypothesis and partially supported our H1c hypothesis, while the H1b hypothesis was disproved.

**Table 3.** Comparison of place attachment toward original pictures.

Respondents	Dimensions	Group A		Group B		Group C		F
		Mean	SD	Mean	SD	Mean	SD	
Macanese	Place Dependence	21.76	5.16	16.54	5.57	16.86	5.17	41.38 ***
	Place Identify	22.38	5.87	17.51	5.46	17.01	5.22	39.21 ***
Fuzhouese	Place Dependence	19.16	6.51	18.49	5.49	18.86	5.78	0.408
	Place Identify	19.12	6.55	19.26	5.81	18.96	6.04	0.078
Taiwanese	Place Dependence	19.69	3.54	20.09	4.95	21.13	4.84	3.444 *
	Place Identify	19.13	5.86	20.73	6.14	21.23	5.91	4.236 *

Note: \*  $p \leq 0.05$ , \*\*\*  $p \leq 0.001$ , SD: Standard Deviation.

**Table 4.** Tukey's HSD test results for individuals' place attachment toward original pictures.

I	J	Macanese				Fuzhouese				Taiwanese			
		MD	Sig	MD	Sig	MD	Sig	MD	Sig	MD	Sig	MD	Sig
		Place Dependence		Place Identify		Place Dependence		Place Identify		Place Dependence		Place Identify	
Group A	Group B	5.221 ***	0.000	4.868 ***	0.000	0.67	0.640	−0.15	0.980	−0.40	0.762	−1.60	0.087
	Group C	4.897 ***	0.000	5.368 ***	0.000	0.30	0.916	0.16	0.978	−1.44 *	0.031	−2.10 *	0.015
Group B	Group A	−5.221 ***	0.000	−4.868 ***	0.000	−0.67	0.640	0.15	0.980	0.40	0.762	1.60	0.087
	Group C	−0.324	0.870	0.500	0.736	−0.37	0.870	0.30	0.917	−1.04	0.158	−0.50	0.784
Group C	Group A	−4.897 ***	0.000	−5.368 ***	0.000	−0.30	0.916	−0.16	0.978	1.44 *	0.031	2.10 *	0.015
	Group B	0.324	0.870	−0.500	0.736	0.37	0.870	−0.30	0.917	1.04	0.158	0.50	0.784

Note: MD: Mean Difference (I-J), \*  $p \leq 0.05$ , \*\*\*  $p \leq 0.001$ .

#### 4.3. Comparison of Place Attachment before and after Picture Synthesis

A *t*-test was used to compare changes in the place attachment of the respondents before and after adding local landscape elements to the images. As can be seen in Table 5, individuals' place attachment toward the synthesized pictures with added local, familiar landscape elements was significantly stronger than for the original pictures. However, the inclusion of other local landscape elements produced no significant difference in place attachment. From the comparison it can be concluded that local landscape elements in a new environment may generate a sense of the familiar and then enhance individuals' place attachment.

**Table 5.** Comparison of place attachment before/after processing.

Respondents	Dimensions	Group A	Group D	t	Group B	Group E	t	Group C	Group F	t
		Mean			Mean			Mean		
Macanese	Place Dependence	21.76	24.07	−4.51 ***	16.54	16.96	−0.63	16.86	16.43	0.68
	Place Identify	22.38	23.72	−2.10 *	17.51	17.32	0.28	17.01	16.87	0.23
Fuzhouese	Place Dependence	19.16	19.09	0.08	18.49	21.57	−4.53 ***	18.86	19.17	−0.44
	Place Identify	19.12	18.83	0.36	19.26	22.19	−3.97 ***	18.96	19.65	−0.95
Taiwanese	Place Dependence	19.69	20.58	−1.85	20.09	20.16	−0.11	21.13	23.35	−4.15 ***
	Place Identify	19.13	19.94	−1.23	20.73	19.93	1.03	21.23	22.96	−2.73 **

Note: \*  $p \leq 0.05$ , \*\*  $p \leq 0.01$ , \*\*\*  $p \leq 0.001$ .

#### 4.4. Comparison of Place Attachment toward Synthesized Pictures by Area

The ANOVA results and post hoc comparisons of individuals' place attachment toward the synthesized pictures are shown in Tables 6 and 7. For all Macanese, Fuzhouese and Taiwanese, the average ratings across the three groups of synthesized pictures were significantly different (Macanese: place dependence [ $F(2405) = 109.903$ ,  $p < 0.000$ ], place identity [ $F(2405) = 70.439$ ,  $p < 0.000$ ]; Fuzhouese place dependence [ $F(2384) = 7.833$ ,  $p < 0.000$ ], place identity [ $F(2384) = 10.942$ ,  $p < 0.000$ ]; Taiwanese: place dependence [ $F(2375) = 18.784$ ,  $p < 0.05$ ], place identity [ $F(2375) = 15.429$ ,  $p < 0.000$ ]), even though no significant differences were found in Fuzhouese place attachment with the three groups of original pictures (Group A, Group B, Group C). Post hoc comparisons showed that respondents exhibited stronger place attachment toward the synthesized pictures which incorporated familiar local landscape elements as compared to the other synthesized pictures. In particular, a significant difference was identified between Fuzhouese respondents' place attachment toward the synthesized pictures with added Fuzhouese local landscape elements (Group E) and the synthesized pictures with added Taiwanese local landscape elements (Group F); Taiwanese respondents' showed place attachment toward the synthesized pictures with added Taiwanese local landscape elements (Group F) and the synthesized pictures with added Fuzhouese local landscape elements, although there was no significant difference between Group B and Group C, both for Taiwanese and Fuzhouese respondents. This provides strong evidence for the hypothesis that local landscape elements improve respondents' place attachment toward a new environment. The hypotheses H2a, H2b and H2c were all validated.

**Table 6.** Comparison of place attachment toward synthesized pictures.

Respondents	Dimensions	Group D		Group E		Group F		F
		Mean	SD	Mean	SD	Mean	SD	
Macanese	Place Dependence	24.07	3.02	16.96	5.48	16.43	5.33	109.903 ***
	Place Identify	23.72	4.55	17.32	5.80	16.87	5.54	70.439 ***
Fuzhouese	Place Dependence	19.09	6.13	21.57	5.45	19.17	5.56	7.833 ***
	Place Identify	18.83	6.32	22.19	6.03	19.65	5.65	10.942 ***
Taiwanese	Place Dependence	20.58	4.08	20.16	5.57	23.35	3.57	18.784 ***
	Place Identify	19.94	4.86	19.93	6.23	22.96	3.96	15.429 ***

Note: \*\*\*  $p \leq 0.001$ , SD: Standard Deviation.

**Table 7.** Tukey's HSD test results for individuals' place attachment toward synthesized pictures.

I	J	Macanese				Fuzhouese				Taiwanese			
		MD		Sig		MD		Sig		MD		Sig	
		Place Dependence		Place Identify		Place Dependence		Place Identify		Place Dependence		Place Identify	
Group D	Group E	7.11 ***	0.000	6.40 ***	0.000	−2.48 **	0.002	−3.36 ***	0.000	0.42	0.738	0.02	1.000
	Group F	7.64 ***	0.000	6.85 ***	0.000	−0.08	0.993	−0.82	0.516	−2.77 ***	0.000	−3.02 ***	0.000
Group E	Group D	−7.11 ***	0.000	−6.40 ***	0.000	2.48 **	0.002	3.36 ***	0.000	−0.42	0.738	−0.02	1.000
	Group F	0.53	0.628	0.46	0.760	2.40 **	0.002	2.54 **	0.002	−3.19 ***	0.000	−3.03 ***	0.000
Group F	Group D	−7.64 ***	0.000	−6.85 ***	0.000	0.08	0.993	0.82	0.516	2.77 ***	0.000	3.02 ***	0.000
	Group E	−0.53	0.628	−0.46	0.760	−2.40 **	0.002	−2.54 **	0.002	3.19 ***	0.000	3.03 ***	0.000

Note: MD: Mean Difference (I-J), \*\*  $p \leq 0.01$ , \*\*\*  $p \leq 0.001$ .

## 5. Discussion

### 5.1. Local Landscape Elements and Place Attachment

None of the original pictures were chosen from the respondents' living environments, however, when familiar local landscape elements were added, local residents' place attachment significantly increased. In contrast, the addition of other local landscape elements did not affect the respondents' place attachment. These results supported our H1a, H2a, H2b and H2c hypotheses. Overall, although similar studies would have to be carried out in other parts of the world, a conclusion from this study can be that addition of familiar local landscape elements can significantly increase people's place attachment toward a new built environment, for example when they move to a new city and/or country. This key finding is in line with some earlier studies that indicated that familiar landscapes can help people build and enhance place bonding with new environments that they have never visited before [29,46,54]. It is also similar with those studies that indicated that emotional bonding can be transferred from a previous to a new location by individuals' memories of prior experiences [58]. This may infer that when visiting a new environment, individuals may compare the physical landscape elements with their previous experience, memories and any local landscape elements in the new environments with which they are familiar and which remind them of previously experienced environments. This experience with similar prior places will ultimately lead to the development of place attachment with new environments.

However, not all our hypotheses were proved, as H1b was disproved and H1c was only partially supported. The original pictures chosen were mainly based on the principle of similarity and reasonability, with the expectation that Fuzhouese would have stronger place attachment with the pictures of Group B and Group C than Group A (H1b), and Taiwanese would have stronger place attachment with the pictures of Group B and C than Group A (H1c), based on earlier studies [29,49]. The rejection of H1b reminded us that Fuzhou and Macau might share some similarities in their urban landscape, even though they were included in the study as settings with rather different characteristics. The pictures in Group A were mainly chosen from European countries, and some European style streets and buildings can be found in the Shangxiahang Historic District of Fuzhou, which was a historic area that combined European and Chinese style buildings. A historic district renovation and implementing



strategy was put forward across the areas by the local government and has now become a symbolic area of Fuzhou, enhancing the city's distinctive identity and character. It is possible that the Fuzhouese respondents in this study may have found some similarities between the original European pictures and Shangxiadian Historic District landscape, resulting in stronger placement, and thus generating a non-significant place attachment difference between the three groups of pictures. Another fact that should not be ignored is that some Fuzhouese reported that they had a preference for European streets and buildings, so it is possible that Fuzhouese place attachment toward the pictures of Group A, B and C was affected by this preference (as some studies have indicated that preference clearly plays a role in place attachment [4,36,59]). Another surprising result was that the H1c hypothesis was only partially supported. To be more specific, the Taiwanese respondents showed a stronger place attachment to the pictures in Group C, while there was no significant difference between Taiwanese place attachment to the pictures of Group A and Group B (see Table 7). However, it should also be noted that there was also no significant difference between Taiwanese place attachment with the pictures in Group B and Group C, and the mean ranked highest in Group C, followed by Group B and then Group A. A possible reason for this might be that Group C is more similar to Taiwanese landscapes than Group B, although they both share some similarities with the Taiwanese landscape. However, the comparison of Taiwanese place attachment toward the synthesized pictures showed a significant difference, which indicates that local landscape elements play a key role in the design transformation.

## 5.2. Implications for Urban Landscape Planning

The key finding of this study for urban planners and architects is that local landscape elements can enhance individuals' place attachment toward new environments, something that is usually regarded as the result of long-term interaction. The study results support earlier findings that the physical dimensions of emotional attachment develop faster than the social dimensions [2,31]. It also provided the new insight that local landscape elements not only contribute to a city's characteristics, but also play a key role in connecting people's memory, culture and identity, and emotional relationship with new environments. Furthermore, when place attachment is evoked through a sensitive design process, people with a common identity are more aware of their rootedness and dependence on local ecosystems and strive to better steward their environments [41]. However, people may experience an emotional sense of loss when the landscape changes negatively or even disappears [4]. Since significant relationships were found between local landscape elements and place attachment, it is urgent to find ways to combine local landscape elements with symbol design and transformation processes, which is usually a challenge for planner and designers. In his research, visual analysis was used by Muslim [48] to produce possible shapes and forms of local plant images in a design process and found that design transformation allows for variations without losing the core characteristics and identity. In addition, heritage conservation could also be used to maintain the public's place attachment [28] and strengthen local identities [40]. Conversely, an increasing level of place attachment further enhances local residents' support for planning strategies [4], increases their pro-environmental behaviour [60], and strengthens the willingness to protect these areas [61]. With a new understanding of the value of heritage, urban planners should find better ways to maintain local heritage, which may maintain place attachment while satisfying the development of urbanization at the same time. Only when local heritage and local landscape elements are preserved and incorporated into the planning or design process will we create a more recognizable and meaningful city for local residents. Another application of the results is in disaster landscape planning and restoration. As there are different disasters in different area of China, such as hurricanes, earthquakes and floods, many people's home environments have been destroyed. For example, the big earthquake of Wenchuang, which happened on 12 May 2008, caused thousands of people to lose their houses and led to great despair for many people for a long time. It is important to restore residents' place attachment in the area to mitigate the effects of the earthquake and facilitate the reconstruction process.

Although realising that place attachment can help people discover the local resources that satisfy their needs and become more trusting of their native wisdom [41], as Manzo and Perkins critiqued [42], planners have not usually incorporated environmental concepts such as place attachment in their work, and have largely neglected the pivotal role of place attachment in the planning process. A typical example from China illustrates this. Huawei campus, the new campus of telecoms giant Huawei, located in the city of Dongguan, China, has evoked a lot of criticism recently. What critical voices focused on most was its construction based on 12 European towns. A newspaper articles talks of “the dreaming spires of Oxford, the quaint redbrick houses of Bruges, the palazzos of Verona and the chateaux of Burgundy, all connected by a meandering Swiss railway” [62], all representing an imitation of European urban and landscape design without any local consideration to local landscape distinctiveness and identity. Criticism on Zhihu (a Chinese question-and-answer website where questions are created, answered, edited and organized by the community of its users) was intense. Someone people mentioned that the building style should be based on its location, local climate, and local culture, and considered it a shame that Huawei campus broke with these basic rules. Another writer even pointed out that “There is still a market in China today for imitating the European style of design. This kind of thing without any local characteristics has long been criticized and abandoned in the construction industry. However, in real life, it has been repeatedly performed. The sense of inferiority in culture evolved into an ugly aesthetic package.” From these comments we might conclude that what made people feel uncomfortable was that the European-style landscapes disrupt people’s place attachment, which results in an emotional sense of loss, even though the new campus provided great opportunities for leisure. Under the background of the New-Style Urbanization Plan of China, it is critical to make Chinese planners, designers and even governments aware of and encourage them to rethink the role of local landscape, not only from the perspective of a city’s aesthetics and characteristics, but also taking into consideration place identity and place attachment.

### 5.3. Limitations and Further Study

Several limitations in the present study should be highlighted and kept in mind for future research. Respondents were asked to rate their place attachment toward a group of five pictures, rather than to one picture. The initial reason for this was that we supposed that the five different local landscape elements related to the location would remind the respondents of their living environments, however, a few Fuzhouese respondents reported that they could only recognize some of the five local landscape elements, which confused them when all five local landscape elements were present in the same group. Although we tried to select the local landscape elements in a strict way, it seemed there were still some deficiencies in doing so. Maybe this also indicates that different local landscape elements evoke different levels of place attachment, and future studies should distinguish between the respective effect of different landscape elements on place attachment. Another limitation is that respondents evaluated place attachment only based on photographs, which means they only relied on the visual information. However, other information, such as sound and smells may also be unique local landscape elements, and these may also evoke individual’s place attachment. Future research should take these factors into account and find a comprehensive way to explore the association between visual information, acoustic information, and olfactory information. In addition, as we discussed before, specific and wider landscape preferences may have affected Fuzhouese place attachment toward the three groups of pictures. Additional research is needed to examine the effect of preference for different local landscape elements on place attachment.

## 6. Conclusions

As vital components of urban landscape characteristics, distinct local landscape elements also contribute to the public’s place attachment toward their city. However, planners often focus on physical environments while ignoring deeper psychological connections to place and neglecting environmental concepts in their design process. This study preliminarily confirms that individuals’ place attachment

to a new environment can be enhanced by local landscape elements that are familiar to them. The study findings provided new insights for planners to understand the association between local landscape elements and people's feelings. By gaining an understanding of the contributions of local landscape elements to the public's place attachment, urban planners and designers can raise awareness regarding the incorporation of environmental concepts in their landscape design process. The present research also enriches knowledge on why we need local landscapes and what planners can do to mitigate the loss of local connection in a globalized world. Moreover, these findings also echo previous arguments that identity can help improve cultural ecosystem services [63–65]. Chinese cities are now experiencing an “identity crisis” in globalization, and thus incorporating results from this study may not only improve people's identification with their city, but also improve place attachment.

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