Important factors of perceiving and memorizing the city during the process of vehicle and pedestrian traffic

Rifat Alihodžić 1, Andrey Butyrin2 and Dmitry Makhov3
3Saint Petersburg State University of Architecture and Civil Engineering, Vtoraya Krasnoarmeiskaya ul. 4. St. Petersburg, 190005, Russia
E-mail: rifata@ac.me

Abstract. Moving within the city, both by vehicle and foot, is a prerequisite of creating visual sequences. A variety of factors should be taken into consideration when planning cities, not only of functional nature, but of the aesthetic nature as well. A particular problem lies in complex cities, which have a complex spatial matrix of different time layers resulting from development over a long period of time. Given that the city needs to provide the needs of its users, who move through it, one of the most important factors needed is easy orientation in a complex urban space. The research is based on the assumption of easy orientation and movement through the city, as well as on the striking appearance of urban elements that facilitate the memory of the city. This work deals with defining important factors effecting perceiving and memorizing, by inhabitants and also of those visiting it for the first time, regardless they are walking or using a vehicle. Physical structures, topography and a climate and a range of other elements are important in order to create a clear idea of some urban area. Many elements were considered - not only being of fixed nature (streets, squares, topography and morphology), but also elements that form the essence of the urban image – elements that can also be some specific public transportation means, such as double-deckers in London, bicycles in Amsterdam or Beijing, or gondolas in Venice. The purpose of this work is to point out the rules helping the urban planning process and contribute to reading and memorizing the image of the city.

1 University of Montenegro, Faculty of Architecture, Bulevar Đordža Vašingtona bb, Podgorica, 81000, Montenegro. E-mail: rifata@ac.me
2 Moscow State University of Civil Engineering, Yaroslavskoe shosse, 26, Moscow, 129337, Russia
3 Saint Petersburg State University of Architecture and Civil Engineering, Vtoraya Krasnoarmeiskaya ul. 4. St. Petersburg, 190005, Russia
1. Introduction

In psychology, there are works and experiments that deal with perceiving in general, but not so many of them are dealing with perceiving the environment where people live in. One of the pioneer works, still applicable, is “An image of the city” [1]. The work deals with the structural relations of the constitutive elements of the city, which concludes that people form an image of urban space, which integrates cognitive schemes on the principles of Gestalt psychology. The author underlines human effort to find a specific schematic order in the environment and to arrange the links among important elements of the city in a logical way. Cognitive processes dealing with memory are consolidating perception, attempting to the maximum to avoid certain chaos. Arranging visual material in human memory is also organized at the cost of deviating from real spatial images, but within schemes that help to reconstruct the image of the city when they are found in real space. [2]

However, we need to know that the city represents something more than just a mutually related physical structures. When talking about a city as a spatially defined and comprehensive urban unit, our notion of the city differs when we perceive it as “here” and when we perceive it as “there”. In our mind, this means being inside the city and outside it.

Being in the city means being directly involved in its image, with our own being and spirit. The town is not only defined by buildings, districts, streets and squares, because the route of movement also plays a big part in the appearance of the city.

Being outside the city often means having a notion based on a memory of it, preceded by an inevitable process of perceiving. Centricity of a human being, which always determines a reference point, is the cause of different notions emphasized previously. Shifting and being in open space, represent elementary conditions of perceiving and meeting the components of each part of the city. The city represents a multidimensional gathering of facilities and the space which formed by them. The observation consists of experience gathered in changing rhythmic sequences in the process of human observation while moving. [3] When people pass along the pedestrian street, their perception defines visual notions. Observing the facilities, their features and mutual relations with the surrounding area are determined. This interactive relation is crucial to perceiving data of the observed ambient. When the street is filled with the dynamics of pedestrian movement, and the observer is moving from the opposite direction, his attention is focused on the people moving, not on the buildings. One’s attention gives the advantage to moving elements. Having dynamical movement from the opposite direction, the feeling of being in a whirlpool appears, almost the same as rowing upstream.

2. Defining important factors.

The city is considered to be one of the most impressive and the most significant creation of the human mind.[4] Its experience is of great significance, and it consists of clear and legible images of the city.

The experience of the image of the city is not the same when going on foot or by car. Pedestrian movement has a speed of 4-5 km per hour maximum, while the speed of a car is much greater, which reflects upon the perception quality. Both perceptions are specific and unique, so they are not comparable neither in their quality not in quantity. The essence of human perception consists of the perceiving and summarizing sequences in movement. The observed images are constantly changing, with the observer not registering minor changes, but those that differ significantly from each other. This happens with considerable shifting, changing of position in space, changing of the angle of observation, height point of the standing place, just like numerous other elements.

Moving by car does not give the same picture as walking, whether one is on a driver’s or some other seat. The whole, quality-quantity range of relations formed by this kind of transition must be taken into consideration. Thereby, a spatial position of the observer is a special subject.
Going by car is pretty much comparable with the occurrence of images moving on film screen. Here, what happens is perceiving of larger plans and shifting with sequences marked on larger city landmarks. Of course, details available to perceiving disappear during pedestrian moving. A relation between an observer and the environment, during the car ride is exceptionally dynamic and one’s adjustment to speed and change of position in space becomes more of safety and protection issue than an observation of a beautiful environment. This can be observed in contemporary city districts all over the world, where image of the city next to the roads consists of macro plans of large physical structures dominated by overpasses, crossroads, pedestrian crosswalks and traffic lights. This moment in human perception is best emphasized when they move along the streets intended for pedestrians. When the car enters this kind of locality, and the observation of surrounding area is from its inside, the inadequate relation and the feeling that things and details pass before one’s eyes.

Structural features of the town make the essence of perceiving and memorizing. However, on the individual plan, we should never exclude previously mentioned “inner factors of perceiving”.

The city is a blended kaleidoscope of various events and people moving constantly, no matter whether this movement occurs on foot or by using some kind of public transportation. This pulsing of life is the best reflected through intensity and density of passers-by. Dynamics is not always equal – it varies depending on time of day, year, or season. This factor makes the city a living being constantly pulsating in its own way. Dynamic changes conditioned by movement make the space more exciting which can be understood as a performance on the city scene. The city does not offer the same feeling every time in its full glory of splendid weather and when the streets are crowded (meaning in full pulsating time), and when it is ominously empty. During the time that the streets are empty, it seems that the city does not fulfils its function. The streets and squares are longing to be crowded. They simply call for the action, because it is a prerequisite of their function. The emphasis on the aforementioned elements confirms the fact that the city is an interaction of physical structures, streets, squares and its inhabitants.

The image of the city changes significantly depending on the intensity of light, so the night and day situation is different, which is experienced differently in the eye of the observer. It is known that colours are not the same in the shadow – they appear more intense. Their intensity weakens on strong light. Perceiving the dimensions under different light intensity and light beam focus affects perceiving. This element of dosed and calculated “stage effect” is managed with immensely. The familiar fact is that certain landmarks are emphasized during the night in city areas, so the night image is completely different than the daily one. The stage setters of the city simply choose what to perceive and what not to perceive that way.

Figure 1. Budapest at night. Forcing of perceiving certain facilities and special detail on them with underlining characteristic elements
Las Vegas is a perfect example of complete city metamorphosis by night, when the artificial light encourages perceiving of “world fair” and puts the emphasis on complete relaxation, for the purpose of encouraging gamblers’ decision to take part in the games.

Figure 2. Las Vegas by night. Dosed effect of “global fair”. There is also a replica of the Eiffel Tower.

The attention should always be paid to accomplishing the city in total (totality) and that each element participates in creating the core of city. [5] The claim has it that, in order to perceive the city properly, the most important is what is comprehended by a single glance: a particular street, a particular square. [6] This assertion stems from the view present in Gestalt theory, that the unity of the whole is more important than its parts. [7] Thereby, it is required to consider the memory factor as the connective tool that integrates the whole, which coincides with perceiving psychology in Gestalt.

The path and the goal are indeed determining factors for perception of space. Thereby it is very clear that, amongst other things, communications are significant factors for spatial structure. Even though the streets and their systems are purely technical thing, they are subject of memorizing out of pragmatic reasons. The original image of human environment consists of such things, which enable them direct movement towards a specific goal. [1] The city is being created through the time and that is the reason for its complex structure. Thus, it is easy to agree upon the fact that, if it could be started again from the very beginning, there could be created a neat image, with straight roads and buildings arranged in harmony on their height and style. [3] Simply, people are aware of the fact that this is not possible instantly because of the complexity of the forming of the city. It does not matter to observers that they have replaced the complex structure of the city in memory with a simple geometric scheme that does not represent a realistic picture of the city, but represents a sediment of memory.

When the case is about the causes of people’s perceiving the city, pragmatism of living and the necessity for movement and orientation present the basic motif which can be considered as the cause for perceiving each urban unity, just like any utilitarian space. The other motif is certainly the aspiration for main characteristics about specific urban environments, visited for touristic reasons for example. When visiting, people want to have a complete picture of the city even if they do not live in it all the time. In any case, the observer creates certain mental images of the city, with easy readability being their most important feature, but it is considered important to remember if there are elements of mystification and surprise in the experienced images. [1]

What is also required is to pay attention to the fact that primary perception is simply impossible without previous images and conceptions, so in that way, the previous experience is important. [8] Surely, integration of new experience with the previous one is a greatly important category that should be taken into account. [9] The initial step should be that the city is a product of human dealings in space, which, unlike the architectural facility, is being created for much longer period of time. It takes a lot of time to get a comprehensive view of the city, bearing in mind that it is never possible to see the city from one point of view, even if that point is in a bird's eye view.
Not being inside the city, but far from it, means to get the notion about the mutual spatial relation between oneself and that particular city and locate it in a wider spatial notion of the Earth, continent, state (figure 3). As an example for this particular consideration, Lisbon can be taken.

Figure 3. Portugal on the map of Europe. There is Lisbon situated in it. Focus continues, on its topological position of a general typical image. Map data: ©2020 Google, Aaron Cheng via http://www.chengfolio.com/google_map_customizer

Figure 4. Lisbon, the view from the bay.

The term Lisbon can only be understood at the level of geographical position and location in the wider area. But any further consideration and understanding of this city must include an immediate experience and perceived images. Thus, the notion of Lisbon cannot be an image obtained by observing that geographical point from space. A city understood in this way would be a stain from space, but they must be gradually sharpened with all the specifics of the city, which consists of street buildings and squares. For the inhabitant of Lisbon, gradual Gestalt focusing can go further on, to the room where do they live (figure 5).

Figure 5. Tower in the sea; Porto Square with Kulhaus musical centre; Cathedral. Old and new landmarks of Lisbon. Map data ©2020 Google
Even the small children perceive essential features of structural characteristics of the city and relations between the elements amongst them. Figure 6 represents the drawing of the downtown part of Bijelo Polje, according to the memory of and made by a 12-years old boy. The relationship between elements is absolutely correct.

**Figure 6.** Photos of Bijelo Polje’s downtown with a drawing of a 12-year old boy (reproduced with permission from the artist). The notion about spatial relations is very clear.

When it comes to the specific elements of the image of the city that make up its essence, their range is usually large. [10] Some cities are identified with architectural facilities, like Paris with Eiffel Tower or Sydney with their Opera House. The most modern occurrence of this type is Spanish city Bilbao with Guggenheim Museum.

**Figure 7.** Las Vegas, Los Angeles, Istanbul. Architecture has disappeared underneath billboards. Profit as imperative.

However, there are cities having lost a part of their distinctive architectural features under the pressure of billboards, Las Vegas for example (figure 7). Spontaneously created settlements, like “slums” represent striking parts based on a continuity that is based on informal conjoint of accidental physical structures. This chaotic image is impressive because of a social misery as contrary to richness of business centers in a large number of cities. The mentioned image becomes a significant participant of a perceived material that creates overall image of the city in our mind. [11]
Figure 8. Slums in Caracas and Rio de Janeiro. The feeling of misery is a common feature of these settlements.

Exploring psychological bases of the perception, we have learned that each subject, as well as the architectural facility can be perceived and defined based on its special features. The same applies to the city. According to which parameters are special features of one urban unity established? It is about determining three important factors: identity, structure and meaning. [1] Thereby, it is essential to consider all three of them as a sufficient prerequisite.

Under the term of identity of some urban space, determining its uniqueness, as the individual and peculiar feature only for that specific urban space, is estimated. What is easily noticed is if the city is situated in the plain or on a slope, on the sea or by the river, in Sahara desert or in a forest area of the Balkans. Based only on certain elements representing “landmarks” of the cities, a convenient conclusion can be drawn. It is easy to connect Guggenheim Museum with Bilbao, Eiffel Tower with Paris, or Petrovaradin Fortress with Novi Sad. Clearly, this is the case if a person is previously introduced with these objects. Some facilities are especially strong, so they do not represent only a symbol of the city, but a symbol of a state as well. Perfect example for this statement is Sydney Opera House.

Structural features of the city represent space correlations of important parts of the city, making its physiognomy. These are, at the first place, streets, crossroads, squares, downtown areas, business, residential and industrial zones, bridges, rivers (lakes, sea) as well as important landmarks of the city. Landmarks make significant points in each city. They are spatial headings, captivating enough to keep the beholder’s attention on the essence of the city. Interaction of the beholder with the space is almost always happening compared to their “zero position”, i.e. to the place where they are situated. Finally, part of the city, or the city alone, in the eyes of the beholder has a specific meaning, which gives them a sense (besides identity and structure). One city can be the center of the region or the state, it can be a cultural or university center, it can be an industrial center of a greater importance as well. Indisputably, since being still a child, through school and experience, during the time, one learns to recognize certain “cultural signs” which each city possesses, so the urban images are absorbed according to them forming the experience of the city based on that. Those are only some attributes following the idea of some city. On mentioning Hollywood, people spontaneously think of global range film industry. Even though someone has never visited Hiroshima, what crosses their mind is the very first atomic bomb ever thrown, so Nagasaki is also accidentally remembered. Typological features of the city can also be qualified by their structure and purpose. Circular (radial), linear and grid are the types of the cities according to their structure. On the other side, there are commercial, cultural, historic and military kinds of cities according to their purpose. Urban transportation means and distinctive details of the city, captured in collective memory of their inhabitants, can significantly represent the elements of their identity. Some of them are specific and impose themselves as a special reason for analyses. Some examples are discussed further on.
Figure 9 shows London’s double-decker bus, which has become a landmark of the city, even though it is a means of transportation. Its image, shown also in children’s drawings, simply associates with and evokes the memory of London. This symbol is familiar even to those who have never visited London. The power of this symbol is so big, that even beside contemporary ecological transportation means (subway, trolley), city authorities don’t happen to consider their abolishing. It would be the abolishing of the city’s own identity, an act equal to demolishing Big Ben.

Similarly, Roman fountains became elements of collective memory and this urban property gives the specific taste to “The Eternal City”. Water jets spatial dance and the sound created this way, is a variable category and presenting products of facilities, i.e. fountains which appear “dead” when they are calm and motionless. Rome appeared handicapped during the reconstruction of Fountain Di Trevi, if people try to recall it. Even when the reconstruction was almost over, the facility itself seemed illogical without water.

As a response to London’s buses, Beijing and Amsterdam made the bicycle, a distinctive feature of these cities. It is interesting that these elements appear as one of the first associations (beside all other possible motifs), that can really be found in both cities. However, bicycle itself doesn’t mean anything without this distinctive character on them, created for recognizing a Chinese or a Dutch kind of urban elements to identify the city purpose. Lisbon also gets its own notion in small trolleys, moving through narrow railroads on an uphill route in a considerable amount.
Figure 11. Beijing and Amsterdam.

The same case is with Venice, having gondolas as their landmark, the feature that we cannot imagine this city without (figure 12).

Figure 12. Gondolas, Venice’s landmarks, just like its channels and their bridges.

Reasons that made these elements symbols of the city are numerous. However, there is a single content being a common feature for London buses, Roman fountains, Amsterdam’s and Beijing’s bicycles and gondolas of Venice. Those are the elements that contain movement. During the perceiving process, the more intensive the shifting is, the greater chance is to be a subject of distinctive memory. [12] Grading the appearing images, these elements represent the images of their cities that are seen mostly, because they would appear even when not expected and provoke beholder’s glance. These urban elements represent permanent and very vivid “excess” in space.

3. Conclusion

This work uses analytical procedure to consider a variety of elements known for their influence on perceiving and memorizing city image. There can be concluded that neither observed elements is not
sufficient enough to create the complete image of any urbanity. Gestalt rule about the importance of the unity above the parts of it shows its domineering function here. [13]

Surely, the hierarchical values of the elements that lead to perceiving and memorizing the city image can be discussed. The most important one, as it is crystallized in this work, is the structural scheme of the city, consisting of communications, because shifting of people and their spatial orientation are the most vital city functions. In one’s orientation and their position in the urban area, without doubt, a considerable part is represented by city landmarks, because they are striking the space with their spatial dominance. Beside the factors of spatial orientation, having observance of structural scheme and existence of the landmarks as the most important factors, the complete mental city image memorized and felt is multisensed, as this work emphasizes. [14] This way, the conclusion imposes that the city image is not formed of fixed elements only (facilities, roads, topography), but a whole milieu is weaved out of specific threads they make, sometimes even the means of transportation, like London buses, bicycles in Amsterdam and Beijing and gondolas in Venice.

References:
[1] Lynch, K. 1970, *The Image of The City* (Massachusetts: The M.I.T. Press)
[2] Arnheim, R. 1966. *Towards a Psychology of Art*, Collected Essays Regents of the University of California
[3] Cullen, G. 1971. *The Concise Town Space* (Butterworth & Co)
[4] Mumford, L. 1961. *The City in History* ,(Harcourt: Brace and World)
[5] Rosi, A. 2011. *The Architecture of the City* (Cambridge: Massachusetts MIT Press Ltd)
[6] Site, C. 1986. *City Planning According to Artistic Principles* (New York: Rizzoli)
[7] Cullen, G. 1976. *The Concise Townscape* (Van Nostrand Reinhold Co)
[8] Merlo-Ponti, M. 2013. *Phenomenology of Perception*. (London: Taylor & Francis Ltd.)
[9] Shulz. K. N. 1971. *Existence. Space and Architecture*. (New York: Praeger Publishers)
[10] Elin. N. 1996. *Postmodern Urbanism*. (New York: Princenton Architectural Press)
[11] Acerman, J. S. 1980. *The History of Design and the Design of History*. (Mit und University of Pensylvania)
[12] Alihodžić, R. 2007. *Definisanje primarnih aspekata psihološkog doživljaja arhitektonskog prostora i forme* (Ulcinj: Plima)
[13] Köhler, W. 1972. *Gestalt Psychology*. (New York: WW Norton & Co)
[14] Kelly, S. D. 2007 “*What Do We See (When We Do)*?” Philosophical Topics 27, (fall 1999): 107–28.Reprinted in Reading Merleau-Ponty: On “Phenomenology of Perception.” T. Baldwin,ed. London and New York: Routledge