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HOW DO PEDESTRIANS PERCEIVE THE SAFETY, COMFORT, AND USEFULNESS OF A WALKING SPACE? AN EXPLORATORY STUDY OF PEDESTRIAN PERCEPTION

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ABSTRACT

Car-oriented development has brought several negative impacts on human quality of life. Therefore, it is necessary to pay more attention to walkability as one of the essential aspects of urban quality of life. In the meantime, most research on walking and walkability still overlooks the role of the pedestrian's perspective in examining walkability. Hence, this research tries to fill the gap in walkability research by exploring the pedestrian perspectives on the safety, comfort, and usefulness of walking space as the three overlapping aspects between walkability and walking needs. This research took context in Suryakencana, Bogor City, Indonesia. This study is a qualitative study case that used interviews, mapping, and field observation to collect information on pedestrian perspectives. By utilizing descriptive analysis, this study found several aspects that contribute to the perception of safety, comfort, and usefulness of walking space. This research is expected to improve the understanding of walking from the pedestrian perspective and to reconsider the salient attributes in developing pedestrian space, hence can accommodate better pedestrians' needs.

Keywords: *Walkability; Perception; Safety; Comfort; Usefulness*

INTRODUCTION

Currently, car-oriented development in urban areas has brought a traffic phenomenon that resulted in the degradation of the quality of life through decreasing productivity, time for socialisation, and the emergence of environmental and mental health issues (Tiwari, 2018). On the other hand, Blečić et al. (2014) revealed that walkability is a crucial aspect of urban quality of life because of its ability to escalate accessibility, public space quality and social climate. Therefore, it is necessary to give more attention to pedestrians as the basis of urban development.

Walking is a daily activity carried out by humans and has several positive impacts: increasing cardiovascular health, reducing stress and emission, advancing equality of access and decreasing transportation expenditure (Gao et al., 2020; Herrmann-Lunecke et al., 2021; Ruiz-Padillo et al., 2018). Walking also can enliven urban creativity by stimulating street life (Speck, 2012). Support for walking can promote the manifestation of a sustainable transportation system and urban development (Rahmatiani & Kameswara, 2021). Gehl (2010) also conveyed that if a city includes walking in its development, it can promote the manifestation of a lively, safe, sustainable, and healthy city.

Based on research about walking needs, Mehta (2008) mentioned seven factors that affect walking: (1) feasibility, the appropriateness of walking; (2) accessibility, the ability to access a destination; (3) usefulness, the usability of an environment to fulfil humans' needs; (4) safety, the feeling of safe and safe condition for walking; (5) comfort, pedestrians' feelings of convenience that are affected by environmental and physical aspect; (6) sensory of pleasure, the feeling that emerges from the experience of sense; (7) sense of belonging, pedestrians' attachment on its environment. After that, Speck (2012), in his general theory of walkability, acknowledges four factors that should be considered to create a supportive walking environment: (1) Useful: a walking environment can fulfil human needs; (2) Safe: an environment should make pedestrians safe and feel safe; (3) Comfortable: walking space should give comfort to pedestrians, and (4) Interesting: a walking space should have attractions that support humans life. Based on those factors, it can be seen that not every walking need depends on environmental factors. Some are related to individual conditions that interact with the environment. Besides, there are overlapping factors between walking needs from Mehta (2008) and walkability aspects from Speck (2012): safe, useful, and comfortable.

Most existing research on walkability focused on environmental factors that are not responded to in the same way by each individual and majority of them still take context in Western countries that cannot be implemented directly in Asia countries (Chan et al., 2020). In their literature review on walkability, Talen & Koschinsky (2013) stated the subjective view of environmental conditions for walking has the same level of cruciality as the objective one. In addition to that, De Vos et al. (2022) also stated that perception is a factor that is still under-explored in the study of walkability despite its pivotal role in the frequency and duration of walking. Those circumstances indicate that to promote walking, deep discussion and understanding from pedestrians' perspectives and exploration in Asian context is necessary to fill the gap in this research area.

Grounding from that issue, this research tries to complement the study of walkability and walking by exploring the pedestrian perception of safe, comfortable, and useful walking space as three aspects that overlap between walking needs and walkability aspects and takes context in an urban area in Indonesia. The two background questions for this research are (1) What kind of walking space is perceived as safe, comfortable, and useful? and (2) What are the attributes that affect them? Through this study, it is expected the safe, comfortable, and useful space for pedestrians can be better understood.

METHODS

This research took place in the Suryakencana Area in Bogor City, Indonesia—an area visited actively by pedestrians for work or leisure from various age groups. Also, this area is already facilitated by walking infrastructure such as sidewalks. Those points become the consideration because it can ease the researcher to obtain pedestrians with various characteristics based on age and walking purpose. The heterogeneity of pedestrians in this study holds a crucial role because this study aims to explore pedestrian perception.

This research adopted a qualitative strategy study case because it can explore a phenomenon in its natural context (Groat & Wang, 2013). The primary data was collected through a semi-structured interview with five pedestrians in the Suryakencana area. The participants should be 17 or older and have passed a minimum of two street segments based on the street segmentation in Figure 1. Furthermore, this research also adopted mapping during the interview to identify street segments that were perceived as safe or useful or comfortable to be later observed to identify the involved attributes. Several interviews are audio-recorded and then transcribed, while the others are in the written notes form for some participants who refused to be recorded. The mapping results are compared to each other to find the patterns of safe or comfortable or useful space.

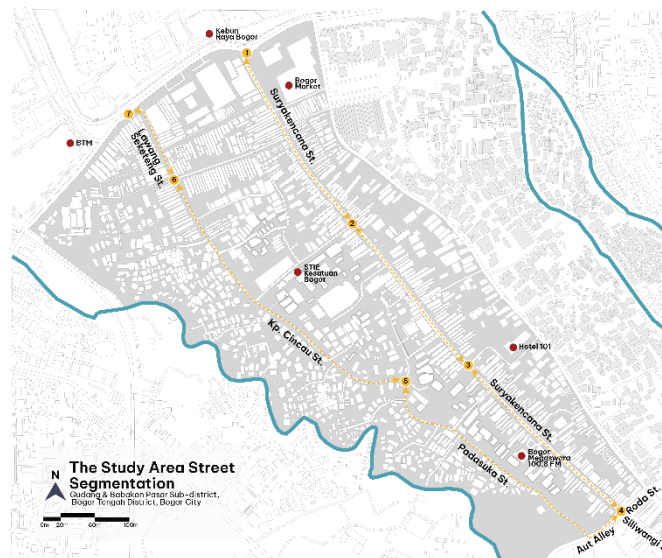


Figure 1. The Study Area Segmentation
Source: Cadmapper; Author's Processing, 2023

RESULTS AND DISCUSSION

Out of 5 participants in this study, 2 participants are from the group of elderly (Older than 60 years old), 2 participants are from the Pre-Elderly group (45-60 years old), and 1 participant is from the adult group (below 45 years old). From those 5 participants, the elderly and pre-elderly group have the purpose of walking in the Suryakencana area to work, while the adult participant for recreation (leisure). Furthermore, from each age group, this research found varieties of results for street segments which are perceived as safe and comfortable (Figure 2). For the elderly participants, the street segment perceived as safe and comfortable is Suryakencana Street. For the pre-elderly group, the female participant perceived Aut Alley and Suryakencana Street as both safe and comfortable, while the male participant chose only Segment 1 as safe and comfortable. From the adult group, segment 1 is perceived as comfortable while segment 3 is perceived as safe.

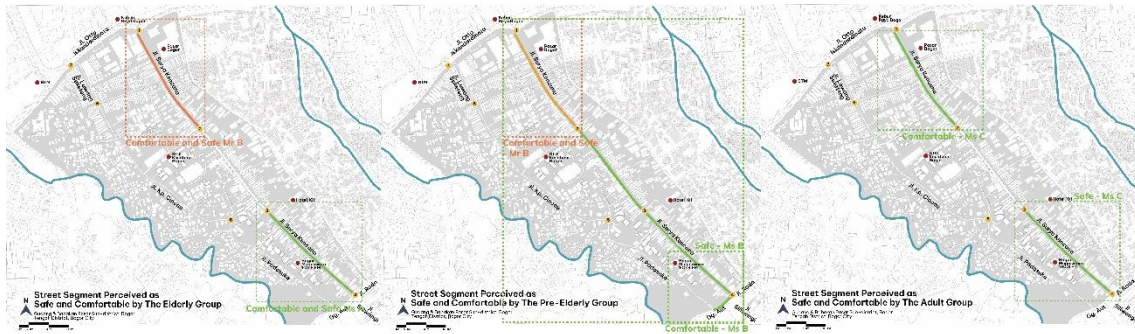


Figure 2. The street segments perceived as safe and comfortable based on age group (from left to right): (a) The Elderly Group; (b) The Pre-Elderly Group; (c) The Adult Group
Source: Cadmapper; Author's analysis, 2023

By studying the result above, we can identify the involved attributes in the perception process of the safe, comfortable, and usefulness of walking spaces. For the safety aspect, Suryakencana Street is perceived as safe and comfortable for the elderly group. Referring to Mr A's statement, that segment is perceived as safe and comfortable because no groups of sellers lay down their goods in disorganized as those in segment 6 (Figures 3D and 3H), where half of the sidewalk is occupied by sellers to put down their goods, hence leave only little to none space for walking. Consequently, some pedestrians' needs for walking space cannot be accommodated. On the other hand, in Suryakencana Street, the selling and buying activities in the walking space still leave enough room for pedestrians, and the layout of the goods is still organized (Figures 3A and 3E). Such a condition shows a phenomenon called crowding—a situation when the level of crowd interrupts the space users' needs (Wen et al., 2020). It signifies that space orderliness is an attribute which influences the perception of safe from pedestrians, especially for the elderly group.

Additionally, Mr B (Male, pre-elderly) and Ms C (female, adult) only perceive segment one and three as safe respectively. Both participants perceive the safety of the two segments based on the same comparison: Crowd. The crowd as an aspect involved in creating a safe walking space is in line with Jacobs (1961) argument that explained the safety of an environment is affected by street life. However, this study found there is an involvement of saturation point as a threshold when a crowd still can be perceived as safe by pedestrians, and that threshold is being perceived varied by age group. By comparing the condition in segment 1 and 3 (Figures 3A and 3B), this study shows that for the pre-elderly, the crowd in a walking space can be perceived as safe when that crowd is spread evenly in the segment and enlive the walking space all together with the surrounding active shops. While for the adult group, the street segment that combines the active and passive shops and the seemingly concentrated crowd can still be perceived as safe.

For the comfortable aspect, each age group perceives different street segments as comfortable. It indicates the comfort of walking space cannot be generalized for all age groups. For the elderly group, all segments in Suryakencana Street are perceived as comfortable. Based on Ms A, the simplicity of the street network compared to the other ones is the cause of the comfort (Figure 3B). In addition for Mr A, comfort is formed from the more organized layout of the buying and selling activities in this segment compared to segment 6 (Figures 3D and 3H), thus leaving some spaces for pedestrians to walk on. The statements above signify that for the elderly group, the order of the space utilization and the complexity of the street network are attributes that impact the comfort of walking space.

Moreover, referring to Mrs B, the perceived comfortable segment is Suryakencana Street and Aut Alley (Segment 4). The comfort comes from the ability of the segment to accommodate walking needs and the breezy atmosphere it offers, consecutively. By looking at the condition in Suryakencana Street, it can be seen this segment already provided a clear-designated space for

walking by the provision of a sidewalk. Therefore there is no mixed space usage between vehicles and pedestrians. Although in several spots in Suryakencana Street, the walking space is occupied by street vendors (Figures 3E and 3F), an area for walking persists. This circumstance shows that the functionality of pedestrian facilities is an attribute which contributes to the perceived comfort of pedestrians. As for Aut Alley, despite the inadequate walking space, this segment does not receive direct sunlight, which results in a breezy atmosphere due to the formed shading in the walking space. The shading in Aut Alley presents the role of the natural and built canopy from trees and the building mass surrounding it. The role of trees in producing comfort for walking space is following one of the steps promoted by Speck (2012) to make walking comfortable: planting trees. Besides, the availability of a canopy from built elements, such as the shops' facade, also provides an enclosure for the walking space. The feeling of being enclosed emerged from the building mass surrounding the walking area (Tiwari, 2018).

Afterwards, for the pre-elderly and adult groups, Segment 1 is perceived as safe by both groups. According to Mr B (pre-elderly) and Ms C (adult), comfort in that segment originated from the crowd. Referring to Figures 3A and 3E, the crowd condition in Segment 1 is produced by buying and selling activity conducted by street vendors and pedestrians and the interaction between the surrounding shops' with the pedestrian space. In addition, most shops in Segment 1 are active. Therefore pedestrians can witness activities and street life along this segment. Thus, it can be stated that the liveliness levels of pedestrian space hold a role in intervening with the level of comfort perceived by the pedestrian.

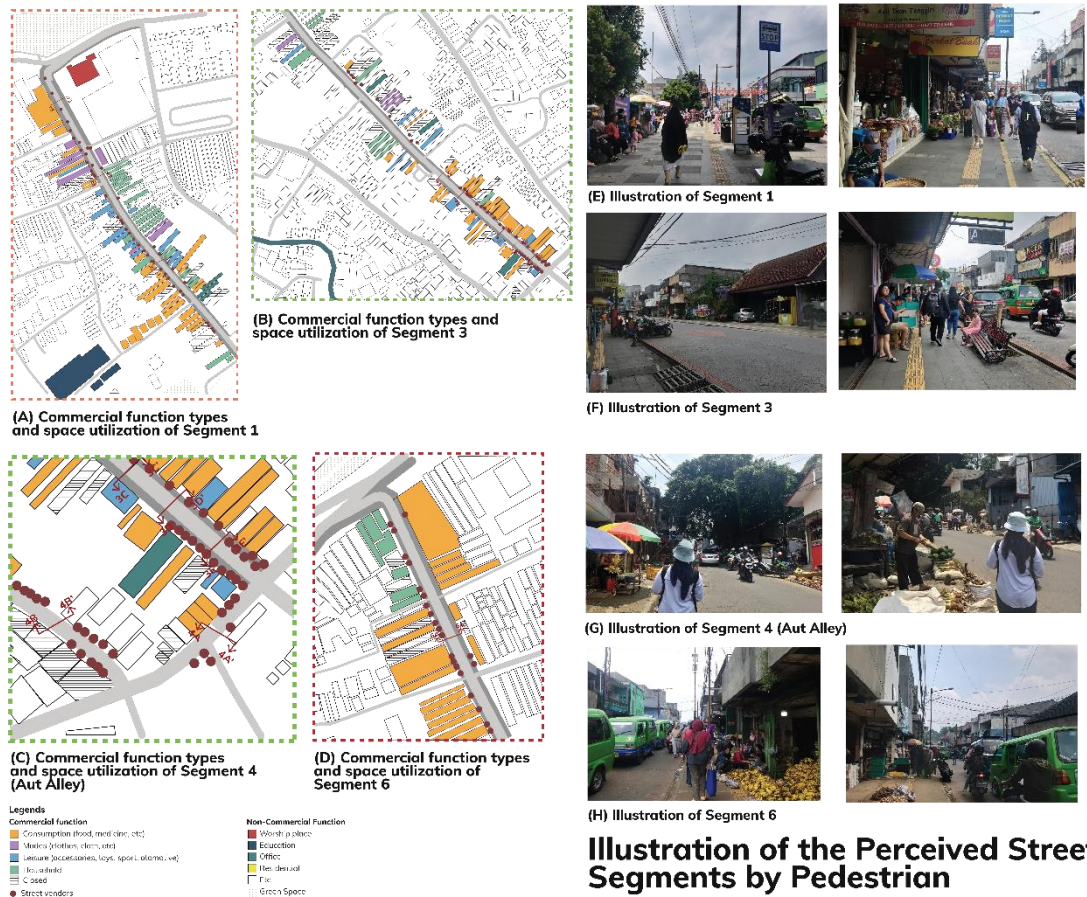


Figure 3. The Illustration of the Perceived Street Segments by Pedestrian
 Source: Cadmapper; Author's analysis; Author's Documentation, 2023

In regards to usefulness, this study found two leading purposes of walking in the Suryakencana area: working and recreation. The working purpose refers to the buying and selling activities. By observing the spaces used for selling by each participant, it can be identified those spaces are part of the pedestrian space or a roadside, as illustrated in Figure 4. That circumstances signify the walking space in the Suryakencana area comprises two roles: a public and a moving space. Likewise, all participants in this study sell their goods in a non-permanent stall. For Mrs A (elderly), the walking space in front of the closed shop is utilized for selling her goods with a non-movable stall (example in Figure 4B). Whereas Mr A (elderly) and Mr B (pre-elderly), as nomad sellers, use the walking space in the front area of active shops (example in Figure 4C). This study revealed the liveliness of the shops contributes to determining the type of buying and selling activities occurring in the walking space. Henceforth, the previously explained condition illustrates that the usefulness of a walking environment can be determined by the flexibility of space utilization, as a public and movement space, and the liveliness of the shop as the attributes. As a public space in the Suryakencana area, the sidewalk is used for buying and selling activities, thus encouraging social interaction among its users and supplementing the diversity of activities formed in the environment. This finding complements the statement from Speck (2012), which adheres more to wider-scale spatial planning, with his popular step: mix the uses.

On the other side, Ms C (adult), a visitor to Suryakencana Area, utilized the area for recreation: looking for photo objects, buying snacks, or visiting worship places. The recreational purpose of finding photo objects confirm the idea that the visual quality of the Suryakencana area is one of the factors that decide the usefulness of the street. The photographed objects or main interest for Ms C is human activities. It expresses that the visual quality of an environment is impacted by non-physical aspects such as human activities. Moreover, the visual quality of a walking environment is closely related to sensory pleasure. Grounded on Mehta (2008), to accomplish pedestrians' sensory pleasure, spatial composition holds a critical role in which pedestrians are keen in a space with the appropriate level of stimulants. In other words, to support the usefulness of an environment, walking space should refrain from an over-stimulated spatial composition.



Figure 4. The Utilization of the Walking Space (from left to right): (a) Roadside non-movable seller; (b) Sidewalk non-movable seller; (c) Nomad seller

Source: Author's documentation, 2023

CONCLUSION

This research tries to conform the gap in walking and walkability research by exploring walkability using pedestrian perception towards safety, comfort, and usefulness of an environment and walking space, as well as the influencing attributes by taking the context of the study case in Indonesia. As a result, this research found two influencing traits on the perception

of the safety of walking space: types and levels of crowd and space orderliness. For the crowd level, there is a saturation point for that aspect because only until a certain threshold of it can offer the feeling of safety. There is a need to avert the emergence of crowding in walking spaces as it is the situation that degrades the walking space's ability to fulfilling pedestrians' needs. Furthermore, from the comfort aspect, building mass, the availability of a canopy, the orderliness of space utilization, the level of complexity of the street network, the liveliness of street life and functionality of the walking space influence that aspect due to its ability to determine the sense of enclosure assembled in a walking space, ease of walking and transparency of the environment. Ultimately, the usefulness aspect is impacted by the flexibility of space usage and the visual quality of the environment. Those attributes influence usefulness by their ability to build up the environment's ability in accommodating various activities.

Several notes need to be taken from this research which can be developed with future research. First, this research only employs a small number of participants. Thus, the result cannot be generalized as the perception of every pedestrian in the study area or for bigger area. Second, this research only explores the involved attributes in the safety, comfort, and usefulness of walking space, yet it cannot identify the strength of the relationship between each aspect. Hence it is necessary to conduct further research to examine that aspect.

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