Walking Behavior in Urban Park Environment

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The design characteristics of urban parks' pathways are important in facilitating leisure walking and maintaining the minimum rate of physical activity, thus improving public health.

urban park | pedestrian mobility | design attributes | visual qualities

1. Walking for Recreation and Its Associated Built Environmental Factors

Previous studies on the neighborhood scale have demonstrated the relationship between walking for recreation and environmental factors, including land use mix [1]; the presence of walking trails [2]; infrastructure for walking, including the state of the footpath and the standard of its surface [3][4]; the proximity of recreational facilities [2][4]; the presence of accessible destinations (mostly services) like shops, parks, and beaches [3][5]; the availability of public transit services, including factors like proximity to bus stops and public transportation [5][6]; nearby non-residential locations [7]; and perceived and actual traffic safety, including elements like the percentage of street length with speed limits [2][5]; personal security, including less concern about crime [3][8]; and perceived neighborhood aesthetics, as well as the existence of aesthetic elements like the proportion of tree canopy coverage, the upkeep of walkways, cleanliness, and the view of the architecture [2][3][9]. In addition, Borst et al. [10] evaluated the relationships between the perceived attractiveness of streets for walking and (physical) street characteristics. They found that three main aspects affect the perceived attractiveness of streets for walking, namely the tidiness of the street, its scenic value, and the presence of activity or other people along the street [10].

2. The Contribution of Age and Gender to Walking Behavior

Age and gender are directly associated with walking behavior, sometimes through the impact on the association between the built environment and walking behavior [11][12][13][14]. Due to health and mobility problems that develop as people age, aging is inversely correlated with walking [11][12][15]. However, Paydar et al. [16] found a negative relationship between age and walking behavior in Temuco, Chile. According to studies by Harrison et al. [12] and Krogstad et al. [17], men walk much more than women. Giles-Corti and Donovan [18], for instance, discovered that women engage in less physical activity than men. Older women were less physically active, according to Mesters et al. [15], who sought to uncover socio-demographic and social-cognitive determinants of physical activity among Dutch women. Van Cauwen-berg et al. [19] examined the contribution of gender to the association between walking behavior and the built environment and discovered that women described their preference for walking more frequently and intensely when they found the environment more familiar and safer from crime.

3. Walking Behavior and Its Contributing Factors in the Urban Park Environment

Most design aspects related to walking behavior along pathways have been explored and examined on the neighborhood scale. Concerning the urban park setting, although park pathways have been identified as important settings to encourage physical activity and walking [20], the relationships between the characteristics of the park pathways and walking behavior have rarely been considered in previous studies [21]. Compared with the neighborhood pathways, the aesthetics and comfort-related aspects were highlighted more than other aspects in the design of urban park pathways. Kaczynski et al. [20] found that parks with paved trails are more likely to be used for physical activity than those without paved trails. Zhai and Korca [21] evaluated the impacts of park design characteristics along the walkways on the walking behavior of older adults. They found that seniors prefer pathways that have soft and even pavement, benches, flowers, and light fixtures. Trails with soft pavement, the level of shade, the pathway width, the presence of benches, and the presence of flowers and trees contribute to improving walking behavior in the urban park setting [21][22][23].

In addition to the physical attributes along the pathways, the aspects related to pathway surroundings were also important to improve walking behavior on the neighborhood scale, as well as in the urban park setting [21][24]. The various aspects of path surroundings in these studies include visual interest, lateral visibility, the scale of street space, the visibility of landmarks along the pathways, the view of public gardens, the transparency of fronting structures, visible activity, street trees, the coherence of the built forms, and lighting [24][25][26]. The enclosure type along the pathways contributes to improving walking behavior in natural and urban park settings [21][27]. Water has a positive impact on observers' emotional state and the preference for walking as well [28]. According to Lynch [25], visual connection with landmarks may influence people's walking movement [25][29]. Finally, the pathway's connection with activity zones also influences the level of walking in the park environment [30].

4. The Contribution of Path Context and Landscape Visual Preference to Enriching Walking Experiences

The picturesque theory asserts that some spatial compositions and particular design elements elicit a more vivid aesthetic experience than other compositions [29]. The relationships between heightened aesthetic experience and specific design elements, such as the variety of open spaces connected by narrow and bending streets, the controlled view of spaces, the sense of enclosure, landmark objects as visual focal points, and complexity in the surfaces and details, were discovered by Isaacs, who supported this theory.

The relationship between the design aspects of the environment and walking experiences could also be considered in studies on visual landscape preferences [31]. Information-processing theory, one of the most significant theories in research on visual landscape preferences [32][33], suggests that the preference for a scene is dependent upon two basic human responses to an environment: the need to understand and a desire to explore. Information can be derived immediately from an environment or it can be inferred. According to Kaplan and Kaplan [34], the four primary information variables, complexity, coherence, mystery, and intelligibility, influence preferences for visual

landscapes. Coherence, complexity, legibility, and mystery—the four significant environmental preference predictors—provide the knowledge to comprehend why people choose such places and how comfortable people are in one place [35]. Cheng [36] found that perceived landscape aesthetics contribute to visual landscape preference through four components: complexity, mystery, coherence, and legibility. Zhang [35] discovered that the most favored visual landscapes in public spaces include a combination of particular landscape elements, such as vegetation, trees, seasonal flowers, and open grassland, as well as the elements of perceived landscape aesthetics, such as intelligibility and coherence. According to Polat and Akay [37], water surface area, widths of pedestrian walkways, the function of recreational areas, plant composition, plant color composition, and plant species diversity can positively affect the visual quality of a landscape area. Kaplan and Kaplan [34] defined complexity as “the number of different visual elements in a scene”. According to Ewing and Handy [38], complexity is a measure of a location’s visual richness and is based on how many distinguishable differences a viewer is exposed to in a given amount of time. Duarte [39] discovered that complexity (more distinct types of landscape elements) implies a strong preference for the streetscape in the built environment.

Coherence in a scene refers to its structure and organization, as well as its patterns of brightness, size, and texture. Mystery relates to a scene’s depth and the hidden qualities that may draw one closer to explore and gain more information. In earlier investigations of the natural environment, mystery and coherence were scored highly as predictors of preference [35]. However, Herzog and Kropscott [40] found that mystery is negatively correlated with preference in forest settings. Legibility helps people to understand an environment and “to comprehend and to function effectively” when the environment provides cues and landmarks that assist, for example, with wayfinding. These four variables are sometimes called “information variables” and have been suggested as predictors of landscape visual preferences [41][42][43]. These four variables have also been highlighted in the urban design literature as urban design qualities [38]. According to Lynch’s research [25], legibility in urban environments can be defined as how easily a city’s components can be identified and arranged into a logical pattern. In the context of the city, he contends that legibility is essential [25]. According to Isaacs [29], it is more effective to improve pedestrians’ visual preferences when the pathway offers a balance between clarity, a variety of components, and interesting visual exploration. According to Ewing and Handy [38], these visual and perceptual aspects of urban design are also related to general walkability and walking patterns. Therefore, these key features, including coherence, complexity, legibility, and mystery, which are engaged in the pedestrians’ visual preference along each pathway, may also be related to the walking behavior along parks’ paths.

5. The Contribution of Age and Gender in the Association between Visual Qualities along Pathways and Walking Behavior

Previous research on visual preferences has demonstrated that age and gender also play a role in the relationship between physical characteristics and visual preferences. Balling and Falk [44] discovered a significant relationship between the age component and various preferences. High naturalism was determined to be an essential landscape component for young (age 12–19) and middle-aged adults (age 19–65) but less so for elderly (age

above 65) persons, according to Zube et al. [45]. They claimed that young and older persons valued the complexity of landforms more than other age groups, making it a significant landscape feature. Additionally, the relationship between visual attributes and visual preference varies according to age and gender. Women, more than men, are sensitive to spatial conditions that evoke fear and react more strongly to it [46]. For instance, several academics have claimed that dense vegetation serves as a meeting place for criminals and fosters conditions that encourage criminal activity [47][48], which may go against women's aesthetic preferences. This lets us also infer that visual qualities such as legibility and mystery, due to their relationships with fear, may function differently for visual preference, as well as the walking behavior of women. Additionally, compared to adults, adolescents are more curious to learn about their surroundings [49]. This could lead to the conclusion that the visual quality that would encourage more curiosity—such as mystery—could be more consistent with the visual preferences and walking habits of adolescents along the pathways of urban parks.

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