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## Towards Bikeability through Place Attachment Approach in Yogyakarta

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### Abstract

Cycling is energy-efficient transportation, free of carbon emissions, and is an active transportation embodiment of a healthy lifestyle. This study aims to understand the process of place attachment in cycling spaces. The objective of this research is to guide the design of attractive new bicycle point destinations and paths, increase the interest in cycling among city residents, and contribute to reducing carbon emissions in urban spaces. The research was conducted using a qualitative method with a place attachment theory approach and descriptive narrative analysis. Primary data collection was carried out by observing cyclists, cyclists' destinations, and interviews with cyclists & other actors. In addition, we do active participation as cyclists to get hands-on experience. This study reveals aspects of interaction, activity, memory, and experience as elements that play a role in place attachment at destination points and cycling routes in Yogyakarta.

**Keywords:** Bikeability; Place Attachment; Cycling Space; Tourism; Built Environment.

### 1. Introduction

The transportation sector is the most significant contributor to energy consumption in urban areas. An increase in the need for transportation impacts the expenditure on carbon emissions (Prato et al., 2018), and an increase in pollution in cities (Dill, 2009) will affect climate change. The use of bicycles can minimize the threat of environmental damage due to transportation. In addition, cycling has various positive impacts from an ecological perspective, including low economic operating costs and long distances compared to walking time. It is part of a sustainable development strategy. Cycling is also a concrete step to creating an environmentally friendly city by changing healthy lifestyles and being increasingly concerned about protecting the environment (Artiningsih, 2011). One of the efforts to increase interest in cycling for the community is to improve the quality of travel and urban space experiences. This effort can also be referred to as increasing bike-ability or providing a space that can accommodate cycling activities. The ability to use space for cyclists or bike-ability (Lowry et al., 2012; Winters et al., 2013; Lopez et al., 2015; Nielsen et al., 2013) is always associated with security aspects (Neufert et al., 2002; Sanz, 2006; CROW, 2017; Gunn, 2018), convenience, route continuity, coherence, and attractiveness (Gunn, 2018; CROW, 2017). However, no one has discussed the emotional and affective aspects created between cyclists and road spaces and destination points. So, the concept of place attachment has a high urgency to be explored to create a space that attracts cycling interest.

Understanding the terminology of place attachment has a different meaning in each discipline. This difference is because place attachment is considered a determinant of an individual's decision to do something in his environment based on complex and dynamic experiences (Seamon, 2013). Anthropology defines place attachment as a symbolic relationship between humans due to emotional attachment to a place (Altman & Low, 1992). Hashemnezhad et al. (2013) identified four aspects that affect cognition and perception. Those aspects are satisfaction, interactions & activities, memory & experiences, and time factors. These statements align with the science of architecture and behaviour, which states that the concept of place attachment plays an essential role in increasing the attractiveness of public spaces, green spaces, and other environments (Rastbod & Aflatounian, 2018). Based on this, the study of the concept of place attachment contributes to creating a sustainable environment from various aspects. According to Hashemnezhad et al. (2013), the place attachment research has been discussed by Yi (2019), but the topic and subject are still very general. For this reason, we will particularly disassemble the relationship between interactions, activities, memory, and experiences in a place attachment to the concept of bike-ability. In this way, the development of the quality of road space and destination points becomes a critical focus to influence the interest of local communities and tourists in cycling. The availability of facilities for socializing and integrating it with the potential of a place will provide an attractive character for cyclists. Improving the quality of the cycling space will increase the use of bicycles for recreation (Yu & Tian, 2013) and be the first step to forming cycling habits as daily transportation (Stefanus & Carina, 2021).

## 2. Objective

This research does not discuss the reduction of carbon emissions directly but tries to dismantle the process of attachment to specific destinations in the cycling route. The study focused on the cycling destination as a gathering point and a point of interaction between individuals. This research aims to design a cycling destination point that is safe, attractive, and possible to increase social interaction between residents. In addition, it also produces urban design guidelines that can develop the quality and experience of cycling spaces because attractive areas are then able to increase interest in cycling, create a healthy lifestyle, and minimize the increase in carbon emissions in urban spaces.

## 3. Methodology

To conduct this qualitative study, we used a place attachment approach (Tuan, 1974; Relph, 1976; Tuan, 1977; Steele, 1981; Altman & Low, 1992; Carl et al., 1992 in Sattarzadeh, 2018; Giuliani & Feldman, 1993 in Vaske & Kobrin, 2001; Williams & Patterson, 1999 in Vaske & Kobrin, 2001; Seamon, 2013; Hashemnezhad et al., 2013; Rastbod & Aflatounian, 2018). Primary data collection was carried out by observing cyclists, cyclists' destinations, and interviews with cyclists & other actors. In addition, we do active participation as cyclists to get hands-on experience. The analysis was carried out with a descriptive narrative. Secondary data is collected through literature studies through news, social media, books, and journals. The study location chosen was a tourist bicycle path named Monalisa (Yogyakarta, 2021), which the Yogyakarta City Government had established to develop a sports tourism program.

## 4. Literature Review

### 4.1 Perception

Tuan (1974) stated that place has more meaning than physical components, but rather a space with a social system formed (Williams & Patterson, 1999). Tuan (1977) also states that place and sensory experience emphasize repetition and routine activities carried out in an area. Space users have specific experiences and memories through their ordinary senses of smell, touch, sight, hearing, and taste through these habits. Based on this familiarity, these places become known by the public. Carl et al. (1992) stated that an ideal public space must support humans to achieve basic needs such as comfort, passive and active engagement, and discovery. Place attachment is also defined as the link between the physical characteristics of the environment with cognitive and perceptual factors (Steele, 1981; Hashemnezhad et al., 2013).

### 4.2 Place Attachment

Hashemnezhad et al. (2013) state that physical and social features have the same role in forming a place attachment. Four aspects affect cognition and perception: satisfaction, interactions & activities, memory & experiences, and time factors (Hashemnezhad et al., 2013). Happiness discusses the relationship between humans to places depending on the level of individual perception. This satisfaction occurs due to aspects of quality and security (physical, social, emotional) formed from the perception of conscious, unconscious, objective, subjective, personal, or social (Hashemnezhad et al., 2013). Social interaction makes man the leading actor in public space, then discussion between people-people and people with surroundings (Seamon, 2013). Cushing & Miller (2020) identify the main drivers that cause attachment to their community, namely the existence of social offerings and openness. Social offering means a place for people to gather and cultural and social participation. In it, there is the presence of community members who are interrelated with each other. Openness is the openness of a community manifested by the diversity of people in it, namely families, the elderly, minorities, and various work backgrounds. Fereidooni & Soheili (2018) reinforced this community openness allows interaction between humans and causes a close relationship between place and society (Fereidooni & Soheili, 2018). Place attachment is also formed from community participation, social network engagement, and cultural interactions (Hashemnezhad et al., 2013). In addition, cultural attraction in the form of festivals, celebrations, and exciting activities in a place can also contribute to attracting people's attention (Hashemnezhad et al., 2013). These repetitive activities can increase experiences and memory so that humans feel familiar with the place (Tuan, 1977). If we have a memory of space, an exciting experience is formed (Hidalgo & Hernandez, 2001). These points become the basis for deepening the place attachment process in the context through field observations.

### 4.3 Bikeability and Place Attachment

According to Altman & Low (1992), there is a correlation between human behaviour and the human environment, forming a behavioural model of elements. The applications and models are (1) point of origin and destination of walking or bicycle trips (Moudon et al., 2002), (2) Characteristics of the selected route on the trip (Moudon et al., 2002; Federal Highway Administration, 1999), (3) Characteristics of the surrounding area on the trip (Moudon et al.,

2002; Gunn, 2018), (4) environmental factors (Federal Highway Administration, 1999), and (5) intrapersonal and interpersonal factors (Federal Highway Administration, 1999; Gunn, 2018). According to Moudon et al. (2002), determining the point of origin and destination for transport can differ but can be the same for recreational or sports activities. Based on these models, human behaviour in cycling can be identified as follows: distance travelled between origin and destination, bicycle space design, and the intensity of motorized vehicles, bicycles, or people in the space. In addition, the quality of space is also a consideration for the impact on aspects of safety, comfort, experience, and cyclist's perception. The intensity of land use, route choices, and the availability of alternative means of transportation also affect the desire to cycle. Based on this, bike-ability is always associated with safety, comfort, route continuity, coherence, and attractiveness. However, no one has discussed the emotional and affective aspects created between cyclists and road spaces and destination points. So, the concept of place attachment (activity, interaction, experience, and memory) has a high urgency to be explored to create a space that attracts cycling interest.

#### 4.4 Study Area Yogyakarta

Based on its history, Yogyakarta is a city that lives and develops bicycles. The Yogyakarta city government made efforts in addition to launching a tourist bicycle path that connects destination points in Yogyakarta. This study explores the potential for space development for cyclists in urban spaces, especially at essential and exciting points for users. The location chosen is Yogyakarta City, a city with a solid historical and cultural background related to bicycles. This city is also a tourist city that is developing a sports tourism program by creating a tourist bicycle path named Monalisa (Yogyakarta, 2021). The first step is to conduct a literature study by collecting data from news, social media, and journals. This step aims to find out the cycling phenomenon and its potential in Yogyakarta, understand the applicable government policies, and identify locations that are favourite spots for cyclists. This information becomes the primary material in the field survey to match it back with current field conditions. This survey activity is observed and documented through photos and videos.

Our first survey looked at the activities of cyclists and how cyclists use their space. This survey was conducted using the drifting method, travelling without a definite destination and only stopping at points that we think are interesting to explore (Andreotti & Costa, 1996 in Fuad & Yatmo, 2017). This method helps review the process of place attachment on the Monalisa tourist bike path, especially the Old City Romance Route or *Romansa Kota Lawas* Route.

#### 5. Result and Discussion

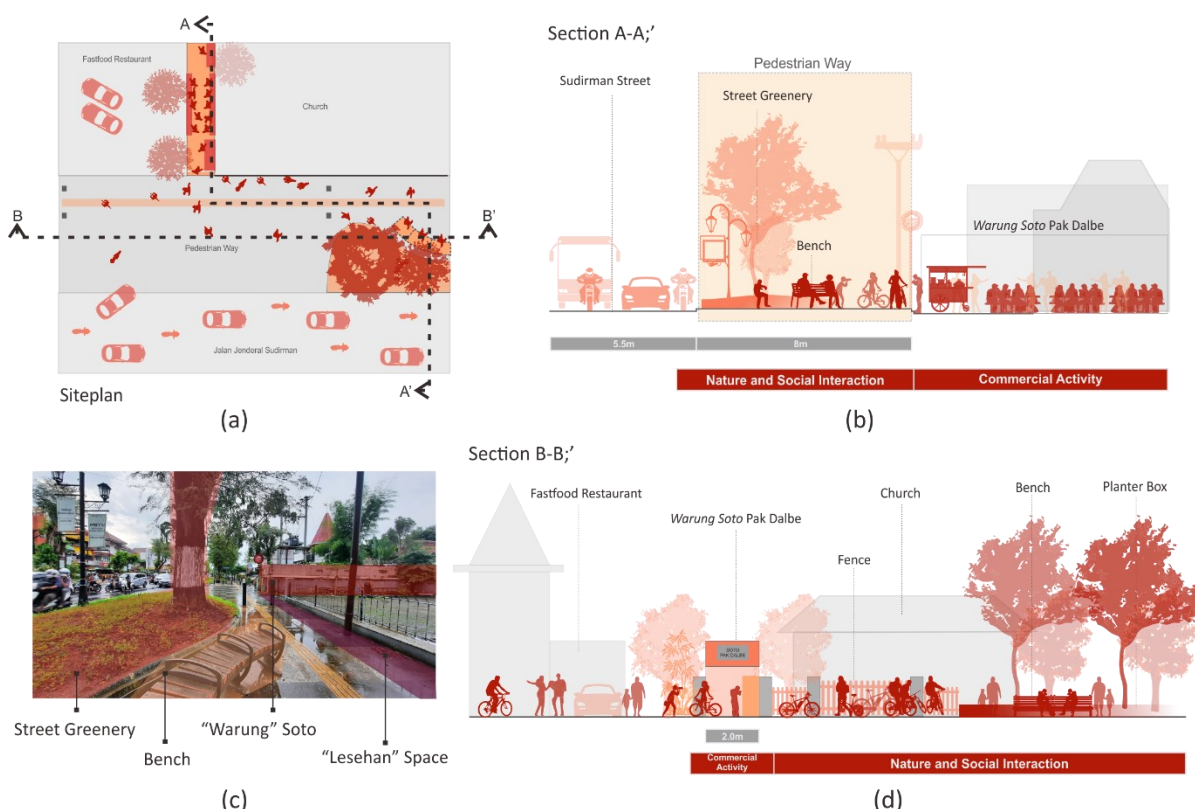
Field observations were made along the *Romansa Kota Lawas* route, as shown in figure 1. Based on this, we can see how a destination or potential point creates a place attachment made field observations. Place attachment discussed in the description is what activities are carried out, how actions and interactions can occur, who are the actors at that point, and how the experience of space can be a memorable memory in a place.



Figure 1. Destination on *Romansa Kota Lawas* Route (Source: author)

### 5.1 Warung Soto Pak Dalbe

The first route is *Jalan Jenderal Sudirman*, around the garden city area. Based on Figure 2(a), this stall can be easily accessed from the protocol road and is on the edge of a pedestrian path of about six meters. The main activity that becomes the main attraction on this road is the activity at Pak Dalbe's food stall, which is quite popular among cyclists and *soto* connoisseurs. This *soto* stall is attractive because, in addition to the typical Javanese *soto* culinary that is served, the physical condition of the building also attracts attention. Figure 2(a) shows the proportion of warungs to public spaces, and as shown in figure 2(d), this simple building is sandwiched between two extensive facilities such as a fast-food restaurant and a church. In figure 2(b), the limited space in the stalls causes the expansion of activities to the pedestrian way or open city public spaces. Based on the observations of many customers who use benches and planter boxes as in figure 2(c) who are on the pedestrian way while chatting and enjoying the beautiful atmosphere in the middle of the city. It is not uncommon for customers to open their mats and sit "*lesehan*" in the area shown in figure 2(c). In addition, the availability of minimal parking space is also a significant problem for motorized vehicles. In this case, cyclists can get around the problem by placing their bicycles on the church fence or leaning on a pew. Although there are limitations in several ways, this "*soto*" stall remains an option because the spacious and shady surrounding space provides an exciting experience for its users. The flexibility of space offers opportunities for various and unlimited social activities. The shade provided by the large trees in the garden city area also increases comfort in activities in the space around *Jalan Jenderal Sudirman*. Based on this, Pak Dalbe's *Soto* stall becomes an activity generator for the pedestrian area of *Jalan Jenderal Sudirman*, both for cyclists and other vehicle users to stop and increase the crowd in the city space.



**Figure 2.** (a) the proportion of stalls to public spaces; (b) expansion of stalls to public spaces  
(c) benches and "*lesehan*" space; (d) bicycle parking

### 5.2 Garden City, Kotabaru

The shady trees and plants in the park along the roads dominate the visual character of this area. Architecturally, the characteristics of the building during the Dutch Colonial era are the expression of the building. Figure 3(c) shows the facilities in the form of benches in the park or pedestrian area used to sit and rest or become a gathering point for cyclists. The use of this space can occur because of the beautiful atmosphere of the trees that make it comfortable. There are signs to support the safety of cyclists, such as special bicycle crossing lanes, special bicycle lanes on both sides of the road, and bicycle parking, as seen in figures 3(b) and (c). The shade and uniformity of the nuances of the building with various uses become the distinctive character of the Kotabaru area. The attachment of

the Kotabaru area is influenced by the presence of green elements from trees and gardens and the diversity of building functions with a distinctive colonial atmosphere.

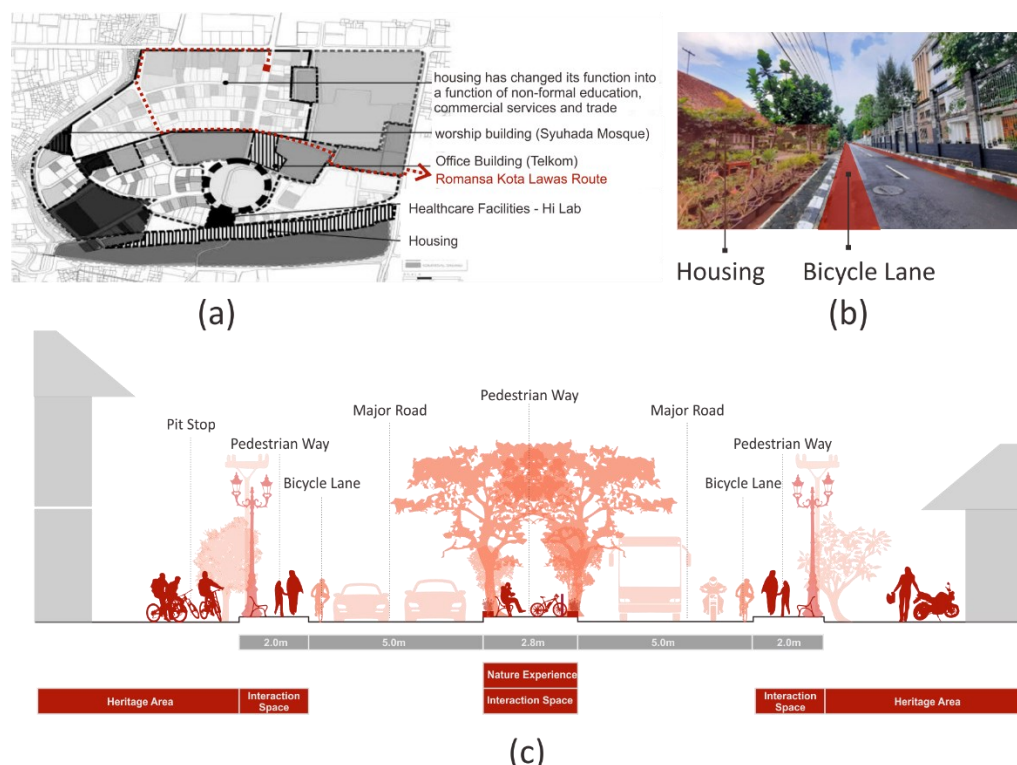
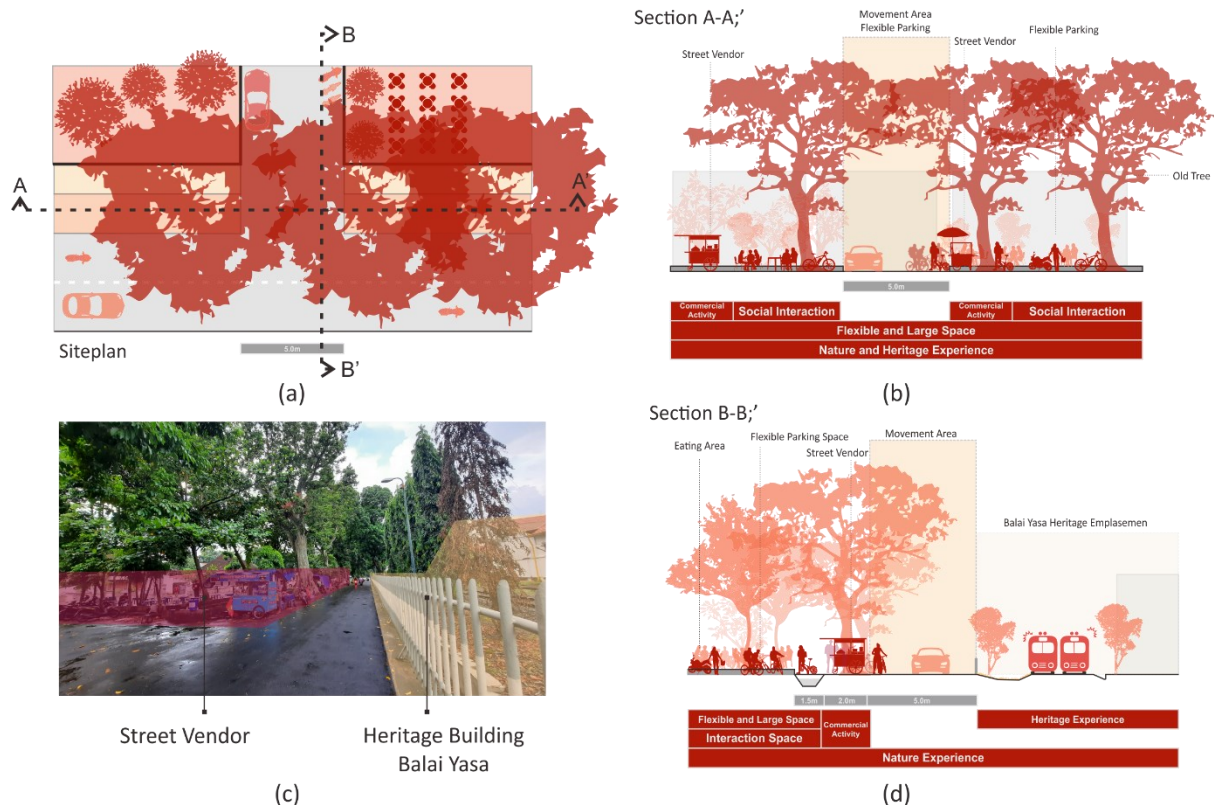


Figure 3. (a) area zoning; (b) residential areas  
(c) Suroto Street pedestrian path

### 5.3 Street Vendors in *Balai Yasa* Area

Another exciting destination is the street vendors around the *Balai Yasa* emplacement area. The excitement is due to the green, shady, and relaxed environment, directly influenced by the large trees still firmly standing along the road segment, as shown in figures 4(a) and (b). The Dutch heritage houses right across from *Balai Yasa* also add accents to the area. The road that runs along *Balai Yasa* is not the main road, so it has a minimum density of motorized vehicles. So that the comfortable, quiet, and spacious space, as shown in figures 4(b), (c), and (d), is used by street vendors to trade from morning to evening. Based on figure 4(b), traders are dominated by ice traders, ranging from *es dawet*, *es campur*, *es doger*, and some sell snacks such as *rujak*, *batagor*, dumplings, as well as heavy culinary delights such as *soto* and meatballs. Because the area is very comfortable, visitors to this area usually prefer to enjoy the food on the spot while looking at shady views and historic buildings. The need for space makes the traders provide temporary seats with a large enough capacity, as shown in figures 4(b) and (c). The seats in figure 4(b) make activities in open spaces longer and allow various activities such as chatting with friends, interacting with traders, and interaction with visitors. The diverse culinary offerings, the comfortable place, and the quiet road space from motorized vehicles make this area very attractive to cyclists. Although there is no rigid parking facility, there is a relatively flexible and spacious parking area that the eyes of the bicycle owner can still reach. The bicycle is sometimes propped up against the trees, and the owner enjoys culinary delights not far from the bike, as shown in figure 4(b). This behavior is related to a sense of security which is an essential factor and causes cyclists to return to the facility. The spacious space with a natural appeal makes a special attachment to its users. The interaction between humans and humans and humans with the surrounding trees is an experience. Based on this, the *Balai Yasa* area is a culinary area characterized by historical buildings and shades of green accompanied by supporting facilities that support its activities.

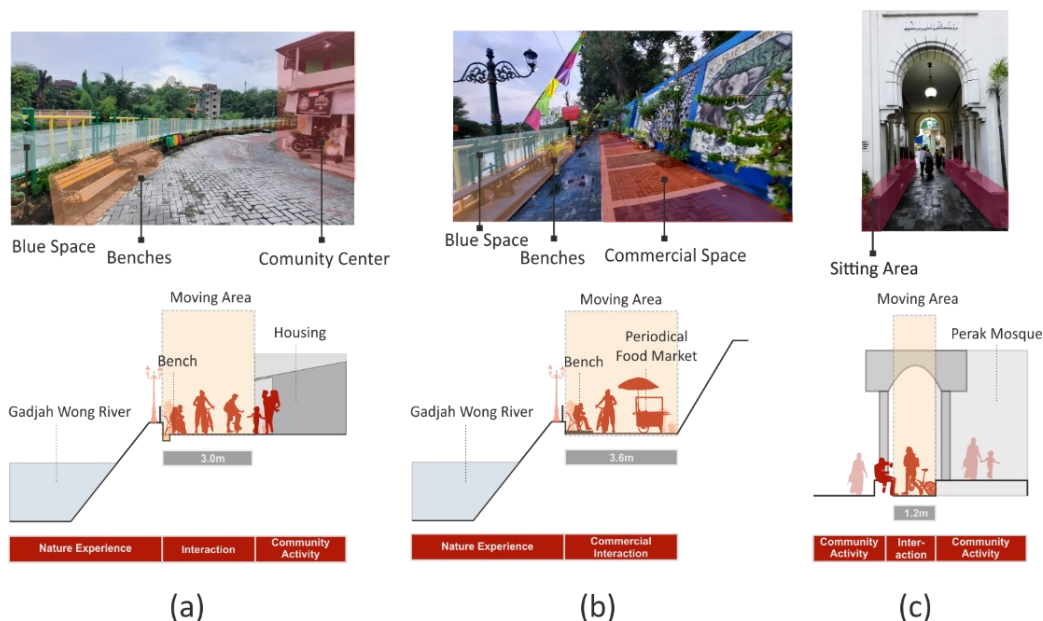




**Figure 4.** (a) the shade of the street space; (b) street vendors; (c) use of space for eating and interacting (d) relationship between street vendors and the Balai Yasa emplacement

#### 5.4 Village Area

The next destination is *Gajah Wong Muja Muju Village*, located on the bank of the *Gajah Wong* river. Based on observations and data from social media, cyclists often gather in this park to socialize or enjoy the village by the river, which is quite beautiful. The attraction in the form of environmental harmony and the activities of the people of *Kampung Gajah Wong* are unique for cyclists. A gazebo and bench by the river, as in figure 5(a), allow for activity and interaction.



**Figure 5.** (a) Muja Muju Village; (b) Bendhung Lepen Kotagedhe; (c) Perak Mosque Kotagedhe

The last destination is Kotagedhe. Kotagedhe is a heritage area with interesting architectural relics such as the Kotagedhe Silver Mosque, the Kotagedhe Grand Mosque, the Tomb of the Kings, and residential buildings with a distinctive Javanese feel. The area, which is dominated by residential areas, makes cyclists who pass through are served with local community activities. Activities such as shopping at the market, traditional culinary traders lined up, people talking on the mosque terrace, and other daily activities such as figures 5(b) and (c). The relatively narrow road space makes cyclists must pass by people who are passing through or stay. Figures 5(a), (b), and (c) show the interaction between tourists and residents due to activities carried out in an alley in the village.

### 5.5 Results

In this case, activities and interactions are divided into "where" the process occurs and "what" drives action in space. There are generally mixed-use, commercial, housing, and major road areas as destination areas based on-field findings. There are also regional generators in culinary, social, and cultural attractions. On the other hand, some experiences and memories are formed from the character of space, including nature and heritage areas. Furthermore, 4 points and destination areas are connected to each point, creating a place attachment as shown in table 1.

**Table 1.** Process Analysis of Place Attachment

Destination	Place Attachment								
	Activity and Interaction							Experience and Memory	
	Mixed-Use Area	Commercial Area	Housing Area	Major Road	Culinary	Social	Cultural	Nature	Heritage
Warung Soto Pak Dalbe				√	√	√	√	√	√
Garden City Kotabaru	√	√	√	√	√	√		√	√
Street Vendors in Balai Yasa Area					√	√		√	√
Village Area (Kampung)			√		√	√	√	√	√
	1	2	2	2	4	4	2	4	4

Then the culinary and social activity factors and nature and heritage characters have an essential role in forming place attachments. Figure 6 indicates a further and detailed relationship between the element of place attachment and the physical aspect based on the development of observations in the Monalisa route.



Figure 6. Place Attachment Diagram

## 6. Conclusion and Recommendation

This study indicates that activities, interactions, experiences, and memories are the basis for exploring the occurrence of the place attachment process in a place. Space exploration based on spatial experience shows that there are triggers for activities and interactions in a space dominated by culinary and social community activities and the occurrence of experiences and memories of areas dominated by natural and heritage characters. Thus, the findings of this study are that aspects of culinary, social community, nature, and heritage trigger attachment to a place in cycling destinations in the city of Yogyakarta. Therefore, we need to explore the physical elements that support each character in the region.

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## Conflict of Interests

The authors declare no conflict of interest.

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