Walking in China's Historical and Cultural Streets

Subjects: Urban Studies

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The urban street has evolved into an important indicator reflecting citizens' living standard today, and pedestrian walking activity in the streets has been proved to be a major facilitator of public health. Uncertainties, however, exist in the factors affecting pedestrian walking behavior and walking experience in streets. Especially, the factors affecting pedestrian walking behavior and walking experience in the historical and cultural streets.

Keywords: historical and cultural streets ; walking experience ; walking behavior ; public health

1. Introduction

The urban street is a necessary part of the city. Since ancient times, urban streets have reflected citizens' living standards, and related behavioral activities have been conducted by street pedestrians in the street space. This serves as a big promoter of public health. Today, as material civilization becomes increasingly mature, the streets morph into the dividing line between administrative areas, commercial areas, living areas and traffic areas, as well as an important carrier for functions of leisure, commerce, and entertainment. Therefore, the planning, construction and management of urban streets have become subjects worthy of key consideration. Studies on urban streets have been initiated at an early time, with a wide range of areas involved. As early as 1961, Jane Jacobs ^[1] in "The Death and Life of Great American Cities" conducted studies and made recommendations from the perspective of maintaining urban diversity and vitality. It's proposed that streets and sidewalks should be the main public areas in cities, and an in-depth analysis of the street's vitality and safety was conducted. Moreover, researchers extensively analyze the street space and its impact on pedestrian walking behavior and walking experience within the space from two dimensions: pedestrian's own conditions and environments. The impact of spatial environment on pedestrian satisfaction is explained via assessment and analysis ^{[2][3]}. Other studies have been carried out based on the relationship between people and streets. Ways of creating spatial environments are provided via the study on pedestrian needs, the evaluation on the quality of pedestrian spaces, as well as the development and optimization of spatial design strategies ^{[4][5][6][7]}.

2. Pedestrian Walking Behavior and Experience

While studying pedestrian walking behavior-a hot topic in recent years, some researchers have discussed it from different perspectives and multifaceted viewpoints based on the division of different pedestrian populations, largely in an attempt to figure out factors affecting walking, and study walking safety. For example, Ross ^[8], via the documented observations of relationship between children's walking behavior and the factors associated with it, discussed the impact of children's gender and walking time on their walking behavior. In the study of the built environment and walking behavior, Mirzaei [9] argued that most previous studies on walking behavior have focused on utilitarian or recreational walking behavior. Considering the differences in walking purposes, she explored the different effects of the built environment on walking behavior, thus confirming the necessity of study on walking motivation. Marisamynathan ^[10] discussed the influence of personal information, income, and road facilities on walking behavior of pedestrians crossing the road by studying the factors that affect walking behavior of pedestrians crossing the road, providing a method by which walking behavior of pedestrians crossing the road and its safety levels can be predicted. While conducting a comprehensive study of factors affecting walking behavior of pedestrians crossing the road, Aghabayk [11] discussed the differences between the signalized crossing and the unsignalized one, and examined overall the effects of gender, age, crossing awareness, technical equipment, and carried items on pedestrian crossing behaviors at the signalized crosswalk and the unsignalized one. In urban life, there are many road accidents involving pedestrian behavior that plays a central part in these accidents. Jay Mathilde [12] studied the walking behavior of French and Japanese populations based on their differences, with a view to analyzing accidental risks caused by pedestrian behavior and providing selections for safe road crossing behavior. Mukherjee [13], from the survey data about video images from the signalized crossings, extracted individual pedestrian acts in violation of regulations and individual pedestrian road crossing behaviors, thereby predicting possible accidents.

The perspective of study on walking experience now is generally the combination of environmental psychology, walking experience and modern technology. Simulation and analysis and more are generally adopted as study methods [14][15]. The study content is divided into two parts: study and definition on the types of pedestrians [16], and study from perspectives including the intervention of the physical environment, the impact on pedestrians' psychological experience, and the humanitarian for special populations. For example, Bornioli, Anna [17], in the article, explored whether the physical environment affects the pedestrian walking experience and pedestrian psychology based on theories related to environmental psychology, concluding that the physical environment affects the pedestrian sensory experience- a key element of the walking experience. Then strategies can be established to create a good sensory experience through the construction of the physical environment. Stevenson and others [18] investigated the pedestrian walking experience via the interviews, as well as conceptualized and captured the pedestrian walking experience, in a bid to help pedestrians further deepen sense of leisure experience in a dynamic space, connect their physical environment, and bodily and mental environment to others, as well as strengthen their experience of the space through a wide range of connections. JIYOUNG ^[19] studied the negative pedestrian walking experience caused by subway stations by collecting materials, as well as analyzing and examining the function of subway stations. Here, the implication of walking as an experience was redefined, with the study purpose of turning a subway station into a positive space and creating a good pedestrian experience through music, sensors, and interesting facilities. Wong, Jeremy D ^[20] proposed that the preferred gait during walking can be adjusted by the nervous system to facilitate the reduction of the physical fatigue that pedestrians experience while walking, and the enhancement of the pedestrian's walking status from a neurological perspective. Cambra, Paulo [21] studied the interventions and effects of the built environment on adult walking behavior by modifying the physical environment, and also conducted a postmortem analysis. The study suggested that environmental interventions serve as an important factor influencing walking behavior, and possibly small-scale interventions in the walking environment can more effectively improve the walking experience. Tz-Yang Chao ^[22] improved the walking experience by adopting mixed reality technology. Pedestrians were guided to walk and interact with virtual characters within a prescribed range of mixed virtual reality technology, providing a new paradigm for the improvement of the walking experience. Ohjisuck [23] provided a realistic walking experience for the visually impaired by creating a new virtual walking experience environment, and setting up walking paths and braille devices, in the study on the walking experience of special populations from a sociological perspective. Jiyoung, Kwahk ^[24] developed pedestrian experience guidelines by analytical research and interviews with special populations with impairments in hearing, vision, speech, and physical mobility. These guidelines were used as a reference standard for the design and evaluation of pedestrian friendliness in pedestrian environments.

3. Cities and Pedestrian Streets

Based on urban pedestrian planning, the study is conducted from aspects of transportation, economy, and policy in the literature of this category. In these studies, the effective use of public transportation systems and information and communication technologies are advocated; innovations are made in implementation methods; and valuable proposals for urban economy, transportation, and environmental sustainability as well as the improvement of living spaces for urban residents, are offered based on the pedestrian city concept. For instance, Varma ^[25] suggested that the effective use of public transport systems and pedestrian cities should be becoming a priority for urban development. Varma also explored the impact of new trends in urban mobility and information and communication technologies on the cities' future development. With Seoul as an example, Young, Kim Sun, and others ^[26] analyzed the gait features of pedestrians by photographing walking streets in order to find the relationship between the rational selection of pedestrians and the extracted walking environment. Rebecchi [27] proposed a framework for assessing the walkability of cities to study the strengths and weaknesses of the urban environments and to improve healthy living spaces. Yassin ^[28] proposed an innovative practice specially used for pedestrians, in a bid to re-attract people to the downtown and pedestrian environment. Sustainable urban development is realized by the restoration of urban walkability. Fallahranjbar ^[29] proposed that putting people first should be a key development principle for all cities that aim to improve urban quality; and a healthy environment should be fundamentally related to a pedestrian community. Fancello [30] explored how citizens' preferences and values vary spatially, as well as designed walking policies that improve citizens' quality, providing new recommendations for mapping out walkability-oriented urban policies. Hui He [31] pointed out that population density was negatively correlated with sport frequency and total sport time, and proposed intervention strategies for an agingappropriate urban environment. The research focus was the relationship between vehicle conditions, visual signals such as monitors and environmental perception signals, and walking decisions. Fanny Malin [32] evaluated the short- and longterm impact of speed display signs in pedestrian street on the speed of moving vehicles in a low-speed urban environment. If the speed displays are installed at pedestrian crossings, the speed of moving vehicles will be reduced, and pedestrian safety will be guaranteed. With historical street of Shapowei, Xiamen, as an example, Lemin Zhang [33]

constructed a street vitality evaluation system based on spatio-temporal data of pedestrians, as well as systematically examined the impact of the built environment on street vitality in historical streets using multi-modal analysis techniques.

4. Impact of Walking on Public Health

Considering the inevitable link between walking and public health, there are increasing studies on how urban transportation planning meets the need of public health. Most literatures focus on the benefits of a walking lifestyle for public health, including physical and mental benefits. On this basis, the discussion is made based on specific influencing factors in these literatures. Also, some researchers have studied the adverse effects of walking on public health by attributing them to the external environments on basis of a comprehensive consideration. The positive impact of walking on health has been studied mainly from internal factors. For instance, D. Merom [34] argued that less dependence on cars facilitates public health, and that active behavioral activities provide a solution to sedentariness and lack of physical activities. James F Sallis [35] concluded from his analysis that most environmental attributes are positively correlated with physical activities. The study results are similar in each and every city. James pointed out, the design of urban environments contributes a lot to physical activities, and the global health burden brought by physical inactivity can be reduced through the participation of all departments. Other researchers discussed on basis of specific walking-based influencing factors of the health benefits. Mohammad Javad Koohsari ^[36] noted that, public open space brings many health benefits physically and mentally. In the study, multilevel logistic regression models are adopted to examine the correlation between measured values of public open space and walking and depression, and the importance of the potential impact of these assessment criteria on health is emphasized. By conducting experiments, Ming-YiHsu [37] proved that brisk walking, as an effective physical activity promoting mental health in adolescents, can reduce depression and anxiety as well as improve self-assessment. However, the walking lifestyle is a double-edged sword for health. The negative impacts are mainly studied from external factors, such as air quality. Giorgos Giallouros [38] argued that, commuting by walking, compared with vehicles, may increase the intake of fine particles for pedestrians, and cause negative health effects. The arguments were started from an integrated relative risk perspective. Caihua Zhu ^[39] et al. thought, PM2.5 in the air impact physical health when pedestrians are fully exposed to the outside environment. They studied the specific impacts as a way to evaluate the risk features of walking and provide recommendations for the improvement of residents' health and decision making about walking trips.

It's found from the analysis of the literature that. Two main features of the existing studies are as follows:

The study is conducted on external factors of pedestrians. Pedestrians are impacted by many factors amid walking. Especially, the physical environment can directly impact pedestrians' physical and psychological experiences. Thus it can be said that pedestrian walking experience is related to the physical environments (roads, signals, facilities, etc.). It is confirmed that, amid the street construction, it is necessary to provide an excellent physical and sensory experience for pedestrians via the construction of the physical environment on the one hand. The impact of the physical environment on different groups, as well as their applicability in the environment, need to be taken into account, thereby meeting the walking experience of people of different types on the other hand. On this basis, the factors influencing the pedestrian walking experience are further investigated via the interventions and technological means that change the physical environment.

The study on the pedestrian ontology. On the one hand, it's confirmed physiologically and psychologically that a walking lifestyle can improve the emotional state, thus promoting public health. Amid construction, physical and mental impact on the public should be considered, and the negative impact from external environment should be minimized. An all-round street space environment, which facilitates daily traveling, and promotes public health, should be constructed. On the other hand, the study is conducted on the division of pedestrian types, and pedestrian behavior differences; the construction of a sustainable city is explored from the urban walkability; policies based on walking city are advocated; importance is attached to the planning of walking environment; citizens' walking behavior is guided. However, in most existing studies, non-participatory pedestrian behavior is referred, and attention is more likely to be paid to pedestrians' behavior and experience in a single physical environment. While the subjective intention of pedestrians is neglected. The policies about street design and pedestrian urban planning are proposed without support of enough studies on pedestrian ontology. Additionally, there is still much room for improvement in comparative studies on walking behaviors in different places. Therefore, in the study, both non-participatory and participatory approaches are adopted, with emphasis on the subjective evaluation of pedestrians. Pedestrian behavior states on streets of different types are observed and recorded, and a multi-dimensional study of pedestrian walking behavior is conducted, so as to put forward constructive suggestions in a targeted manner.

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