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Dimensions of the Pedestrians' Personal Territory in the "New Bendar 45" Urban Area in Manado – North Sulawesi, Indonesia

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ABSTRACT

The New Bendar 45 area in Manado - North Sulawesi is a shopping and office center that provides territories or spaces for pedestrians. This research, therefore, aims to determine the dimensions of the pedestrian's personal territory by observing their behaviors at the location in the morning, afternoon, and evening with the use of video and photo cameras. Person-centered Mapping technique was used for the analysis with the help of AutoCAD program. There are 17 dimensions of pedestrian's personal territories found, each with varying behavioral characteristics. These results are therefore useful as a reference when planning the pedestrian space requirements in the urban areas.

Keywords: Personal territory, pedestrian, urban area, Manado

Introduction

The need for pedestrian facilities in urban areas is increasing, specifically in mixed, shopping, and office areas. Cities in different parts of the world are undergoing road design resolutions, trying to construct paths based on the functionality and uniqueness of local cultures in order to encourage pedestrians (WHO, 2015). According to GDCI (2020), found that walking is increasingly having a positive impact on a healthy urban environment, and according to government's appeal during the COVID-19 pandemic, people are expected to do their activities in open spaces in order to maintain healthy living. Walking is a healthy sport that is often performedby everyone, including children and adults, as well as people with disabilities by using certain tools. It has been discovered that roads in urban areas are used for purposes such as work, shopping, leisure, and other activities (Febrianto, 2021; Reza et al., 2018; Setyowati, 2017; Saraswaty, 2017).

Consequently, everyone needs a walking space of different sizes depending on their behavior, activities, companions, and the load, which has affected the dimensions of pedestrian's personal territory. The Ministry of Public Works and Housing Regulation No. 03 of 2014 concerning Guidelines for Planning, Provision, and Utilization of Pedestrian Network Infrastructure and Facilities in Urban Areas has described the standard dimension of pedestrian lane widths in the appendix. However, the local situation and developing state of the area do have characteristics that may differ from the pedestrian's behavior. Several studies have analyzed the flow of pedestrian movement and walking speed, but only a few have focused on the dimensional requirements of their personal space, which exhibit different characteristics. Makalew et al., (2017) found that children pedestrians have different spatial dimensional requirements, depending on the characteristics of places in rural and urban areas.

Pedestrian's space design requires spatial dimensions based on the characteristics of road users. Therefore, it is important to consider in detail, the differences in pedestrian characteristics. This interest in researching the pedestrian's personal territory, specifically on the phenomenon

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of their behavior, is influenced by the activities of other users occupying the territory, hence it is important for urban planners to understand the need for personal pedestrian space in order to accommodate them in future. Based on this reason, this research seeks to analyze the characteristics and dimensions of pedestrian personal territory in mixed urban areas.

Material and Methods

Descriptive method was used to obtain qualitative and quantitative data, while person-centered mapping analysis technique, which is an actor-based mapping, was used to obtain the characteristics and dimensions of pedestrian's personal territory. This research was conducted by direct observation in the New Bendar 45 area of Manado, and to facilitate these observations, this area was divided into 8 segments, which include Suprapto, DotulolongLasut, MT Haryono, Lembong, WalandaMaramis, Siswomihardjo, DI Panjaitan Street and Letter T Streets as shown in Figure 1.

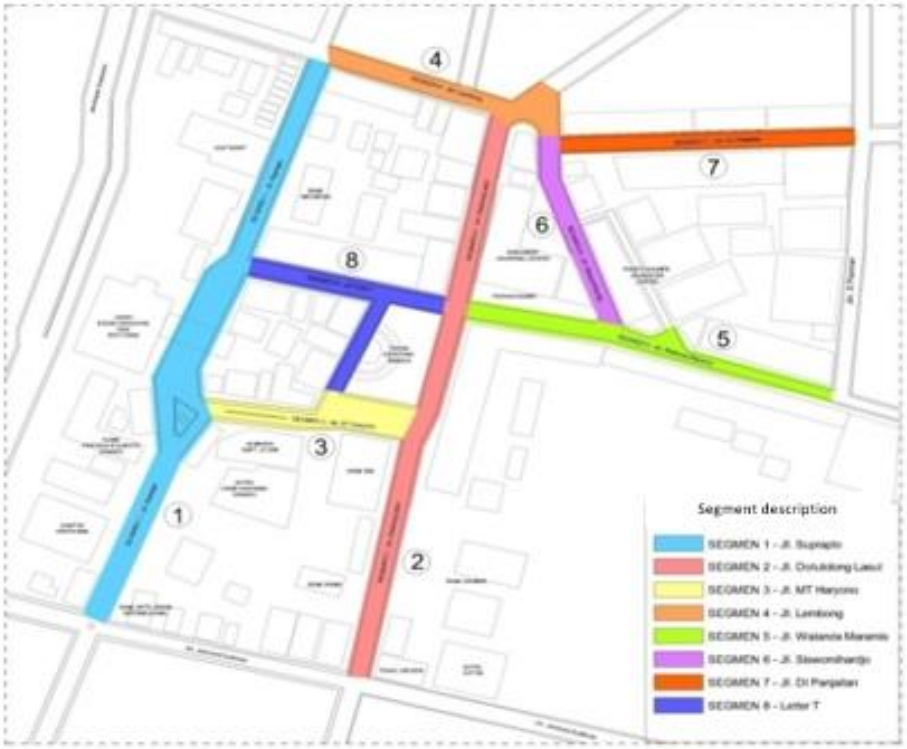


Figure 1. The division of the segment in the New Bendar 45 area of Manado

The behavior is related to the personal territory of the pedestrians while walking and other activities carried out on their way when dealing with other users who also occupy and have activities on the path. The dimension measured is the width of the space required by pedestrians, meanwhile observations were made on several days from ending 2021 to early 2022 when the day is still bright in order to facilitate data collection through a recording device, such as photo and video cameras. These image data were processed by using the AutoCAD program.

Results and Discussion

The personal territory on the pedestrian path in the New Bendar 45 area of Manado is found in the space around the path, in the front area of the shop/office building, and on the traffic lane. These territories are situated to enable the pedestrian to adapt to the difficulties in passing through the path, due to the obstacles caused by other users. This simply indicates that the

personal territory in this area is not only found on pedestrian paths (sidewalks) but also on other road spaces.

Formation of pedestrian personal territory

Pedestrian paths in all observation segments are not only occupied by people, but are also dominated by shop owners, street vendors, and parkers. For example, the shop merchants occupied the area in front of their respective shops by placing properties such as merchandise/materials, tables, chairs, cabinets, and shelves on the sidewalk floor or hung above.

Street vendors (PKL) use areas that are not occupied by shop traders, such as in front or beside the building, directly adjacent to the shop wall, but leave a free area to enter the shop. They are characterized by the placement of merchandise/materials, tables, chairs, cabinets, and shelves on the sidewalk floor or hanging above. Furthermore, their properties include parasols or tarpaulins that are used to protect from the sun and rain. Based on the fact that there are no boundaries between street vendors, they tend to form a long row, and the distance between them varies from one to another, some are close together, while some make a certain distance.

Parkers occupy free spaces around shops and street vendors, some form groups, while some are random. Their dominance is characterized by the placement of two-wheeled, three-wheeled, and four-wheeled vehicles. It is important to note that the areas occupied by shops, street vendors, and parkers have no time limit, rather, it is based on their respective needs. Generally, traders use pedestrian paths when opening and arranging their goods at 07.00 and closing at 18.00, while parkers are often seen during the day.

Consequently, pedestrians only get the rest of the paths, meaning that the more space occupied by shops, street vendors, and parkers, the smaller the space available for pedestrians to walk. The process of forming pedestrian personal territory is shown in Figure 2.

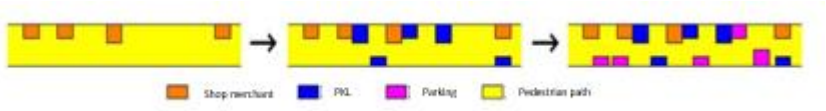
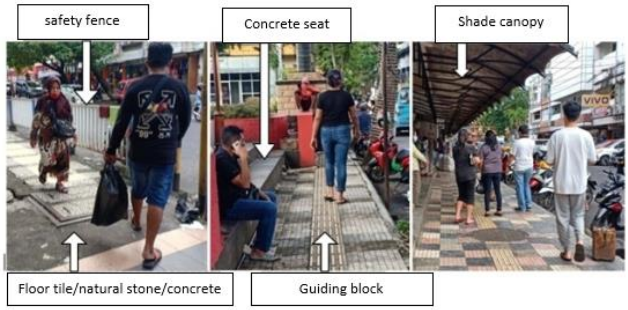


Figure 2. The process of establishing pedestrian personal territories on pedestrian paths

In the physical setting of the pedestrian path, the pedestrian's territory is formed from fixed and semi-fixed elements. Fixed elements are things that do not move, such as concrete or ceramic floors, guiding blocks, safety fences, shade canopies, and concrete seats, while semi-fixed are those that moves, such as wooden/plastic seats and tables. These elements are described in Table 1.

Table 1. Elements of pedestrian personal territory on pedestrian paths

Physical Setting of Pedestrian Path	
Fixed Element	**Visualization**
• Concrete or ceramic floor material, • Guiding blocks • Safety fence • Shade canopy • Concrete seat	

To be continued…

Semi Fixed Element	Visualization
• Wooden or plastic chair • Table	

Pedestrian personal territory type

The pedestrian personal territory is not only limited to fixed and semi-fixed elements, but also related to the dimensional space, because pedestrians need space for movement while walking. Therefore, the observation of the dimensions in each road segment is the width of the space required.

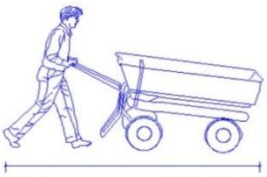
This width is determined by the variation in the way they walk, the things they carry, who they walk with, and other passers-by. Based on the observation of pedestrian behavior, 17 types of pedestrian personal territory dimensions were found as shown in Table 2.

These types of dimensions include child pedestrians, adult pedestrians, adults carrying small/little items, adults carrying large/lots of items, adults pushing goods carts, adults calling, adults carrying one child, adults carrying two children, adults with children and carrying goods, adults holding hands, adults walking together, adults traveling in threes, two, three, four, and five passers-by, and many people passing by.

Table 2. Dimensions of pedestrian personal territory

No	Pedestrian Type	Dimensions (Width)	Visualization
1.	Child pedestrian	 35 – 50 cm	
2.	Adult pedestrian	 60 – 80 cm	

To be continued…

3.	Adults carrying small/little items	 80 – 100 cm	
4.	Adults carrying large/lots of items	  100 – 180 cm	
5.	Adults pushing goods carts	 90 – 120 cm	
6.	Adults calling	 70 – 90 cm	
7.	Adults carrying one child	 100 – 120 cm	

To be continued…

8. Adults carrying two children

130 – 160 cm


9. Adults with children and carrying goods

120 – 150 cm




10. Adults holding hands

120 – 140 cm

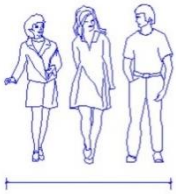


11. Adults walking together

140 – 160 cm

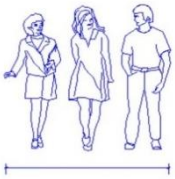
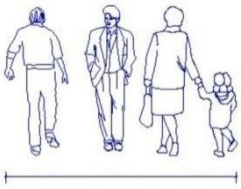


12. adults traveling by three



200 – 240 cm


To be continued…

13.	two people passing by	 200 – 240 cm	 
14	Three people passing by	 200 – 250 cm	 
15	Four people passing by	 250 – 300 cm	 
16	Five people passing	 300 – 400 cm	
17	Many people passing by (situation before the holidays)	 > 600 cm	

Conclusion

According to the results and discussion, 17 dimensions of pedestrian personal territory were found in the New Bendar 45 area of Manado. This pedestrian's personal territory has varying behavioral characteristics depending on (1) the individuals such as children and adults, (2) body sizes which include small, medium, and large, (3) movement such as calling, holding hands, and playing, (4) items carried namely bags, boxes, carts, and others, (5) walking partners which include family and friends, and (6) interactions with fellow pedestrians. It was observed that these characteristics changes from one place to another such as on the path, the front of the shop building (overhang), and the street space (vehicle traffic). Similarly, the dimensions of pedestrians' personal territory also change rapidly with respect to the varying characteristics.

Meanwhile, the distance between pedestrian's territories was adjusted to the situation of the place, but there was no social distancing as appealed by the government during the COVID-19 pandemic and its variants. These results are useful as a reference when determining the pedestrian's space requirements in urban areas.

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