EXPERIMENTAL APPROACH ON THE COGNITIVE PERCEPTION OF HISTORIC URBAN SKYLINE

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ABSTRACT

In a lifetime, human brain constitutes cognitive models for various conditions and events in order to be able to adapt to the environment and lead a life based on experiences. Based on multidimensional sensory experiences, people create an internal model of a city and they use this model as a mental sketch in their new urban space experiences. Cognitive mapping methods create qualified data for way-finding and the process of classifying the stimuli of the living area and carrying out spatial designs that promote quality of life. Aesthetic perception of the urban pattern consists of keeping the skylines of a city in memory and being able to create an image in mind. Urban skylines can be classified basically in three categories as the historic skyline, complex skyline in which new and higher structures are dominant and mixed skyline which is a combination of these two situations.

The aim of the study is to investigate how the image created by the skylines of historic cities can be expressed by drawing. The basic differences among the cognitive mapping techniques and the cognitive perception and the schematic display of a skyline can be discussed through this experimental approach. This study aims to do experimental research among a group of architecture students who are strong at drawing and schematic expressions. The selected group of samples will be asked to draw (1) the schematic skyline images of the city they live in and a city they have visited as far as they remember, (2) examined how they draw a skyline and how much time it takes after they are shown a skyline of a historic city chosen in a certain time, (3) watch a video on the streets of two different cities they have seen or haven't seen before, and asked to draw a skyline of the city based on what they have watched. Finally, these different situations will be analysed. In the experimental study, After 3 days, drawing the best remembered skyline image will be requested from students. And what the sample group have thought in this selection in terms of aesthetics will be measured with the semantic differential and the adjective pairs. Participants will be asked to draw the catchy image of the skyline shown in order to compare the experimental methods and the subjective aesthetic evaluation methods. Observation-based determinations will be realized by the analysis of these drawings and the adjective pairs. In this way, the relation between the skyline perception and the aesthetic experience in urban life will be discussed.

Keywords : Urban skyline, Cognitive skyline perception, Urban sketching, Visual education, Aesthetic evaluation

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1. **INTRODUCTION**

Being able to imagine the skyline of a protected city or creating a simple drawing of it differ from imagining or drawing a skyline which is in a state of a rapid flow in terms of the aesthetic experience. How rapid changes of skylines through the urban changes can be best observed may cause confusion in mind, which is a different kind of cognitive perception process than the cognitive mapping. Cognitive mapping and urban experiences define the communication process between a city and its inhabitants. According to Lynch (1960), the two-way process between the observer and his/her environment is the cognitive experience through the effects of environmental images. The main components of these images are identity, structure, and meaning of his words. Urban skylines are the reference points for the historic perception of the environmental image. Besides, detecting and remembering the urban skyline with the experience of urban space, legibility and way-finding are the different phenomenon from each other. The way-finding system whose basis consists of the vital adaptation process is related to the cognitive mapping at the plan level, however; the remembering and visualising of the skyline and the transfer of the observations are related to the urban sketching. The common features of these cases are the visual quality of the city and the urban aesthetics. Besides, way-finding is more vital and a practice for everyone, whereas visualising of the urban skyline image is more related to the self-pleasure and an interest for artists, designers and architects.
Considering the relationship of the image characteristics of the cities, it is seen that the holistic skyline of the cities like Venice and Istanbul is the visual character in minds. Besides, it is thought that cities like Barcelona and Konya have some visual effects that create the motion awareness such as a certain historic monumental structure and a landscape pattern within the city, which the visual characteristics of the city are on the memory. In addition to these two basic patterns, there are a large number of cities containing the mixed of these features. The fact that cities are changing constantly shows that cities like Istanbul, which are famous for their coastal skyline can protect the holistic aesthetic value of their very limited textures but cause a dramatic change and a chaotic visual effects within their urban transformation process. One of the major fundamental research areas of this study is to determine how these changes effect the memory.
In the field of architecture, planning and urban design, the visualization studies, as well as the basic design and the project assignments constitute the basic input of the education process. According to Lynch (1960), the imageability is a quality in a physical object which gives a high possibility of evoking a strong image in any given observer. This process has a very comprehensive and complex content describing how the design students perceive the city and how it should be perceived by multidimensional methods, knowledge. "In the development of the image, education of seeing will be quite as important as the reshaping of what is seen. Visual education impels the citizens to act upon his/her visual world, and his/her action causes him/her to see even more acutely" (Lynch 1960). The ability to design cities which are more liveable and high in visual quality, such architectural structures depends on being a deep visual space observer who primarily internalizes the urban experience. This observation has some holistic features such as the ability to observe and predict the human movements and feel the historic layers of the cities which have life experiences as well as the ability to comprehend the natural and built environment. Urban memory is materialized through objects and space. It is often the case between the collective and the personal. Assmann (2008) argues that space is the storage containers of the memory. According to Taşkıran (1997), space is an arrangement that determines the boundaries of belonging with its physical attributes and a three dimensional formal community where values are imprinted. Halbwachs and Coser (1992) conceptually

make a distinction between historical and autobiographical memory while describing the memory space. The definition of autobiographical memory belongs to the events that can be personally experienced. While describing the individual and social processes of recalling, they argued that these two were in fact totally inseparable and mutually exclusive

2. THE COGNITIVE PROCESS OF THE URBAN IMAGE

The cognitive aspects of the urban image, visual memory, visual interest and satisfaction have impacts on the decisions of urban settlement within the scope of the environmental psychology and are seen as a directive scientific field in order the discipline of urban design to reach its purpose. The city image and its visual characteristics have a main link with the organic textures in the nature. This approach is expressed by Alexander (2002) as "the archetypal forms that we think of as the forms of human-based and traditional architecture, are drawn from a class of profound living structures which have the deepest symmetries and the most complex form." According to Nasar (1989), homes and buildings by the effects of their facades, can be designed and planned to define and give character to space. Experiencing the urban image is related to the cognitive process and the city, and human interaction gives its aesthetic quality to the places. For him, urban aesthetics refers to the urban effect or the perceived quality of urban surroundings, which is an important objective for community satisfaction. In the evaluation of the city image, the perceived holistic quality of the elements represents the city as being pleasant or unpleasant for the inhabitants and tourists. Besides, his studies showed that the imageable elements influenced both favourable and unfavourable images of the city. "The evaluative image represents a psychological construct that involves subjective assessments of feelings about the environment" (Nasar 1998). From this point of view, in the experimental study on the perceptibility and visualization of the city skylines, the students' opinions were taken considering the pair of adjectives used mostly in the aesthetic evaluation studies in order to determine which effects were created by the positive/unimportant while recalling the skylines. Another feature of this process is the fact that the urban image that is expected to be drawn with the city image in memory can overlap in mind, and it is related to the fact that it takes place in the mind map. In this sense, as Eagleman (2015) stated, the brain uses the past experiences related to cognitive models to adapt to the environment, and the system of urban modelling is similar to this structure. "Cognitive maps of the structures of the cities, neighbourhoods, and buildings are not exact replicas of reality, they are models of reality" (Lang 1987). "The mind represents the world through ideas, symbols, images, and other meanings" (Minai 1993). In this regard, as Arnheim (1969) points out, the visual thinking is not a feature that belongs to the artists and designers, or is a medium of acquiring skills at an early age, but also a quality feature that all people must follow up in order to give a meaning to life. In this section, after discussing the place of the cognitive mapping in design, the cognitive process of the perception of urban skyline image will be examined.

2.1. The Cognitive Mapping in Urban Design
The first cognitive mapping revealed through experimental researches by Tolman (1948) is then it is widely used as a psychological research area from education to urban design. According to Downs and Stea (1973) "the cognitive mapping is a construct which encompasses the cognitive process that enables people to acquire, code, store, recall and manipulate information about the nature of spatial environment." For Altman and Chemers (1984) "the term environmental cognition is related to the perceptions, cognitions, and beliefs about the environment." Environmental cognition and types of experiencing city will vary

depending on the mode of travel like walking, cycling, active car driving or on public transport (Madanipour 1996). In the cognitive process of visualization, in other words remembering a part of urban area as a skyline image, professionals in art or design area stand still in a view point and try to make long observations for these city scenes. Usually people keep this image in their memory for a long time but they have difficulties in visualizing these. There are a wide variety of experimental, analytical and observational studies involving the mind maps on the intellectual effects of the urban experience on the cognitive processes and visual characteristics. Cognitive mapping studies and experimental studies based on environmental psychology are also related to feeling safe in the city (Oc and Tiesdell 1999). Technological developments, particularly based on the information processing, enable the innovative studies in this area. Here are a few examples of the discovery of the cognitive process in the formation of the urban image.

Portugali (2004) has some experimental studies on analysing the cognitive process of people for the urban forms and he made some city games for this aim, which is a kind of simulation for the city visualising. Cubukcu and Nasar (2005) made some experimental studies on understanding the mental models of the urban spaces through the virtual spaces, and analysing the process of way-finding systems of the human senses. Cubukcu and Eksioglu Cetintahra (2016) made some experimental studies with virtual street scenes for observing the 3D cognitive mapping process of the urban planning students in different classes. Hiller and Hanson (1989) developed the space syntax approach by observing human movements in the urban space. Neto's (2001) study can be considered as an example of the studies carried out to find out the differences between the aesthetic evaluations of the urban images through computer-aided models made by architectural and non-architectural students. Today's technology, eye tracking studies for landscape analyses and urban aesthetics (Parsons et al. 2002); neuro-cognitive psychology of aesthetics, measures such as electroencephalography, magnetoencephalography, event-related brain potentials (ERPs), functional magnetic resonance imaging (fMRI) or positron emission tomography" (Jacobsen 2010) and with approaches like the cognitive process of the aesthetic experience is able to show that how it effects the shape and the colour changes of the human brain structure.

2.2. The Cognitive Perception of the Urban Skyline Image

Historic cities, especially the ones surrounded by the coastal relationships such as sea and river, reflect their aesthetic characteristics as a skyline image of the city as a whole. According to Rapoport (1983), "traditional cities are both cognitively clear and legible and perceptually complex and rich. At the cognitive level traditional cities are much clearer and more legible than modern cities."

There is an extensive research literature on experimental, quantitative, computer-aided and cognitive urban skyline evaluation such as the holistic perception of the urban skylines, quantitative approaches on the aesthetic evaluation of the city skylines, comparison of the historic and modernist skylines, characteristics of the meaning and form, which can primarily be categorized as various studies of Krampen, Nasar and Stamps (Krampen 2013; Nasar 1994; Stamps 2002; Stamps et al. 2005). The common feature of these studies is that they prove the persistence of the aesthetic qualities of the historic city skylines through different approaches. Since the urban skyline enables visibility of the cities in terms of aesthetic evaluation, the studies in this area vary a lot because they have strong visual effects and comparable features for each city. Within the research, the skyline is considered as the focused subject that focuses on the imageability of the cognition. Within the research, it is focused on the subject of the cognitively imageability of the skyline.

Among the experimental studies on building and urban skylines, the relationship between building and form were classified, systematized and modelled in the studies of Appleyard (1969), the 149 of the 320 respondents were able to answer the map recall questions. Appleyard says "Unless a building is seen, it cannot project an image. Visibility is, therefore, a necessary component for recall. It is a measure dependent on the location of a facility-the visual counterpart of its accessibility-and on the focus of the city inhabitant's actions and vision." The experimental studies on visual assessments provide the ability to obtain a variety of predictable data.

3. URBAN SKETCHING IN ARCHITECTURAL EDUCATION

The visualization of the urban skyline image is one of the pioneering works of Cullen's work (1961) which explains the importance of urban sketches in the design process. The process of experience enables to discover and adapt the environment with its opportunities and risks. The relationship between the experience and art is described by Dwey (1958) as "experience as art in its pregnant sense and in art as processes and materials of nature continued by direction into achieved and enjoyed meanings, sums up itself all the issues which have been previously considered."
According to Berlyne (1973) "experimental psychology were using the method of impression to investigate determinants of feeling, a kind of conscious experience varying along a pleasant / unpleasant dimension. The longest-lasting branch of the scaling theory stream is experimental aesthetics. This, the second oldest area of experimental psychology, has been in existence continuously, though somewhat falteringly, since Fechner initiated it in the 1860s." Depending on this approach, the schematic skylines prepared for Istanbul arouse both pleasant and unpleasant feelings. For the students, studio work in architectural design education is a process that includes studying, analyzing, learning and interpreting of the space. By studying the concepts of belonging, resident order, space, culture through architecture, the idea of architecture is created. The selected urban spaces for the projects are recorded visually on the spot through video and observation. In the studio studies, by taking the students' improvement in the design behaviour and in cognitive and sensory perception as a general goal, urban interaction is questioned with sketches and self-concepts such as scale-space, behavior-method and content are examined. The design process stages followed during the studio are generally the evaluation process that includes project preparation studies and concept development approach in accordance with given conditions, interpretation-synthesis and development of agreed-upon studies and expression-presentation steps. If it is accepted that architectural and urban heritage accumulates individual and collective memory, the experiences to be gained with studio studies can be considered more meaningful.

4. METHODOLOGY

This research can be expressed as an empirical and exploratory study involving the field of design and the visualization skills of advanced people, including the skyline image, the traceability of the perceptual qualities of the scene to the scratch, and the process of visualization. In the study, the experimental approach is concerned with psychology as it is related to the study of the cognitive process. In this respect, it has the features related to behavioural science and the experimental psychology. In this study, experimental drawings were made through the images of Konya and Istanbul with a sample group of 6 post graduate students from Konya Selcuk University, Faculty of Architecture. At the same time, during the

2016-2017 academic year, these students have also made skyline studies in Konya Karatay region and cognitive mapping work has been carried out. In the evaluation of the visual characteristics of the urban skyline at the workshops, in the study of the perception process, sketches and schematic drawings are created and with cognitive mappings, the recallability of urban skyline is tested. Students are asked to draw the skyline of Istanbul they see at various time intervals. The findings of the literature search constituted the substructure of the workshop. The questions such as what kind of city the students lived in during the developmental age, whether they went to Istanbul or not are related to the determination of their cognitive city images. The semantic differential method was used to understand why the skyline that they recall has a lasting effect and the motivation is pleasure or displeasure. The adjective pairs identified in this approach were formed in accordance with the information in Nasar (1998). The architectural workshop group is shown in Figure 1.


Figure 1. Selcuk University, Konya Karatay Workshop Group

In Figure 2, different expression techniques of the students who perform the sample work and the examples of sketches from Istanbul and Konya can be observed. It was observed that structures and textures having historical depth were more easily perceived and remembered by the students. In chosen skylines, the motivation that creates lasting effect has been formed in the direction of an idea of satisfaction. In the summary section, 3-step application including skyline recalled from the images, skyline visualized in the mind, and the sketches of the visualized scene through video shoots was performed.

 (1) The schematic skyline images of the city they live in and a city they have visited as far as they remember; Students are asked to draw sketches of the skylines from Istanbul as they remember in order to compare them with the drawings of the city they live, which they know the best. In Figure 2, it is seen that the skyline drawn by Konya is quite detailed. The reason for this is that the students have already drawn this visual sketch in their workshops and that they have visuals in their minds as a project theme. In the skyline of the historical peninsula of Istanbul, there is a schematically strong narrative including less detail. The student, who drew these schemata, stated that he recalled this skyline from various trips in Istanbul, he had a postcard of the skyline and he could visualize this image as he had seen it during architectural lessons.
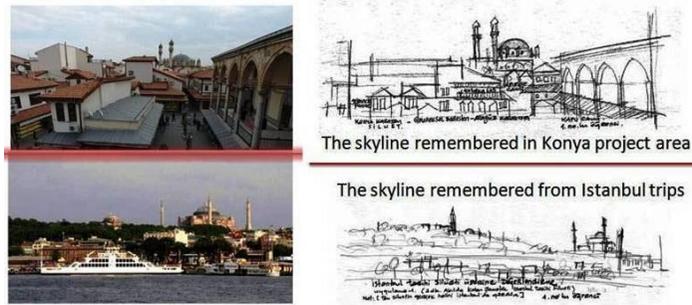
Figure 2. Different skyline experiences and sketching of historic cities: Above; Remembering the Konya skyline effect in architectural studio project / Below; Imagining the compact skyline by a boat trip in Istanbul in the past.
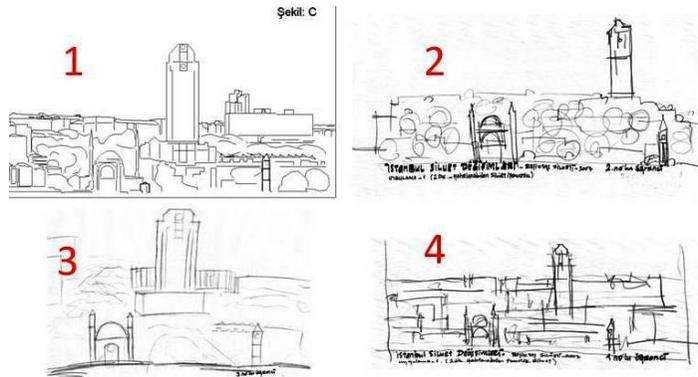
Figure 3. Drawing Besiktas coastline skyline sketch by watching its schematic skyline image between 2 and 5 minutes time periods.

(2) Examined how they draw a skyline and how much time it takes after they are shown a skyline of a historic city chosen in a certain time; In this study, the schematic image of the coastal skyline of Besiktas (Istanbul) is shown. Students who came to Istanbul as tourists stated that they are not as familiar with this visual image as the historical peninsula because they did not live in Istanbul. The visual marked with the number 1 in Figure 3 shown to the students is the schematic drawing. The 3 skyline drawings were drawn by different students. The Drawings 2 and 3 were visualized at the end of the demonstration of the schemata for 2 minutes. In the drawing 2, it is seen that the 3 of 4 buildings that show positive or negative landmark characteristics as Lynch (1960) stated were remembered and their locations were partly remembered. In the figure 3, it is seen that the 3 landmarks were remembered and correctly positioned, but other details were not remembered. The images were shown for 5 minutes to the student who made drawing number 4. It has been seen that the student who were able to observe for a longer time could make better image visualization for general appearance visual fiction. The fact that the Conrad hotel, which is capable of achieving a partial adaptation to the topography with its horizontal and vertical effects is not included in the 3 drawings supports the idea that buildings, which occupy a large area in the city, such as hotels, congress centres can relatively adapt to the environment with the correct position and horizontal-vertical effect balance.

(3) Watch a video on the streets of two different cities they have seen or haven't seen before, and asked to draw a skyline of the city based on what they have watched; The videos from the Konya Karatay workshop and the Istanbul ferry trip strait Maslak region were discussed within the scope of the study. Since Karatay was studied in the workshop and well-remembered, Istanbul Maslak skyline cognitive perception study shown in Figure 4 has been included in the study. Here, the students were shown some videos of Maslak skyline that can be viewed from the ferry with various proximities for 2-3 minutes. The purpose of this practice is to understand how the skyline is perceived on the move and to conceive how it is schematized by correlating with the other high-level urban models in the memory. The figure 4 showed that the 3 learners making two different drawings eventually made more similar drawing compared to the figure 3 example, and the skyscrapers created a specific skyline memory prototype.
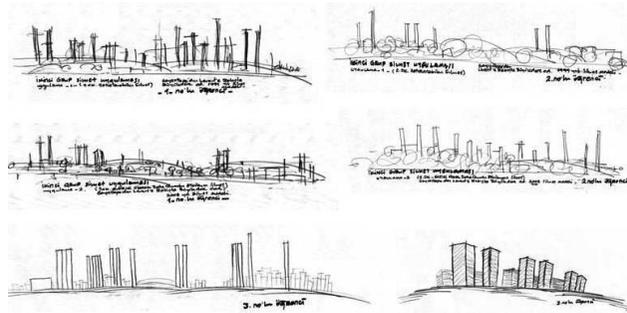
Figure 4. Schematic drawing of the skyline based on the catchy video on the ferry ride from Istanbul Maslak skyscrapers.

Three days after these practices, students were asked to redraw the skylines they remembered best. Students first drew the skyline of Konya recalling their workshop experience, and then they drew the historical peninsula of Istanbul. In order to measure the relationship between the skylines remembered easily and the pleasure, some adjective pairs as pleasant/unpleasant, boring/exciting, monotonous/complex, attractive/ordinary, calming/distressing were used with the semantic differential approach. It has been determined that the historic skylines that have a positive impact on the rating of these adjective pairs were remembered more than the skylines that are more similar and easier to draw such as skyscrapers and mass housing which were tried to draw after 3 days. When the emotions evoked by skylines, which are a part of the semantic differential approach, were asked, the historical peninsula of Istanbul was defined as historical, proportional, continuous, and peaceful; Istanbul Maslak skyscrapers shown via videos evoked some positive and negative emotions such as chaotic, complex, unidentified, vibrant, moving, and innovative. From this point of view, it has been seen that the history of the city skyline recalls a clearer positive emotions whereas the skyscrapers revealed some different emotions such as innovation or chaos.

5. CONCLUSION

In this study, the urban and spatial relation, the concept of memory, recallability of the urban skyline as a cognitive process was researched and tried to be read through these images of urban textures. The recollection and the cognitive visualization of urban skylines - although not a vital urban experience - reveal an intellectual deepness because they allow the life

flourish with the visualization and vary the imaginative features of imagination. This aspect creates a mental base in the internalization of urban aesthetic experiences.

In the applied evaluations on the skylines of Istanbul and Konya, it was found that the participant students remembered the historical architectural figures that they knew and sounded familiar in these sketches. These also have easily remembered features as landmark. One of the findings of this research, the historical peninsula of Istanbul's skyline takes an important place in the memory for the students of architecture. The Istanbul historical peninsula skyline which the people of the city also struggle for the protection of different viewpoints can be accepted as the signature of Istanbul. The skylines of historical cities like Istanbul and Venice have often have visual impacts on the memories of the ones who has never visited the city but are interested in it. When someone first encounters with the city that they always imagined visiting there, the observation of those special skylines creates a sense of excitement and completeness. The negative aesthetical perception created by the chaotic textures formed in the process along with the historical skylines of Istanbul can be considered as a factor that the students schematize these textures as similar blocks. One of the relevant illustrations of the urban texture that does not make a difference in the memory is that of a similar type of project, as shown in Figure 5 below.
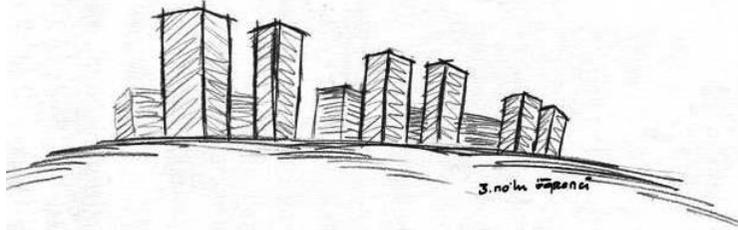
Figure 5. Skyscrapers' image drawn as a cognitive template.

This drawing is one of the images in Figure 4. The created skyline image is a challenging example which shows how these similar standard skylines and groups of structures are packaged in the mind how the non-exciting city textures are standardized by the mind. The visual quality is related to the legibility of the city and the perception of urban aesthetics. Different methods can be used to understand and identify the concepts in the memory. When the research is considered with this point of view, it is thought that it may create data for different studies to be conducted. In future studies, it is important to note that the architectural students at different levels of their education, such as junior and senior students, can be examined in terms of the differences between their skyline drawings on cognitive memory. This study investigated the effects of cognitive features of urban skylines in the visual thinking system.

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