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Why Do People Tend to Walk in Certain Places? A Review of Urban Social and Physical Attributes Affecting Pedestrian's Sensory Experience

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ABSTRACT

Unlike walkability studies, pedestrians' sensory experience during walking received less focus. Literature suggests significant link between sensory experience and sensory pleasure that consists of sensations that are initially perceived solely by human's five senses without further rationalization. In each walking trip, pedestrians face variety of physical and social attributes exist in urban space that impacts them sensory. However, which of the attributes causing sensory experience or in what degree they impact the pedestrians in widely unknown. In this paper, by reviewing the existing studies, we identified 20 social and physical attributes with their 189 variables. Theoretical mapping and statistical analysis using the variables and senses shows that sight (91%) has the highest capacity to be influenced by the urban space followed by Touch (57.14%), Hearing (33.86%), Smell (18.51%) and Taste (11.11%). Additionally, the result of this review reveals areas of the research that could be focused on for further studies.

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WHY DO PEOPLE TEND TO WALK IN CERTAIN PLACES? A REVIEW OF URBAN SOCIAL AND PHYSICAL ATTRIBUTES AFFECTING PEDESTRIAN'S SENSORY EXPERIENCE

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Abstract

Unlike walkability studies, pedestrians' sensory experience during walking received less focus. Literature suggests significant link between sensory experience and sensory pleasure that consists of sensations that are initially perceived solely by human's five senses without further rationalization. In each walking trip, pedestrians face variety of physical and social attributes exist in urban space that impacts them sensory. However, which of the attributes causing sensory experience or in what degree they impact the pedestrians is widely unknown. In this paper, by reviewing the existing studies, we identified 20 social and physical attributes with their 189 variables. Theoretical mapping and statistical analysis using the variables and senses shows that sight (91%) has the highest capacity to be influenced by the urban space followed by Touch (57.14%), Hearing (33.86%), Smell (18.51%) and Taste (11.11%). Additionally, the result of this review reveals areas of the research that could be focused on for further studies.

Keywords: Pedestrians, Walkability, Urban Space, Sensory Experience, Five Senses

1. Introduction

Unlike walkability, less attention is focused on pedestrians' sensory experience during walking. While walkability in general refers to a series of physical attributes of the urban space that make walking possible, studies show walkability alone may not always lead to pedestrians' positive experience during walking and relatively their positive perception towards the urban space [1][2][3][4].

Recent studies support strong link between human's basic five senses and the formation of experience, which is referred to as 'Sensory Experience'. Sensory experience grants the dialogue between the external environment and human internal perception. In the urban space, there are certain attributes of built environment that manage to attracting people to certain places, [5]. This could be related to the sensory experience the place creates [6] that is perceived by our five senses. Our basic five senses are responsible for human detection, decision making and reaction and what surround us [7].

With the social and physical attributes surrounding pedestrians in urban space, pedestrians face many variables that could influence one or more than one or all of their senses simultaneously [8]. What pedestrians see, hear, or smell may result in their willingness to walk certain paths or change their walking direction [9] [10]. What is said leads to two main questions, 'Which attributes of the urban space associate with pedestrians' basic senses and what is the impact of this association on the sensory experience?'

To answer these questions this paper reviewed the related literature and studies, in the fields of 'Walkability', 'Public Urban Space' and 'Human Sensory Reactions' with the purpose of firstly, categorizing Social and Physical attributes of walkability and demonstrate a theoretical association between the attributes and each sense. Secondly, exploring the evidences of 'sensory experience' in the existing studies and the relationship it has on pedestrians walking and perception towards urban space. Eventually, through this review, it is hoped to highlight the importance of

‘Pedestrian’s Sensory Experience’, its implementation on the current urban design principles and create attention to the areas in this field that did not receive enough focus and seek more attention in the future studies. It should be note that in this paper, we reviewed walkability studies that investigated walkability broader than its physical form.

2. Literature Review

A proper series of physical attributes in streets and neighborhood, increases possibility of pedestrians easy walking and physical safety as well as preventing pedestrians to change their walking direction into hazardous pathways [10] while a casual conversation between individuals, social exchanges, being involved in community activities [11] and as some studies suggested lower crime rate [12] are considered to be some of the achievements of a socially enhanced community. It is believed that walkable environments, due to the possibility of walking, pedestrians find the chance to meet each other more frequently and engage in socially interactive activities [5] with the physical environment supporting these social interactions.

Through the literature, we identified overall 20 main categories of attributes with total of 189 variables, including 166 physical variables and 22 social variables including variables including 1. Walkways (45 Variables), 2. Road (4 Variables), 3. Crossing (8 Variables) 4. Accessibility (8 Variables), 5. Connectivity (6 Variables), 6. Land Use (6 Variables), 7. Climate (8 Variables), 8. Pollution (4 Variables), 9. Pedestrian’s Presence (5 Variables), 10. Maintenance (6 Variables), 11. Buildings (12 Variables), 12. Motor Vehicle (8 Variables), 13. Density (6 Variables), 14. Visual Property (35 Variables), 15. Nature (5 Variables), 16. Inclusiveness (4 Variables), 17. Meaningful Events (5 Variables), 18. Comfort (4 Variables), 19. Safety (4 Variables), 20. Pleasurability (5

Variables).

It is believed that there is a significant link between ‘experience’ and ‘pleasure’ [13]. However, defining the pleasure is could be very varied and subjective. Aydede[14], suggests that the pleasure forms the experience is rather sensory its self, which means that the pleasure resulted from an act is merely resulted from the perception caused by basic senses and does not go further than the basic sensation that the sense is detecting. He suggests that in one theory a ‘Pleasant Sensory Experience’ is the one occurs when a sensation is responded that is liked and or desired. In short, we could say a pleasant sensory experience is ‘Joyful’ integrating with one or more than one of human senses.

In the urban space, studies show that sunny, mild and dry weather positively associate with higher number of people prioritize walking and biking over cars as transportation modes [15]. Visual property of the place perceived by sight such as shapes, patterns and edges create attraction and narrative for the place [16] while proportion of space could increase the perceived safety for the pedestrians [17].

Children reportedly prefer to spend more time walking in places with natural colorful texture accompanied with good scents, which in their words is associated with “enjoyable and fun experience”. Neighborhoods with natural scenery presence also increase cognitive developments of the child [10] unlike neighborhoods with high levels of traffic exposure [18] .

Excessive noises resulted from high volume of motor vehicles and construction cause noise sensitivity, which is associated with anxiety and stress leading to serious mental and physical issues for children, adults and seniors [19].

Although, the direct association between

sensory reaction of taste and walking is yet to be explored, studies show that streets with the presence of food establishments along with other types of retail shops associate with more pedestrian visits, however studies show that residents living in neighborhoods with higher density of fast-food facilities have more chances of increasing their BMI and mean waist circumference [20].

To elaborate more on which of the variables exist in urban space influences sensory experience, we draw a theoretical mapping between the senses and 189 identified and the result shows significant association between all senses and the variables with 'Sight' impacted the most and 'Taste' with lowest percentage of influence. In the result section, there will be more detailed description.

3. Research Method

The research method used in this study included 3 stages. 1st Using comprehensive review of most recent papers published recently including original case studies as well as peer reviewed studies and urban design principles guidelines to collect the secondary data and design an assessment model inclusive of attributes and their variables, 2nd designing theoretical mapping to create a link between the senses and the secondary data, which later on utilized in the analysis stage. 3rd Analysis of 49 original case studies using the assessment model and theoretical mapping result (1st and 2nd stages results) to statistically demonstrate the associations between the variables and senses as well as the percentage of the research done on the variables in these 49 studies.

The studies used in the 1st and 2nd stages included more recent researches in the field of walkability, livability, public space, sensory experience and sensory reactions while the 3rd stage included studies more focused on walkability, walking experience and built environment.

4. Analysis & Results

Comparison Mapping result shows that theoretically, there is association between five senses and Social and Physical attributes. But, by more in depth exploration into the relationship between the identified variables and senses, it is seen that not all the variables are related to the senses. It should be point out that the identified relationships are purely based on theoretical mapping and self-exploration and to confirm any of them further research is required.

However, to move forward with the direction of the current study we limited ourselves with what the theoretical mapping enlightened us with. It is also noteworthy to mention that although quantitatively, senses like Smell and Taste do not have significant percentage of association with identified variables, we could not undermine their importance since other studies support the fact that sensory complexity is one of the important factors motivating citizens for recreational walking [21]

- **Sight:** Has the highest statistical percentage of (91%) associated with all the 20 attributes and 172 out of 189 identified variables among all the other senses associated 100% with 'Walkway', 'Pedestrian Presence', 'Maintenance and Cleaning', 'Buildings' and 'Visual Property', 'inclusiveness', 'Meaningful Events', 'Safety' and 'Pleasurability'. This result is based on the fact that at least 172 variables are visible or could become invisible (e.g. due to the bad weather or lack of lighting).
- **Hearing:** Has (33.86%) association with 64 identified variables. There is 100% association with 'Pedestrian Presence', 'Density', and 'Safety'. There are no associations identified between 'Pollution' and 'Visual Property' with hearing. This result is purely based on whether the identified variable produces frequencies

detectable by human ears.

- **Touch:** Has (57.14%) association with 102 of the identified variables. There is 100% association with 'Accessibility'. There is no association identified between touch and 'Density' and 'Visual Property'. The result is purely based on what influences human nervous and limbic system as well as skin detection.
- **Smell:** Has (18.51%) association with 35 identified variables with 100% association with 'Pollution'. There is no association identified between smell and 'Road', 'Crossing', 'Connectivity', 'Building' and 'Visual Property'. This result is purely based on human olfactory system and whatever human inhales. In fairness, senses of Smell and Taste collaborate closely together.
- **Taste:** With only 11.11% has the lowest association with 21 identified variables. With 100% association with 'Pollution'. There is no association identified between Taste and 'Road', 'Crossing', 'Connectivity', 'Climate', 'Pedestrian Presence', 'Buildings', 'Motor Vehicles', 'Density', 'Visual Property', 'Nature', 'Inclusiveness' and 'Safety'.

Based on the analysis we also identified variables that are covered in less than 10% of the studies and including Type of walkway (shared or else), Tactile pavement, Telephone/post boxes, Vendors, Distance to crosswalks, Buildings Under construction, Articulation of the building, Visibility of Patterns, Proportion of space, Human scale elements, Transparent building's façade, Visibility of diverse activities, Visibility of ground (e.g. paved or else), Visibility of distressed pavement, Concentration, Perceived openness, Perceived nuisance noise with **(8.16%)**, Sidewalk on both sides, Adjacent walls, Corner, Water-body, Toilet, Visual Ads (e.g. stands), Guardrails, Mid-cross blocking, Cul-de-sac, No. of non-designated buildings, Smell, Pedestrians

Waiting (line), Public Facilities (e.g. trash bins), Smell, Building Age, Building Lighting, Visibility of adjacent space/street, Visibility of Animals, Visibility of Vandalism, Stray Animals, Public space Opening hours with **(6.12%)**, Public Art, Bollard, Fire Hydrants, Billboards, Disabled facility, Crossing Distance, Barriers limiting access (e.g. drainage, boulevards, etc.), Distance to the border vacuums, Wind, Missing Facilities, Building Façade, Visual advertisements perception, Lack of vision due to bad weather, Controlled entrance of the public space with **(4.08%)**, Corner island, Blind corners, Curve, Columns, Advance stop bar, LED Screens, Poles/Bare poles, Vending Machines, Snow, Fog, Building continuity, Narrative (of the place), Visibility of personalized design, Visibility of Public Art, Visibility of slope, Street Density, Sound (nature), Natural Scents, Buildings personalization with **(2.04%)** and Humidity, Dryness, Smoke, Haze, Visibility of Texture, Reflection, Visibility of Sky, Visibility of the path, Perceived businesses' usefulness with **(0%)**.

The literature as well as the current principles of the urban design emphasizes on the importance these variables have on walkability as well as the shaping of Sensory Experience [22] [23]. Thus, including them in the future studies seems as a suitable approach to enhance pedestrians' sensory experience.

5. Conclusion

Ppedestrians' sensory experience during walking and how pedestrians perceived their surroundings certainly plays an important role in their motivations to walk. Literature suggested strong link between shaping of sensory experience how humans' sensory likes and desires are responded. The theoretical mapping demonstrates significant link between social and physical attributes and five senses. This may suggests urban designers and policy makers to relook into the streets

and reevaluate the attributes surrounding pedestrians to investigate the degree of the impact they have on us in sensory level perhaps too much visual information or too many facilities on the sidewalks are not beneficial for pedestrians' sensory experience and instead of facilitating walking damages the sensory pleasure a pedestrian seeks during a walk.

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