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EVALUATION OF STUDENTS' IMAGES OF CITY CENTER: AKSARAY-TURKEY

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Abstract

The relationships of human with the environment are built on the images in their minds. The human age, gender, education level, and the time spent on a place affect people's perception of the environment. Cities include numerous elements that can be perceived in the mental images of people. According to Lynch (1960), in the minds of people living in cities, the five primary elements comprise routes, edges, intersections, zones, and triangulation points. The current study primarily aimed to elicit images of the Aksaray City Center from the minds of the students attending the Aksaray University, Faculty of Education, Department of Social Studies Teaching. This study also aimed to determine the causes of differences in the perceptions of the students (time spent in the city, gender, residence neighborhood, and economic status) using the city center. The sketch map method was employed in the study. The students were asked to draw a map of the city center in their minds. The results primarily revealed that the city square, which is positioned in the main intersection of the city, was most frequently detected in the students' mental maps. This landmark was followed by the route leading to the university.

Keywords: *city image, mind maps, sketch map, university students, Aksaray, Turkey*

1. INTRODUCTION

The space is the plane and horizon perceived and evaluated by its inhabitants. In other words, the space is where people carry out all their activities and live all their experiences (Tümertekin and Özgüç, 2013). Behavioral geography deals with how individuals perceive space and the effect of people's perceptions on their behaviors. That is, behavioral geography explores the relationship between the reactions of people to various environments and the manner by which they perceive these environments (Tümertekin and Özgüç 2013). In this context, the effects of nature on humans and communities have also been investigated (González, 2017). People's connection with the world relies on their environmental perceptions. These mental images may belong to the units of space with different scales ranging from the whole world to a continent, region, city, or a part of the city (Tümertekin and Özgüç 2013).

The concept of cognitive mapping has been utilized to explain how people make sense of their environment, the design forming in their minds in relation to the space, and how they perceive spaces and store the related information in their minds. Geographical mind maps result from the links created by individuals within a given space and other spaces or their perceptions of a given space in line with their cognitive structures (Da Vinha, 2015). Tolman (1948) was the first person to use the concept of cognitive mapping; in his laboratory studies on how animals find their ways in a restricted space, he determined the principles of the formation of real-life knowledge in mice and drew conclusions with a general viewpoint of spatial relationships. In light of his findings,

Tolman assumed that people construct map-like representations (cognitive maps) in the black boxes located in their neural systems and that these representations guide them in their daily lives (Kitchin and Freundschuh 2000). "Geographers describe cognitive maps as the end result of spatial learning, a developmental process that depends on navigation and way-finding. In other words, how we travel significantly affects what we know about our surroundings" (Mondschein et al., 2010). Ribery (1980) regarded cognitive maps as tools useful in learning individual perceptions of the city. Defining the cognitive map on the basis of city perception, Bell et al. (1978) argued that cognitive maps are "cognitive cities" that we form in our minds and represent the city as we know it. A typical cognitive map is similar to the view of the city from above

Although human relationships with spaces have been investigated by various disciplines from different perspectives (Kaba, 2018), in the literature, Lynch's research (1960) was one of the first studies that evaluated people's perceptions of the city by means of cognitive mapping. As a result of his cognitive mapping study conducted in Boston, Jersey City, and Los Angeles, Lynch (1960) determined five elements contributing to the effective formation of a city image. These five elements include paths, edges, regions, nodes, and landmarks.

Individual differences are another important issue to be addressed within the context of urban cognition (Ömüriş 2007). Perception and mental image are shaped under the influence of individual personal characteristics related to the space, feelings, instincts, and culture (Tümertekin and Özgüç 2013). Beck and Wood (1976) revealed that the length of time spent in the city is one of the important factors contributing to the effective formation of the mental image of the city, followed by age and gender differences. Those who have lived for a long time in a certain environment can draw better maps than those who have just settled to the city considering the content and accuracy. Older males can produce better maps. Although the reason why women demonstrate a poorer performance remains unclear, Howard and Templeton (1966) discovered that women produce poorer map image than men. In relation to the Turkish culture, the women to produce maps with fewer details as they are less involved in the professional life, travel around in more restricted areas and time periods in the city, and spend most of their time inside the house. The perception of urban space can yield important data in terms of determining the needs of different populations, the direction of their interest development, and location preferences. In this regard, the space perception can offer important insights into the living areas of people, in particular about the planning and creation of urban spaces (Üçışık Erbilen 2012). If the rules of people's spatial behaviors can be identified, then better space planning can be performed (Ghioca 2014).

Some research focused on the different aspects of cognitive mapping, such as determination of the image of Islamic countries in the mind maps of individuals (Tunçel 2002); elicitation of the urban image of the city of Balıkesir from university students' minds (Aliağaoğlu 2007); perception of a shopping street in the city of Elazığ by different groups it (Tunçel 2009); determination of the mind maps by Turkish immigrants about Australia (Gökten and Südaş 2014); production of the image of Europe in the mind maps of Turkish students (Südaş and Gökten 2013); investigation of students' urban environment perceptions about the city of İzmir and the reasons behind the formation of these perceptions (Karadağ and Turut 2013); elicitation of international students' urban space perceptions and factors affecting the formation of these perceptions (Temurçin and Keçeli 2015); analysis of city dwellers' urban images in terms of urban problems (Aliağaoğlu and Çildam 2017). Another study investigated how the city of Kastamonu is perceived and the prominent urban elements that come to the fore in the city (Erkan and Yenen 2010). A study conducted in the Northern Cyprus Turkish Republic determined how İsmet İnönü Boulevard (Salamis Road) in the city of Gazimağusa is perceived by inhabitants and which places are preferred by them (Üçışık Erbilen 2012). Another study explored the behaviors brought about by the design of the İzmir–Konak Square and by whom these behaviors are displayed (Ömüriş 2007). In addition to these works, another research attempted to determine the

Hungarian high school students' perception of Europe and the world by means of mind maps (Redei et al., 2011), and one study investigated the use of mind maps in the evaluation of the gender and socio-economic status of children (Çanakçıoğlu 2015). Çelen Öztürk (2017) evaluated the university students' mind maps about the city of Eskişehir on the basis of the basic elements proposed by Lynch. Other studies are worth mentioning in this regard. For example, Son (2015) attempted to determine the mental images of the cities of Sydney and Melbourne formed by university students; Matthews (1980) investigated the mind maps of students aged 11–18 years old about their city of residence on the basis of the urban elements proposed by Lynch, Wang and Schwering (2005) attempted to determine the perceptions of three different urban areas located in the city of Münster in Germany; Biolek and Andráško (2015) explored local people's perceptions of suburbs located in the hinterland of Olomouc by means of the mental mapping technique, whereas Annechino and Cheng (2011) attempted to determine the inhabitants' perceptions of San Francisco.

The current study intended to evaluate the students' images of a city in line with Lynch's theory of city image. The primary purpose was to elicit the Aksaray City Center images from the minds of the students attending the Department of Social Studies Teaching. The present study also aimed to determine the causes of differences in the perceptions of the students (time spent in the city, gender, neighborhood of residence, and economic status) using the city center. The current study intended to seek answers to the following questions: *"What are the students' mental images about the city of Aksaray?"; "How do the students' mental images about the city of Aksaray vary depending on gender, grade level, and income status?"*

2. METHOD

To find answers to the research questions, the draft map technique was used during the data collection stage of the study, whereas descriptive analysis, one of the qualitative data analysis techniques, was employed during the analysis the collected data.

The current study was conducted on the first- and fourth-year students attending the Department of Social Studies Teaching in Aksaray University. Assuming that the map drawing skills of preservice social studies teachers would be better, the students were preferred for the current study. To test whether the perception changes over time, the study was conducted on the first- and fourth-year students. The participants of the study were selected from these students on voluntary basis.

The participating students were a blank A4 paper and asked to draw the center of Aksaray city in their minds. The students were given 30 min, and no intervention was made while the students were drawing the areas of the city. The students were asked to write information about their gender, age, and income status on the back of the drawing paper.

The students' drawings were first evaluated according to the area of the city they drew and their drawing style. The urban elements found in the draft maps were evaluated by using the descriptive analysis technique, one of the qualitative research techniques. The evaluation was conducted on the basis of the five elements (paths, edges, regions, nodes, and landmarks) proposed by Lynch (1960). Each element found in the students' drawings was coded under these five themes. After coding, the elements gathered under each theme were evaluated according to their frequency of drawing and proportion to the total number of elements drawn. The same operations were repeated to compare the students' mental images depending on their grade level, gender, and economic status. Then, the results were listed in tables for interpretation.

2.1. Study area

Aksaray was declared a city in 1989. This area is a medium-sized city located in the Central Anatolia. The population of the city was 396,673 in 2016 (TUİK 2016). There is one university, established in 2006, in the city. A city square occupies the city center of Aksaray. The important business centers of the city surround the city square. Some changes have occurred in the geographical outlook of the city after the establishment of the university. The most important of these is that a previously unknown street before the opening of the university has become very popular as it is along the route taken by students. To date, the street is full of restaurants and shops for students. The two widest streets frame the whole city. A small river flows across the city, but it is dry in the winter months. Two large recreational areas are also found in the city (Figure 1).

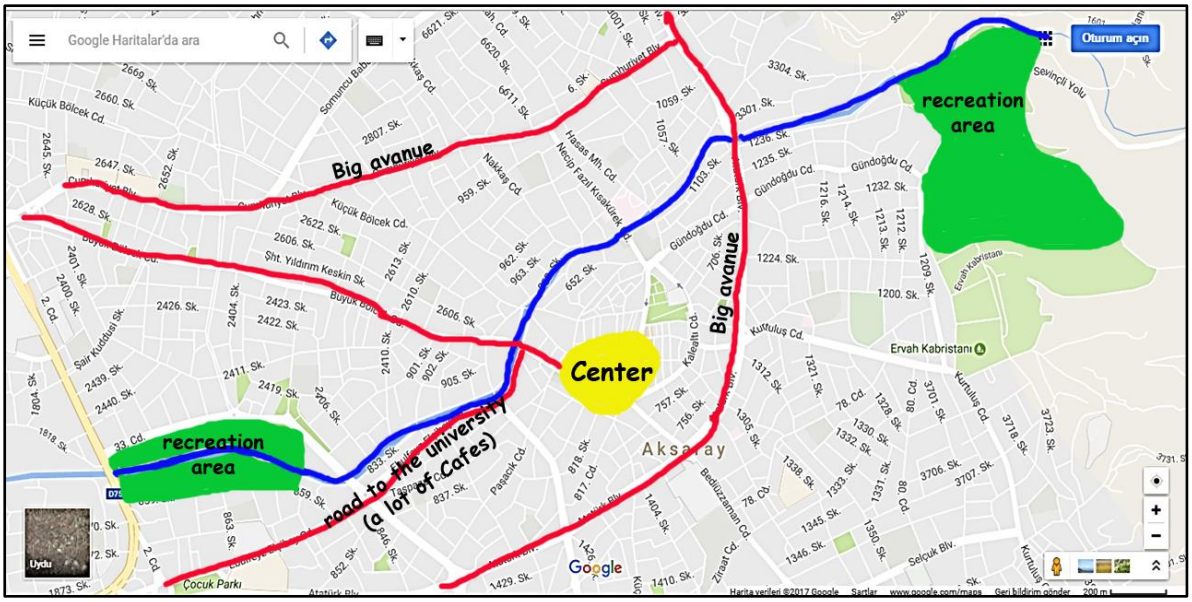

Figure 1. Plan of the study area

After classifying the elements found in the city on the basis of Lynch's image elements (1960), the students' routes to the university were placed under the category of paths. Large streets surrounding the city and the river flowing through the city were placed under the category of edges; the city square and recreational areas were considered to be nodes, and the various shops located in and around the city square and certain elements that are unique to their respective regions or the city (e.g., Atatürk Statue and the clock tower) were evaluated within the category of landmarks.

3. RESULTS

Before the results obtained in the current study were evaluated, the personal information of the participating students were first collected. In the second stage, the data collected were evaluated according to the students' drawn areas and drawing style. In the third stage, the results obtained from the classification of the elements found in the students' drawings under the five elements proposed by Lynch (1960) were evaluated. In the final stage, the results obtained from the comparison of the elements found in the students' drawings were evaluated according to their gender, grade level, and income level.

3.1. Demographics of the participating students

As shown in Table 1, 43 students (21 males and 22 females) participated in the study. Of the participating students, 20 were first-year students, and 23 were in the fourth year. Of the students, 13 belonged to the low-income group, 16 in the medium-income group, and 14 in the high-income group (Table 1). The participating students demonstrated a homogenous distribution on the basis of their demographics.

Table 1. Demographics of the participating students

Gender	f	%	Grade level	f	%	Income	f	%
Male	21	48,84	First-year	20	46,52	Low	13	30,23
Female	22	51,16	Fourth-year	23	53,48	Medium	16	37,21
Total	43	100,0	Total	43	100,0	High	14	32,56
						Total	43	100,0

3.2. Evaluation based on the area of drawing and drawing style

Examination of the students' drawings according to the drawing area indicated that all the students drew the city square and Lynch's elements found in this square (Figures 2–3).

Figure 2. Student drawing sample 1 (city square and its surroundings)

The city square is more emphasized in the students' drawings as all the urban elements are gathered in and around it, and students perform activities, such as eating and drinking, shopping clothes, praying, and banking, in this square.

Two of the students included in their drawings a street full of cafes and which is used by students to go to school (Figure 4). After the establishment of the university, one of the most important changes occurring in the geographical outlook of the city was the foundation of cafes, which are now frequently visited by students, located along a street. Students frequently use this street to go to the university by vehicle or on foot.

Figure 3. Student drawing sample 2 (city square and its surrounding)

The students excluded the street full of cafes in their drawings possibly because of their economic situations. As the students reported low incomes in general, they might find these cafes expensive and prefer not to go there. Moreover, as only cafes are present, and no other establishments can meet students' basic needs in this street, this location was absent in the students' drawings.

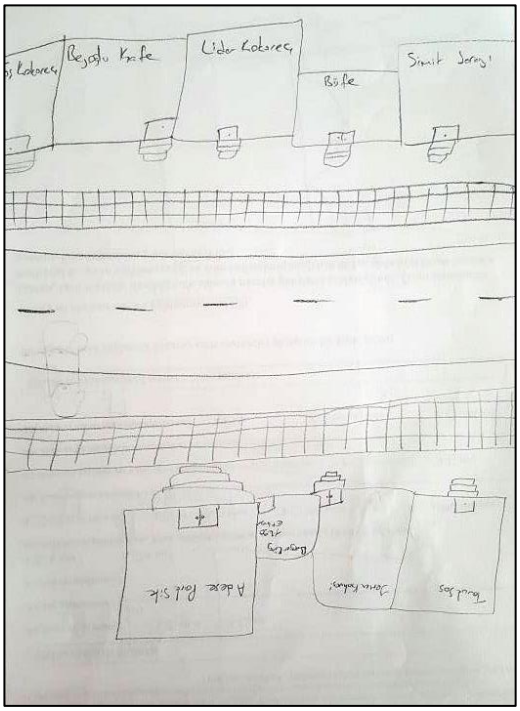

Figure 4. Student drawing sample (the street with cafes)

The two main streets were excluded in the students' drawings in general as they are distantly located from where the students reside and school location. Remarkably, the river was absent in the students' maps. This finding might be attributed to the dryness of the river throughout winter.

The students were told to produce their drawings as sketches. When the students' drawings were examined according to drawing style, the results showed that although the majority of the

students drew their draft maps as top views, several symbolically portrayed elements, such as clock tower, mosques, governmental buildings, etc (Figures 5–6).

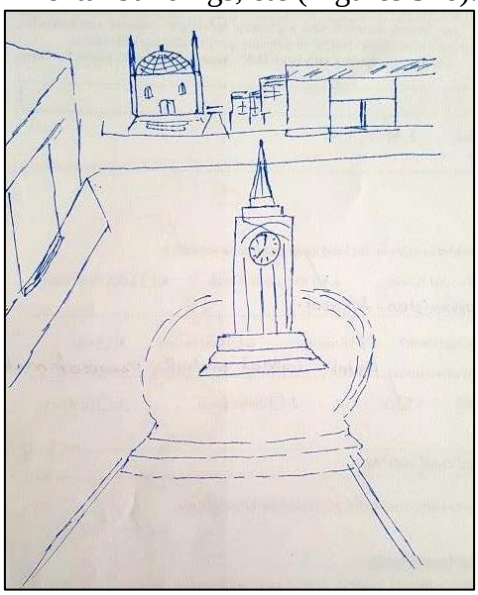

Figure 5. Sample of symbolic drawings 1

The symbolic elements used by the students in their drawings mostly included the famous landmarks of the city. In addition, pictorial drawing styles in which trees and buildings are three dimensionally depicted were also observed (Figure 6).

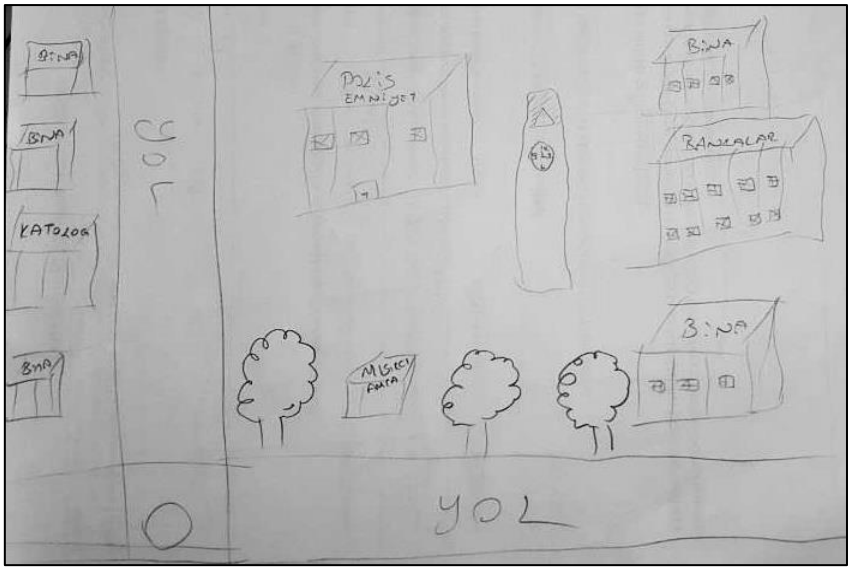

Figure 6. Sample of symbolic drawings 2

3.3. Evaluation of the urban elements found in the drawings

Lynch ordered the elements of the image of the city in decreasing number, that is, paths, landmarks, nodes, regions, and edges. The analysis of the student drawings determined that the students used a total of 237 elements under these five themes. When the order of the elements of the city image in the current study was considered, the most frequently illustrated element was business areas, that is, they are the most important element. Business centers were evaluated in the category of regions. The city square of Aksaray is the most important business center. The square includes shops for different businesses. In the students' drawings, the

elements belonging to business areas were repeated 120 times. Specifically, 50.63% of all the elements drawn belonged to the theme of regions. Under the theme of regions, the students mostly depicted clothing shops, shopping centers, restaurants, supermarkets, banks, and pharmacies, which are defined as business areas.

Table 2. Repetition frequency of the elements in the students' drawings

	Frequency	%
Regions	120	50,63
Landmarks	73	30,80
Nodes	35	14,77
Edges	7	2,96
Paths	2	0,84
Total	237	100,0

The second most frequent element was the landmarks (30.80%) as per Lynch's order. A total of 73 landmarks were identified in the drawings of the students. The places most frequently depicted by the students under the theme of landmarks comprised municipality, governorship, mosques, clock tower, and the Atatürk Statue. In the student drawings, the nodes were ranked third in accordance with Lynch's order, with a frequency of 35 times. Paths, which ranked first in Lynch's order, ranked the last in the students' drawings and were repeated only twice (Table 2).

3.4. Evaluation of the urban elements found in the students' drawings depending on different variables

When the data obtained from the students' drawings were compared according to gender, the findings revealed that the female students included more urban elements (63) from the theme of regions compared with the male students.

3.4.1. Gender

When the students' drawings were compared by gender, the results indicated that although the clothes shops within the business areas were included in the drawings of the female students 19 times, they were only included five times in the male students' drawings (Table 3). On the other hand, the places where foods and drinks are served were more frequently depicted in the male students' drawings. Such findings can be regarded as a reflection of the characters of male and female students. The male students also depicted landmarks in their drawings more frequently. The drawing frequency of certain landmarks, such as the House of the Governor and large mosques in the city center, showed no variation depending on gender (Table 3).

Table 3. Elements depicted in the draft drawings in relation to gender

	Regions	Landmarks	Nodes	Edges	Paths
Girls	6 Clothing brands (19) 3 malls (12) 10 food shops (16) 2 supermarkets (5) Banks (9) Pharmacy (2) **Total 63**	Municipality (2) Governorship (10) Mosques (16) Clock tower (2) **Total 30**	City center (15) Two recreation areas (4) **Total 19**	Three big streets (6) **Total 6**	From university to home (2) **Total 2**
Boys	4 Clothing brands (5) 3 malls (17) 11 food shops (19) Supermarket (2) Banks (12) Pharmacy (2) **Total 57**	Municipality (6) Governorship (10) Mosques (16) Clock tower (6) Atatürk Statue (5) **Total 43**	City center (14) Two recreation areas (2) **Total 16**	One big street (1) **Total 1**	

Different from the drawings of the female participants, the Atatürk Statue was included in the drawings of the male students. In terms of the depiction of the nodes in the drawings, no considerable difference was observed between the male and female students, whereas larger streets were depicted more frequently under the theme of edges by the female students. However, the route to the university was only depicted by the female students (Table 3). Meanwhile, although the male students' urban image was expected to be more extensive as they walk around the city more than the female students, the opposite was found in the study. The drawings of female students showed the names of streets six times, whereas those of the male students indicated street names only once. Moreover, the female students depicted the two recreational areas at the two ends of the city three times (Table 3). All these findings show that the female students' urban image areas were more extensive.

3.4.2. Grade level

When the students' drawings were compared depending on their grade level, the exact opposite of what was expected was encountered. The fourth-year students had been expected to produce more extensive image of the city given their longer residence time. However, the first-year students depicted more various elements in their drawings particularly in relation to business areas (Table 4).

Table 4. Elements depicted in the draft drawings in relation to grade level

	Regions	Landmarks	Nodes	Edges	Paths
First-year students	6 Clothing brands (9) 3 malls (19) 15 food shops (27) 2 supermarkets (7) Banks (8) Pharmacy (2) **Total 72**	Municipality (2) Governorship (6) Mosques (11) Clock tower (2) Atatürk Statue (3) **Total 24**	City center (12) Two recreation areas (6) **Total 18**	Two big streets (6) **Total 6**	From university to home (2) **Total 2**
Fourth-year students	4 Clothing brands (12) 3 malls (9) 5 food shops (11) Supermarket (1) Banks (13) Pharmacy (2) **Total 48**	Municipality (6) Governorship (14) Mosques (21) Clock tower (6) Atatürk Statue (2) **Total 49**	City center (17) **Total 17**	Two big streets (2) **Total 2**	

The first-year students depicted 72 urban elements within the theme of regions, whereas the fourth-year students depicted 48. On the other hand, the frequency of the fourth-year students

depicting landmarks in their drawings is nearly twice higher than that of the first-year students (Table 4). Meanwhile, the city image is expected to be more diversified and specialized with the increasing time spent in the city. However, in the current study, the results on the elements depicted by the fourth-year students can be easily recognized more by new student residents of the city in their drawings.

Furthermore, the images produced by the fourth-year students only depicted the city square, whereas those of first year students included recreational areas. Such results were observed possible because the first-year students walk around more to explore the city, whereas fourth-year students spend most of their time at home or in dormitory due to concerns about graduation and finding jobs.

3.4.3. Income level

When the students' drawings were compared depending on their economic status, the findings indicated that the students with low economic status drew fewer business areas (f: 23). This situation can be linked to the low-economic-income students who rarely shop in these areas. Moreover, the cognitive maps of low-income students were limited to the city center, whereas medium- and high-income students' cognitive maps included recreational areas and the main avenues (Table 5).

Table 5. Elements depicted in the draft drawings in relation to income level

	Regions	Landmarks	Nodes	Edges	Paths
Low-income students	2 Clothing brands (3) 3 malls (5) 5 food shops (6) Supermarket (1) Banks (6) Pharmacy (2) **Total 23**	Municipality (2) Governorship (4) Mosques (4) Clock tower (2) Atatürk Statue (5) **Total 17**	City center (4) **Total 4**	One big street (1) **Total 1**	
Middle income students	4 Clothing brands (10) 3 malls (16) 11 food shops (19) Supermarket (2) Banks (9) Pharmacy (1) **Total 54**	Municipality (4) Governorship (13) Mosques (19) Clock tower (5) **Total 41**	City center (14) Two recreation areas (4) **Total 18**	Three big streets (5) **Total 5**	From university to home (1) **Total 1**
High-income students	3 Clothing brands (9) 3 malls (7) 6 food shops (13) 2 supermarkets (5) Banks (8) Pharmacy (1) **Total 43**	Municipality (2) Governorship (3) Mosques (9) Clock tower (1) **Total 15**	City center (11) Two recreation areas (2) **Total 13**	Two big streets (2) **Total 2**	From university to home (1) **Total 1**

Several differences were observed between the drawings of the students from the middle and high-income levels. However, the students of medium-income level remarkably depicted more urban elements within the themes of regions and landmarks compared with the other two groups. The city images made by the students in this group can be argued to be more sophisticated.

4. CONCLUSION AND DISCUSSION

The following conclusions were reached in the current study, which aimed to investigate the perceptions of the students attending the Department of Social Studies Teaching in Aksaray University about the city center of Aksaray on the basis of the five elements determined by Lynch (1960) in relation to urban perception.

The results obtained to answer the research question, "What are the students' city images?" in line with the work of Lynch (1960) can be summarized as follows. When the basic elements of Lynch were considered, the frequency order of the elements drawn within the context of the current study differed from that of Lynch. In the current study, the order of elements in decreasing number was as follows: regions, landmarks, nodes, edges, and paths. Paths, which are the most important element according to Lynch, ranked last in the current study. The reason for the minimal inclusion of the large streets surrounding the city might be the poor public transportation facilities in these streets and the small number of shops targeting students. According to Lynch's classification, the river flowing through the city falls under the element of edges. However, this element was absent in the students' drawings. In other words, the students' urban images were unaffected by geographical elements, such as rivers, possibly because the channel is often dry. The literature has reported findings similar to and different from the ones obtained in the current study. Although the first position was occupied by the elements involved in the category of regions in the current study, in numerous other studies, the first position was taken by the category of landmarks (Aliağaoğlu 2007; Çelen Öztürk 2017; Biolek & Andráško 2015; Son 2005). Other studies showed the prominent depiction of more than two elements: landmarks and paths (Huynh & Doherty 2007); landmarks, nodes, and paths (Imani & Tabaeian 2012).

The results obtained for the research question, "How do the students' mental images of the city vary depending on gender, grade level and income status?" can be summarized as follows. The elements in the drawings varied depending on gender and interests of the male and female participants. Although more elements from the theme of regions were depicted in the female students' drawings, more elements from the theme of landmarks were presented in those of the male students. More clothing stores were illustrated in the drawings produced by the female students. Although the male students were expected to produce more extensive images of the city, the female students presented more elaborate illustrations. Parallel to the findings of the current study, Tunçel (2009) reported that the female university students mostly depicted clothing shops and cafes.

According to comparison made on the basis of grade level, the results obtained differed from the expectations. The time of residence in the city showed no effect on the urban image. The number of elements in the drawings of the fourth-year students is lower than that of the first-year students. Such result was obtained possibly because the fourth-year students spend most of their time studying for the teacher appointment exam in closed areas. The comparison made on the basis of income level revealed the relatively lower number of the elements in the drawings of the students in the low-income group compared with the other income groups.

In light of the findings of the current study, the planning attempts in the future should address first the large streets of the city and the river flowing through it. The public transportation in the streets surrounding the city should be improved, and more clothes shops, restaurants, bookstores, and cafes should be opened for students in these streets. Moreover, future renovations on the river should enable filling of the channel with water, and the surrounding areas of the river should be transformed into recreation spots for students.

REFERENCES

Aliağaoğlu, A. (2007). Davranışsal Coğrafyaya Bir Örnek: Öğrenci Merkezli Balıkesir Şehir İmajı. *Fırat Üniversitesi Sosyal Bilimler Dergisi, 17*(1), 17-44.

Aliağaoğlu, A., & Çildam, S. Y. (2017). Balıkesir'de şehirsel imaj: şehirsel problemlerin tespitine yönelik bir araştırma. *Doğu Coğrafya Dergisi, 22*(37), 35-52.

Annechino, R., & Cheng, Y.-S. (2011). *Visualizing Mental Maps.* USA: San Francisco University of California in Berkeley.

Beck, R. J., & Wood, D. (1976). Cognitive Transformation of Information from Urban Geographic Fields to Mental Maps. *Environment and Behavior, 8*(2), 199-238.

Bell, P. A., Fisher, J. D., & Loomis, R. J. (1978). *Environmental psychology*. Philadelphia: Saunders.

Bilgin, N. (1999). *Sosyal Psikoloji'de Yöntem ve Pratik Çalışmalar.* İzmir: Ege Üniversitesi Edebiyat Fakültesi Yayınları .

Biolek, J., & Andráško, I. (2015). Investigating suburban environment by means of mental maps: a case study of Olomouc hinterland. *Human Geographies-Journal of Studies and Research in Human Geography, 9*(1), 43-56.

Çanakçıoğlu, N. G. (2015). Can cognitive maps of children be analysed by space syntax? *ITU A|Z, 12*(3), 127-140.

Çelen Öztürk, A. (2017). Studies on Reading the Urban Centre via Cognitive Maps: The Example of Eskişehir, Turkey. *WIT Transactions on Ecology and The Environment, 226*, 29-38.

Da Vinha, L. (2015). Falling Dominos or the Role of Geographic Mental Maps In Foreign Policy. *European Journal of Geography, 6*(4), 76-87.

Erkan, N. Ç., & Yenen, Z. (2010). A Method of Analysing Urban Image: Lessons from Kastamonu. *Megaron, 5*(2), 67-81.

Ghioca, S. (2014). The cognitive map's role in urban planning and landscaping. Application to Brăila City, Romania. *Cinq Continents, 4*(10), 137-157.

González, M. (2017). Planning, Urban Sprawl and Spatial Thinking. *European Journal of Geography, 8*(1), 32-43.

Gökten, C., & İlkay, S. (2014). The image of Australia: A case study on the mental maps of Turkish immigrants in Sydney. *Journal of Geography and Geology, 6*(2), 82-92.

Howard, I. P., & Templeton, W. B. (1966). *Human spatial orientation.* London: Wiley.

Imani, F., & Tabaeian, M. (2012). Recreating mental image with the aid of cognitive maps and its role in environmental perception. *Procedia - Social and Behavioral Sciences, 32*, 53–62.

Kaba, B. (2018). Measuring Neighborhood Attachment and Urban-Related Identity Among Residents of Gated Communities: A Case Study in Mavişehir. *European Journal of Geography, 9*(2), 66-80.

Karadağ, A., & Turut, H. (2013). Üniversite öğrencilerinin kentsel çevre algısı üzerine bir araştırma: İzmir örneği. *Coğrafi Bilimler Dergisi, 11*(1), 31-51.

Kitchin, R., & Freundschuh, S. (2000). Cognitive Mapping: Past, Present, and Future. *Psychology Press, 4*, 1-8.

Lynch, K. (1960). *The Image of the City.* Cambridge: MIT Press.

Matthews, M. H. (1980). The mental maps of children: images of coventry's city centre. *Geography, 65*(3), 169-179.

Mondschein, A., Blumenberg, E., & Taylor, B. D. (2010). Accessibility and Cognition: The Effect of Transport Mode on Spatial Knowledge. *Urban Studies, 47*(4), 845-866.

Morval, J. (1985). *Çevre Psikolojisine Giriş.* (N. Bilgin, Trans.) İzmir: Ege Üni. Edebiyat Fak. Yayınları.

Ömüriş, E. (2007). *Bir Kamusal Alan Örneği Olarak Konak Meydani'nin Mekan Kullanimi Açisindan İncelenmesi. Unpublished Master Thesis.* İzmir: Ege University.

Redei, M., Kincses, Á., & Jakobi, Á. (2011). The World seen by Hungarian students: a mental map analysis. *Hungarian Geographical Bulletin, 60*(2), 135–159.

Ribery, F. (1980). *Les Cartes Mentales.* Strasbourg.

Son, A. (2005). The measurement of tourist destination image: applying a sketch map technique. *International Journal of Tourism Research, 7*, 279–294.

Südaş, İ., & Gökten, C. (2012). Cognitive maps of Europe: geographical knowledge of Turkish geography students. *European Journal of Geography, 3*(1), 41-56.

Temurçin, K., & Keçeli, K. (2015). Bir davranışsal coğrafya çalışması: Isparta şehri örneğinde uluslararası öğrencilerin kentsel mekân algısı. *SDÜ Fen Edebiyat Fakültesi Sosyal Bilimler Dergisi, 36*, 117-138.

Tolman, E. C. (1948). Cognitive Maps in Rats and Men. *Psychological Review, 55*, 189-208.

TUİK. (2016). Yıllara Göre İl Nüfusları. *Türkiye İstatistik Kurumu*. Ankara.

Tunçel, H. (2002). Türk öğrencilerinin zihin haritalarında İslam ülkeleri. *Fırat Üniversitesi Sosyal Bilimler Dergisi, 2*(12), 83-103.

Tunçel, H. (2009). *Kentsel mekânın algılanması: Elazığ örneği.* Ankara: Ankara Üniversitesi V. Ulusal Coğrafya Sempozyumu Bildiriler Kitabı.

Tümertekin, E., & Özgüç, N. (2013). *Beşeri Coğrafya: İnsan, Kültür, Mekân.* İstanbul: Çantay Kitabevi.

Üçişik Erbilen, S. (2012). An Example For Urban Space Perception: Famagusta (Ismet Inonu Boulevard). *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi (H. U. Journal Of Education), Special Issue 1*, 157-166.

Wang, J., & Schwering, A. (2005). Number invariant spatial information in sketch maps — a study of survey sketch maps of urban areas. *Journal of Spatial Information, 11*, 31–52.