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Criteria of Walkability: As a Sense of Urban Experiment

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ABSTRACT

What kind of future awaits the act of walking indicating that a person has started to live, with the increasing car dependency? This manuscript evaluates people's perception of space in modern cities depending on their walking ability and conducts a literature research by focusing on streets as urban open spaces. It sets the walking as a center as a basic sense increasing the urban experience, in addition to basic senses of human beings. Initially, the relationship between urban spaces and citizens will be examined in order to reveal the normal state of walking, which is the most basic human activity in the networks of the city. Then, with the concept of pedestrian *in* the street, it will be ensured that the principles of walkability will be investigated within the scope of people's perception of space, and the determinants of attractiveness of streets will be revealed. The aim of this research is to determine the walkability criteria on the streets, as a part of the public open spaces of the city. As a result of the literature research, the criteria for walkability on streets were determined as *accessibility, pyhsical form and design, usage, networks* and *others* to built or suggest more livable urban spaces regarding walkability.

1. Introduction

Man, who is the producer of vertically rising cities and vehicle traffic with the developing technology, for some reason recalls the most primitive form of transportation: "walking". Walkability can be defined as a desire to walk and the satisfaction of walking, which prevents the citizen from choosing to use public transportation or car while going from one destination to another. While leading a more introverted life with increasing technological opportunities, the walkability of places where modern people can socialize, meet, or experience the city, is being researched by many different disciplines today.

The social and economic changes experienced with the industrial revolution have changed daily life and consumption habits, and brought along waves of rapid migration to metropolis. This has resulted in the proposing of new access roads and streets to recently developed residential areas. Considering that all cities are composed of transportation networks, a street brings the fixed and mobile elements of the city together as a space consisting of two side facades, a horizontal surface on which the one walks and an opening to the sky. Based on this, this research taking the photograph of the human being as a mobile element walking and experiencing the streets of the city has been examined in the context of the urban environment, which are the public open spaces of the city (streets and horizontal surfaces) and pedestrian movement within the scope of *walkability*. By reason of using the concept of pedestrian in the street, this review presenting a projector in the urban context and public spaces of the city is essential.

Focusing on human beings and street subjects, the principles of walking and walkability on the streets (the transportation networks of the city) were investigated within the scope of accessibility by referring to Brownson et al. [1], and Southworth and Parthasarathy [2]; walkability by referring American Planning Association (APA) [1,3]. In the part of attractiveness of streets for pedestrians, the criteria for streets were examined using the references of the Commission for Architecture and the Built Environment (CABE) [4], APA [3] and Rapoport [5,6]. After examining all the subjects, the criteria determining the walkability on the streets were evaluated under a total of five headings: *accessibility, pyhsical form and design, usage, networks* and *others.*

2. Public Spaces of Urban Environment and the Urbanite

Urban space refers mostly to a residential area where most of its people were involved in trade and industry. It has been expressed as an economic, demographic, and social complex where people dealing with non-agricultural works came together [7]. Urban spaces are divided into private urban spaces and public spaces mainly. Private urban spaces are privately owned and controlled areas, which are used by limited and defined persons, and where private life takes place. Public spaces, on the other hand, are the spaces that respond to both individual and social needs of people, are in common use of the urbanite, and are open to the use of urbanites of all ages and abilities. [8,9].

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In essence, they are public spaces planned and organized for the community, open to make use of the community, and where the activities of collective life continue [8,9].

Private urban spaces have dimensions, functions, and forms specified to their users. While these spaces are shaped under the control of certain user groups, the public spaces such as streets, roads, squares, pedestrian paths, and green areas cover all segments of the society; thus, they are more mentioned in urban studies.

Public spaces are defined as an area open to all actors of the city [10]. For Max Weber, these spaces, which were defined as common areas or areas belonging to citizens until the 1960s, met with the concept of *public space* in the 70s, and the whole of the spaces except the home are defined as the meeting areas of the public [11].

It is proper to group public spaces as closed, semi-open, and open spaces. Public open spaces concerned by this research are the parts or gaps of the city that are largely defined by the buildings but remain outside the buildings, and are defined as the spaces where common or personal needs are met as a result of the collective life in the cities [8,12].

Public open spaces are divided into four different groups [13]. These consist of regulated pedestrian areas (parks, recreation and sports areas, etc.), shopping areas (marketplace, shopping street, market places, etc.), transit areas (streets, roads, transportation areas, sidewalks), and zones (squares). Transportation networks such as streets, avenues, and boulevards are the basic spaces of open public spaces that form the defined urban integrity [14].

Lefebvre, while addressing the concept of public space as social space, emphasizes that public space is socially produced [15]. Similarly, with a phenomenological approach, Castells defined the space not as a reflection of society, but as a society itself. In this respect, while the public space is the focus of architectural disciplines due to its spatial nature, it is also the research subject of social and human sciences that prioritize human beings [16].

According to Church, public open spaces are spaces that are reconstructed with the circulation and occupation of people, and are in constant change [17]. For this reason, the human factor is at the center of all areas of the dynamic city, especially public spaces. Public open spaces, not just have a transitional meaning, but are the common physical, social, and cultural spaces of people or societies that come together for different purposes. The network of public space thus includes the space of movement, but also the social dimension [7].

Urban theorists such as Rob Krier and Kevin Lynch mentioned the concepts of *streets* [18] and *paths* [19] in common meaning while conducting urban studies, and they gave importance to these two concepts, which are quite controversial in the urban research literature. While Krier explores the streets that have become the focal points of public life and the squares they connect to, for Lynch, the paths that represent the communication networks of the city are the means of providing socio-cultural interaction among the urbanite and at the same time a *way* of creating a sense of community [18, 19].

In this context, networks of the public open space are used interchangeably in the literature as roads, paths, streets, passages, etc. depending on the concepts. However, basically, the difference between road and street needs to be understood. The road, in its simplest form, can be defined as the line that provides transportation and communication by vehicle or on foot. The action is the movement between two points. However, a street, in addition to being a road, also requires being in a residential area [7].

Moudon defines streets as *more* than the traffic lines: streets are the lines that organize and connect the public spaces of a city [20]. According to Rapoport (1990b), a street is a narrow or wide linear element, which is basically used for circulation, besides supported by different activities, surrounded by buildings in residential areas. In this sense, the street is actually a defined volume and space, different from the road [6].

Francis has mentioned the word of street as social life itself and a learning space [21]. Therefore, according to Marcus et al., streets are important elements of the landscape of daily life [22]. Urbanite use the street as a social space for transportation, travel, shopping, or to interact with other people.

3. Pedestrian “in” The Street

Since public places are common areas covering people, using the concept of *“in” the street* is more proper then *“on” the street* in regard to defined volume of the street, too. Public open spaces, which cover all segments of society and can be transferred as places of trade and exchange, socialization or interaction, are at the center of urbanite-space communication. The three basic elements in urbanite-space communication are urbanite *(citizen,people)*, *space*, and *spatial perception of people.*

The phenomenon of perception can be defined as the sum of the processes of transforming the information acquired through the senses into the process of understanding, noticing, and distinguishing after it is processed in the mind [23]. For this reason, it is not possible to consider sensation and perception events independently from each other. Perception, for Porteus, is a complex phenomenon that depends on many different variables such as distance, color, shape, and texture [24]; therefore, the sense of eyesight gains importance in communicating with the space. Another sense that is very strong in the sensory is hearing. For example, acoustic space surrounds us without definite boundaries [7]. In addition, in order to be involved in emotional states, it is necessary to be physically in touch with the place [25].

The way we gain experience of touching and texture in a spatial and urban context is possible with our feet rather than our hands [24]. Thus, the concept of pedestrian becomes featured in the experience and perception of urban spaces. One of the greatest possibilities that people use to ensure their integration with the environment is the ability to move. Depending on the pedestrian situation in the perception of the space, *walking* is a form of perception in another dimension. For this reason, besides the basic senses such as eyesight and hearing, *walking* is the most basic action necessary for people to perceive an urban space.

3.1. Walking and Walkability

Passing through the world rather than being rooted is a very powerful image of what it means to be human. The most important elements of exterior urban life are the urbanite and their activities. The state of movement, which is one of the most basic actions of urban life, is defined as "walking [which] is the oldest and basic form of transportation" [26: 5]

Considering the moving elements of the streets, the concepts of human and vehicles come into concern. The distinction between the two is the mere circulation of vehicles, and the potential of pedestrian movement to establish interpersonal relationships. For this reason, pedestrian movement is compatible with the understanding of streets as social spaces [7].

Walking goes beyond any transportation, physical activity, or meeting daily needs, and turns into an important socialization method. Based on this, it is necessary to mention the myth of *flaneur*. The flaneur, which means wandering and idler in French, was discussed by Baudelaire as a person who wanders without a purpose just to experience the city [27]. So, the home of the flaneur is the city, the streets. Just as the man "in" the street feels at home within his four interior walls, the flaneur feels as if he is at home between the facades of the buildings in the street. For Benjamin, passages are where the flaneur actually exists. According to him, if passages (urban networks implied by the passages) did not exist, wandering like an idler and gaining urban experience would hardly have gained importance [28].

In the periods when transportation was by foot or horse, the overlapping space of movement and social space created the concepts of pedestrian traffic and vehicle traffic, with the movement gaining different dimensions thanks to technology. In modern times, social space has been captured by the vehicles, and there has been a change in the social structure of transportation networks in a way that suppresses the pedestrian movement and circulation, *walking*. In short, the speed of modernism executes time and space for the flaneur who wants to define his speed as turtle speed. On the other hand, walking is a kind of resistance against the speed of the "industrial revolution" [29: 380], just like the existence of the flaneur.

Earliest reference to pedestrian-oriented development was Perry's introduction of the "Five-Minute Walk" [30]. Then Jacobs criticized and defended the street life and walkability depending on safety, diversity, and lively streets [31]. More recently, Jan Gehl has been an important resource focusing on urban and human scale issues. Gehl states that being a pedestrian provides close integration with the urban environment and society [32]. Rapoport, on the other hand, states that pedestrians can perceive many differences in forms and functions in the environment, thanks to their low-speed movement, and in this way, they can become more aware of the spaces and activities in the city [33].

Walking, which contributes to a healthy life primarily due to its active action structure in the daily life of the city [34, 35, 36], is the cheapest form of transportation that can be used by people in reducing environmental pollution and is the least harmful one to the environment [37]; due to this, it is a supported mode of transportation in the world, rapidly polluted and losing its health. In addition to its unifying effects on social life [38], walking gains importance in terms of the feeling of freedom it provides and its contributions to psychology; the experiences gained by the citizens depending on walking speed [19]; the ability of people to perceive the urban space from different perspectives [33]; and supporting human-human relations in a social context [39].

Instead of automobile-oriented values, walkability prioritizes the human factor. To deeply understand the walkability, it is proper to understand it apart from the term of *walkable.* A walkable place is basically defined as *easy to walk around* [40]. Walkability is more specific about what it is, how it is measured, and what it might mean for the design of cities. It is a kind of performance indicator used in urban spaces to test the walking ability. While placing the human at the center of the space and design, walkability focuses on environmental qualities of urban spaces basically affecting the human experience but also relates to many other qualitative characteristics of the urban environment.

Accessibility is the primary factor of walkability. In regard of accessibility, Brownson et al. have stated that the walking surface, availability and accessibility of competitive transport alternatives and infrastructure (e.g., transit, sidewalks), facilities, availability and accessibility of facilities or natural features for activity, availability of local government funds for parks and recreational facilities are essentials [1]. Likewise, Southworth and Parthasarathy focused on public transport access and pedestrian access on street design and circulation systems. Southworth's lates studies argued the accessibility regarding connectivity and linkage to other modes [2].

APA has mentioned the subjects of *characteristics of sidewalks, street design, land use mix, route connectivity, side planning considerations in human scale, retrofitting older communities* regarding the "walkability" heading in the *Places and Placemaking* studies [3].

Within the scope of *characteristics of sidewalks*, it has been stated that a person needs approximately 90 – 120 cm wide area while walking. Since walking is a social activity, a barrier-free area of at least 150 cm is required for two people to walk side by side. In addition, an extra 30 to 60 cm of space is required when the sidewalk is adjacent to a wall, building or any threshold (Fig. 1)

Besides, well-designed sidewalks should provide a sense of comfort, security and enjoyment to support walking. While designing, there should be a *buffer zone* of 150 to 240 cm in length between the street and the sidewalk serving for the fittings like trees, urban furniture, traffic lights, parterre, etc. In residential areas, sidewalks separated from vehicle traffic by a planting strip or enclosed sidewalks are recommended. If a planting strip cannot be placed, an additional buffer zone should be left of 30 – 60 cm (Fig. 2).

Within the scope of *street design*, it is mentioned that pedestrians tend to stay away from streets with excessively busy or fast traffic [41]. To encourage people to walk, streets in residential areas should be designed to not exceed 40 km/h.

In addition, pedestrians face a great danger while crossing the street; thus, it is extremely important to design safe and legible crosswalks. Reducing the speed of vehicles and shortening the transition distance increase safety. In commercial areas, crossings should be at least 3.60 m wide to allow pedestrians to cross in both directions. Additionally, traffic lightings that show how much time pedestrians have to cross the street will also be useful.

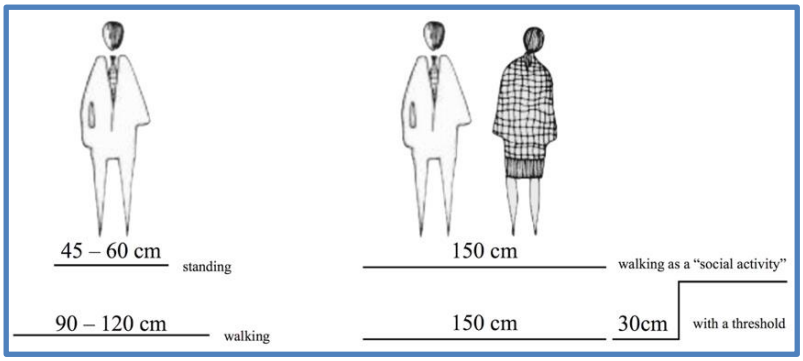

Fig. 1 Necessary width for walking (Created by Talia Özcan Aktan referring APA, 2007).

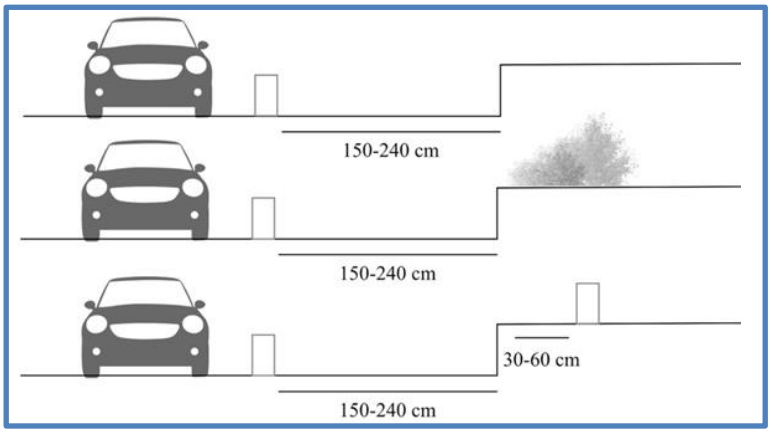

Fig. 2 Division of sidewalk from the traffic (Created by Talia Özcan Aktan referring APA, 2007).

In concern of the *land use mix*, using the areas in different ways and having various places nearby where people can go on foot guarantee the walkability. Stores, public places, education and entertainment areas, schools, markets, residential use etc. should take place in walkable residential units. This unit refers to the circle within a radius of 400 – 800 meters where pedestrians can walk and is expressed as the *pedestrian zone.*

Land use mix not only encourages people to walk to destinations that are close enough, but also creates a safety-enhancing effect by contributing to the presence of more people on the streets at different times of the day and night (Fig. 3).

With *route connectivity*, it is mentioned that there should be convenient connection roads in walkable settlements. In this way, pedestrians do not have to walk long distances to their destination. Small blocks of buildings less than 900 meters in diameter will contribute to walkability if there are enough access roads. Building blocks greater than 1200 meters should have carefully designed access roads and extended sidewalks, medians to increase pedestrian safety. In addition, safe paths for pedestrians and cyclists should be provided in places where the street network is interrupted due to landforms (Fig. 4).

Side planning considerations in human scale requires

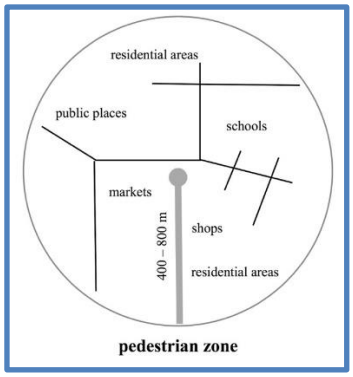

Fig. 3 Land use mix in pedestrian zone (Created by Talia Özcan Aktan referring APA, 2007)

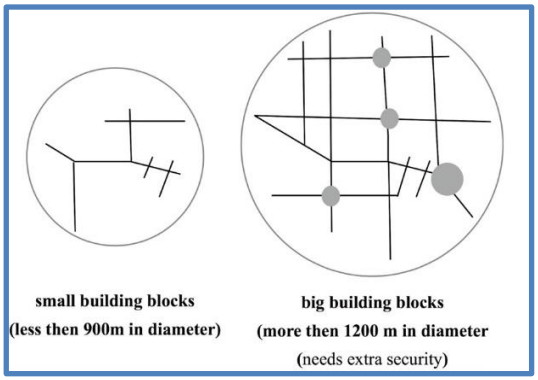

Fig. 4 Route connectivity (Created by Talia Özcan Aktan referring APA, 2007)

presenting a micro-scale approach to the public open spaces. Pedestrians moving at a speed of 1 meter per second notice the details on the facades of the buildings, the items in the showcase, the slope of the pavement or the quality of the bench. Therefore, it is necessary to take into account the various details that form the streets and sidewalks (Fig.5).

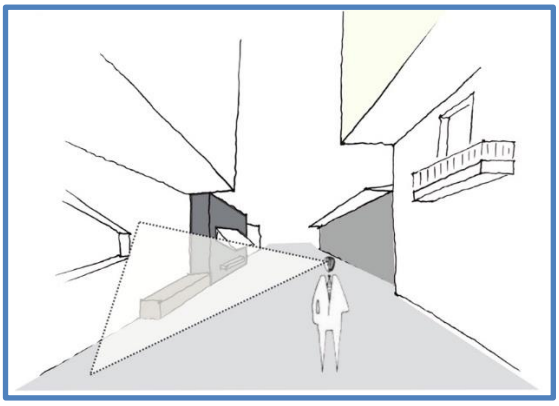

Fig. 5 Perception of the walker (Created by Talia Özcan Aktan referring APA, 2007).

In the context of *retrofitting older communities*, a road diet can be applied. Latest land-use and community design features are more associated with walkability, which means less vehicles and more pedestrians. As a traffic-calming strategy, excess lanes are removed with the road diet; parking lot, bike lanes etc. are provided. In this way, while the speed of vehicle traffic is reduced, safety is increased and thus the walking rate rises. Another measure that can be taken is to add passageways and pedestrian connections between the building blocks, in short, to make new connections whenever possible (Fig.6).

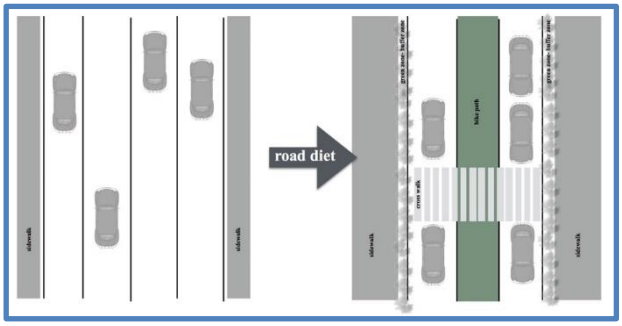

Fig. 6 Change in the street design by road diet (Created by Talia Özcan Aktan referring APA, 2007).

3.2. Attractiveness of a Street for the Pedestrian

"For far too long the street has been a neglected part of our everyday environment" [4: 3]. It has become important for the most frequently used public open space networks to be able to draw people and keep them in, for the walking action to be successful. Within the scope of this research, CABE and APA studies emphasizing the importance of street spaces to identify the elements that increase the attractiveness of streets were examined [3, 4].

According to CABE "Paving The Way" (2002), the key indicators that test successful street and street views are;

- *Comfort and safety* is that the streets are comfortable and safe for pedestrians and the disabled,
- *Domination by functions* is that only one function is not dominant in the street, the street has different functions.
- *Visual simplicity* is the street being visually simple and clutter-free. Regardless of whether a street is a simple or complex space, the simplicity and clarity of the flooring (asphalt, stone etc.), street furniture, lighting and landscaping are simple and solution-oriented.
- *Utilities subordinate* is that the street is well-maintained. Services or advertisements should stand out from all other street functions.
- *Fitting to character and activity* is that the street is compatible with local character and activity environments in terms of design and detail.
- *Ordered for access and storage* is to make appropriate arrangements for access, distribution and vehicle parking on the street.

Another study aimed to examine the spatial character of streets is the research conducted by APA [3]. It has explained the parameters to be considered in the attractiveness of streets under the heading "main streets" as summarized below.

Building form has been impacted by several elements; for instance, storefront buildings grasp the attention of pedestrians by serving the varieties. Height and bulk are also effective and low-rise buildings in two- three storey height are more pedestrian friendly. To give an example, Carmona et al. discussed the effects of streets on people in terms of scale, size, and proportion and set a standard. Accordingly, when the ratio of road width to facade height is 1:4 or more, it is spatially very congested and it was stated that the facade view is less than the sky view and a suitable sense of closure can occur at 1:2. When the ratio of the height of the facade to the width of the road is 2:1, it is stated that there is no sense of spatial closure, while the most appropriate ratio for urban roads is 1:1. [42], (Fig.7).

Providing setbacks to engage pedestrian activity, door

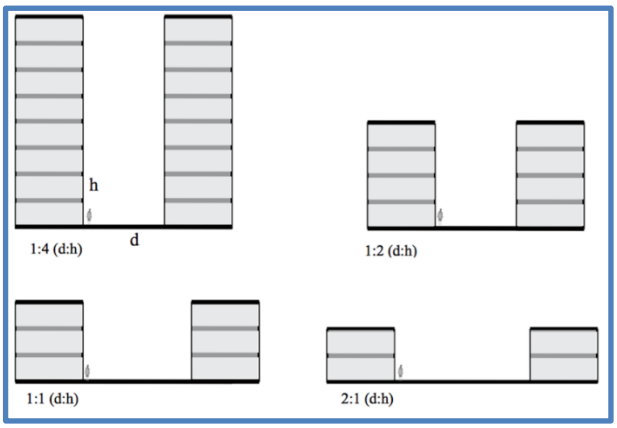

Fig. 7 Building height affecting the sense of space (Created by Talia Özcan Aktan referring Carmona et al., 2003).

and window openings to support the transparency between inside and outside ;, thus, it enhances the horizontal relationship between different spatial layers. Roof shape or profile are also effective in both the attactivenes of the building shape and defining a place for pedestrians especially with eaves.

Streetscape design is determined by landscape planting, lighting, way finding systems, open spaces and other elements. While the street trees are visual signals first, they define the street line by camouflaginge the buildings; and the trees serve optimum shade and shadows for the climatic conditions. To encourage the street activity during evening time, lighting gains importance besides its contribution to the safety precautions. As public places, the streets provided with open spaces may contain seating areas, weather protection, shade or a focal point; even they are small areas adjacsent to a sidewalk. Also some display boards, benches, bike racks etc. are other elements enhancing streetscape design.

Parking is an other component to meet the needs of the citizens. On-street parking, parking lots and structured parking are some ways of creating parking areas. Besides, *traffic* as an element of businessy and should be under the control in terms of walkability. To slow the traffic and improve the pedestrian safety, streets should be designed to accomodate traffic at 40 to 70km/s max.

Also *sidewalks* as common elements of the urban streets, should always be provided to differ the pedestrian and vehicle zones, for wayfinding, and safety and accessibility. Cycling is also an undeniable fact for the streets of the future. So, the *cyclists* are other customers of the streets bedises the pedestrian. To have a proper and safe cycling, bike paths and parking lots can be provided. Lastly the *public and private investments* are also important to to meet the citizens with more facilities.

Streets where static (sitting or resting) and dynamic (walking or strolling) pedestrian activities [6] intertwined encourage the walking. According to this, the most important feature of these streets is the concept of complexity in terms of human behavior and diversity. It contributes to the living capacity of the street and makes it a social space. In short, complexity increases the pleasure of walking. Structures that support the complexity are mentioned as *alternate routes, location, mixed-use, activity variations and diversity, ambiguity, open-ended design, allowing for change during time* and *the system of the street as gridal or irrational pattern* by Rapoport [5].

4. Results

According to this research, conducted on the scale of streets as public open spaces of the city, *accessibility* [1, 2] was determined as an overarching and prior criterion within the scope of walking and walkability. The physical features and functional details of the streets were obtained in human scale according to the qualitative characteristics of the standards determined referring "walkability" by the source of APA [3].

Under the title of attractiveness of streets for the pedestrian, data on the physical structures of the streets, the activities on the streets, and the use of urbanite were obtained by using CABE [4]. The features that APA mentioned under the title of "main streets" were examined and information about the features of the street and the surrounding structures and the sub-uses of the street were obtained [3]. In addition, Rapoport's [5, 6] point of view, which connects the attractiveness of streets to complexity, is examined and the importance of both street design and uses as well as the alternatives offered is mentioned.

As a result, the criteria that determine the walkable streets were gathered under the main headings of *accessibility; physical form and design, usage, networks and others,* and 26 subheadings of each criterion were determined according to the sources examined (Table, 1).

Considering that the *accessibility* criterion covers every main headings;

Urban form discourages or encourages the walking. So, the ciriterion of *pysical form and design* covers street design, characteristics of sidewalks, side planning considerations in human scale and retrofitting older communities [3] (related to "walkability"), visual simplicity, utilities subordinate, fitting to character and activity (that is also related to *usage* criteria) and ordered for access and storage [4], building form and streetscape design [3] (related to "main streets"), location, open-ended design and system of the street [5, 6].

Under the criterion of usage; land use mix [3] (related to "walkability"), comfort and safety, domination by functions [4], parking, traffic, sidewalks and cyclists (which are also in concern of physical form and design) [3] (related to "main streets"), mixed use, activity variations and diversity [5, 6] subheadings were compiled. Therefore, besides the design elements, the function, the activities and their possibility for socializing contribute to walkability in different perspectives serving at the same purpose.

While networks criterion includes the route connectivity [3] (in "walkability") and alternate routes [5, 6], under the others criterion; public and private investments [3] (related to "main streets") and ambiguity [5, 6] criteria are mentioned. In this regard individuals' walking is not just for transportation but also to feel pleasure of solving the uncertainty psychologically.

5. Conclusion

As a final remark, people perceive and realize places with their senses. In addition to the basic five senses in the processes of perceiving and experiencing the city, walking has been highlighted in this research as a sense that has lost its importance and should be prioritized. In this context, the walkability criteria of the streets have been determined as a result of the literature research on the walking of the people, who are the subjects of the activity in the public open space networks of the city and the walkability of the streets. The criteria determining the walkability of the streets are; accessibility, pyhsical form and design, usage, networks and others and a total of 26 subheadings were created for each.

This research, which is important for many disciplines and stakeholders working at the city scale, in terms of looking at the city from a micro perspective, emphasizes the importance of walking on the streets (activity centers of the city), by mentioning the prioritized urbanite. Wishing to remember the importance of walking in the modern world and in the heart of rapid urbanization.

Table 1. Walkability criteria with headings and subheadings.

Headings of the walkability criteria		Walkability criteria			
Accessibility	Physical form and design	• Street Design • Characteristics of sidewalks • Side planning considerations in human scale • Retrofitting older communities	• Visual simplicity • Utilities subordinate • Fitting to character and activity • Ordered for access and storage	• Building form • Streetscape design	• Location • Open-ended design • System of the street
	Usage	• Land use mix	• Comfort and safety • Domination by functions	• Parking • Traffic • Sidewalks • Cyclists	• Mixed use • Activity variations and diversity
	Networks	• Route connectivity			• Alternate routes
	Others			• Public and private investments	• Ambiguity
(Brownson et al., 2009) (Southworth, Parthasarathy, 1997)		APA (2007) "walkability"	CABE (2002)	APA (2007) "main streets"	Rapoport (1990 a,b)

Declaration

Author Contribution: Conceive-T.Ö.A.; Design-T.Ö.A.; Supervision-T.Ö.A.; Experimental Performance, Data Collection and/or Processing-T.Ö.A., M.Ö.; Analysis and/or Interpretation-T.Ö.A.; Literature Review-T.Ö.A., M.Ö.; Writer-T.Ö.A.; Critical Reviews- T.Ö.A., M.Ö.

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References

[1] R. C. Brownson, C. M. Hoehner, K. Day, A. Forsyth, and J. F. Sallis, "Measuring the Built Environment for Physical Activity", *Am J Prev Med*, vol.36, no.4, pp.99-123, 2009.

[2] M. Southworth and B. Parthasarathy, "The Suburban Public Realm II: Eurourbanism, New Urbanism and the Implications for Urban Design in the American Metropolis", *Journal of Urban Design*, vol.2, no.1, pp.9-34, 1997.

[3] APA-American Planning Association, "Planning and Urban Design Standards", Wiley Graphic Standards Series, New Jersey: Wiley, 2007.

[4] CABE- Commission for Architecture and the Built Environment, "Paving the Way –How to Achieve Clean, Safe and Attractive Streets", Thomas Telford Ltd. for the Office of Deputy Prime Minister, 2002.

[5] A. Rapoport, "The Meaning of the Built Environment", Tucson: University of Arizona Press (Revised Edition), 1990 a.

[6] A. Rapoport, "History and Precedent in Environmental Design", New York: Plenum Press, 1990b.

[7] H. Z. Yazıcıoğlu, "Spatial Characteristics of Streets as Walkable Urban Spaces, Bağdat Street Case Study", PhD thesis, Istanbul Technical University, Institute of Science, Istanbul, 2010.

[8] S. B. Özsel, "The Effect of Building-Urban Space Interface Features on Urban Pedestrian Spaces", M.S. thesis, Istanbul Technical University, Institute of Science, Istanbul, 2009.

[9] M. Çubuk, "Kentsel Kamusal Mekanlar Alanlar", *Yapı Dergisi*, vol 30, no.11-12, pp.25-45, 1978.

[10] E. Dacheux, "Kamusal Alan", (Tr: H. Köse), İstanbul: Ayrıntı Press, 2012.

[11] M. Weber, "Şehir", (Tr: Musa Ceylan), İstanbul: Yarın Press, 2010.

[12] D. Yıldız, "The Interrelations of Architecture and Urban Design with Landscape and Their Effects on Architectural Design", M.S. thesis, Istanbul Technical University, Institute of Science, Istanbul, 1996.

[13] F. Kavi, "Evaluation of the Pedestrian Street Arrangements In Istanbul from the Point of Planting Design", M.S. thesis, Istanbul Technical University, Institute of Science, Istanbul, 2003.

[14] P. Gökgür, "Kentsel Mekânda Kamusal Alanın Yeri", İstanbul: Bağlam Press, 2017.

[15] H. Lefebvre, "Mekanın Üretimi", (First print June, 2014), İstanbul: Sel Press, 1974.

[16] M. Castells, "The City and the Grassroots: A Cross – Cultural Theory of Urban Social Movements", USA: University of California Press, 1983.

[17] K. Church, "Making Visible: Registering the Asynchronous City", in *Urban Interior: Informal Explorations, Interventions and Occupations*, Rochus Urban Hinkel Ed., Germany: Spurbuchverlag, 2011, pp.27-42.

[18] R. Krier, "Urban Space", New York: Rizzoli, 1979.

[19] K. Lynch, "Kent imgesi", 14. Print, (Tr. İrem Başaran), İstanbul: Ayhan Matbaası, 2020.

[20] A.V. Moudon, "Public Streets for Public Use, With a Foreword by Donald Appleyard", New York: Columbia University Press, 1991.

[21] M. Francis, "Control as a Dimension of Public Space Quality", in *Public Spaces and Places- Human Behaviour*, Altman, I., and Zube, E.H., Eds. No. 10, 1989, pp.147-171.

[22] C. Marcus Cooper, and C. Francis, "People Places: Design Guidelines for Urban Open Space", New York: John Wiley Son, 1998.

[23] E. Ahundzade, "Sosyo Kültürel Değişim Kapsamında İç Mekanda Renk Kullanımı ve Analizi", M.S. thesis, Hacettepe University, Fine Arts Institute, Department of Interior Architecture and Environmental Design, Ankara, 2014.

[24] J. D. Porteous, "Environmental Aesthetics: Ideas, Politics and Planning", London: Routledge, 1996.

[25] J. Pallasmaa, "Space, Place, Memory and Imagination: The Temporal Dimension of Existential Space", in "*Spatial Recall: Memory in Architecture and Landscape"*, M. Treib Ed., New York: Routledge, 2009.

[26] R. Retting, and S., Schwartz, "Pedestrian Traffic Fatalities by State", Washington: Governors Highway Safety Association, 2017.

[27] W. Benjamin, "Baudelaire'de Bazı Motifler Üzerine", in *Pasajlar*, W. Benjamin, Ed., (Tr. A. Cemal,), 8. Print, İstanbul: Yapı Kredi Press, 2011, pp. 202-253.

[28] W. Benjamin*, "Pasajlar", (*Tr. A., Cemal), İstanbul: Yapı Kredi Press, 2002.

[29] R. Solnit, "Yol Aşkı: Yürümenin Tarihi", İstanbul: Encore Press, 2016.

[30] C. A. Perry, "The Neighborhood Unit, Monograph 1 in Committee on Regional Plan of New York and Its Environs", *Neighbourhood and Community Planning*, vol.7, pp. 20-141, 1929.

[31] J. Jacobs, "The Death and Life of Great American Cities*"*, Vol. 241, New York: Random House, 1961.

[32] J. Gehl, Life Between Buildings: "Using Public Space", New York: Van Nostrand Reinhold, 1987.

[33] A. Rapoport, "Pedestrian Street Use: Culture & Perception", in "Public Streets for Public Use", A. V. Moudon, Ed., New York: Van Nostrand Reinhold, 1991.

[34] L. Frank, P. Engelke, and T. Schmid, "Health and Community Design: The Impact of the Built Environment on Physical Activity", Washington, D.C.: Island Press, 2003.

[35] J. Pucher, and L. Dijkstra, "Promoting Safe Walking and Cycling to Improve Public Health: Lessons From the Netherlands and Germany", *Am. J. Public Health*, vol.93, no.9, pp.1509-1518, 2003.

[36] P. K. Baran, W., R. Smith, H., D. Türkoğlu, R., W. Marans, and F. Bölen, "Walking Behaviour in İstanbul: Individual Attributes, Neighbourhood Context and Perceived Safety", *ITU A-Z*, vol.6, no.1, pp. 21-40, 2009.

[37] J. Crawford, "Carfree Cities", The Netherlands: International Books, Utrecht, 2000.

[38] K. Leyden, "Social Capital and the Built Environment: The Importance of Walkable Neighborhoods", *Am. J. Public Health*, vol.93, no.9, pp. 1546–1551, 2003.

[39] R. Cervero, and K. Kockelman, "Travel Demand and the 3 Ds: Density, Diversity, and Design", *Transportation Research*, vol.2, no.3, pp.199-219, 1997.

[40] URL 1- https://www.epa.gov/sites/default/files/2021-06/documents/national_walkability_index_methodology_and_user_guide_june2021.pdf

[41] D. Appleyard, "Livable Streets", Berkeley: University of California Press, 1981.

[42] M. Carmona, T. Heath, T. Oc, and S. Tiesdell, "Public Places, Urban Spaces: The Dimensions of Urban Design", Oxford: Architectural Press and Elsevier, 2003.