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Audiovisual perception of a historical route in Konya city (Türkiye)[1]

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Abstract
To perceive our world, the city we live in, and communicate with the urban elements surrounding us, information from other sensory sources (such as auditory, touch, and smell) as well as visual perception are very important and deeply affecting data. With the help of all the sensory data they feel, people attach meanings to the space, feel a sense of belonging, connect to the space, and transform the space into a 'living space'. It is stated by many studies that this issue is very important in the design of a sustainable urban environment. From this point of view, **the main purpose of this study** is to understand the interaction of the visual and auditory characteristics of the urban space with each other and how these interactions are evaluated by the individuals using the space with inquiries such as '*Is the visual value also high in areas with high soundscape value?*' or '*Does the visuality of the urban environment affect sound quality assessments?* Within the scope of the study, the axis between Konya High-Speed Train Station and Mevlana Tomb, an important axis in terms of the city's vision, was selected as a sample area. This axis is about 3 km. long and has many historical identity values and central functions of Konya city. For the study, **soundwalking and the questionnaire application method** accompanying this walk on the sample axis were used. Acoustic characteristics of the axis were also understood with sound intensity measurements (dB levels). Photographs taken from the area and the questionnaire application to measure the user's perspective were used to understand the visual attractiveness of the sample axis. The study was carried out with a total of 92 people participating in the study. In the next step, the data obtained from all these analyses are integrated, and detailed evaluations were made on the determined parts and the whole axis. **As a result of the study,** it was seen that the relationship between the auditory and visual environment was not directly proportional across the selected sample axis. At this point, it can be said that the importance of the context in which the auditory landscape is perceived is obvious.
Keywords: soundscape, sound intensity, soundwalk, visual appeal, Konya historical city center.

[1] This study is prepared from the thesis titled "Bir kentsel mekânın davranışa etki eden duyu(m)sal yönlerinin irdelenmesi' which was accepted as the Master Thesis of the Department of Urban and Regional Planning at Konya Technical University Graduate Education Institute in 2021.

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1. INTRODUCTION

All senses interact with each other like parts of a whole. In addition to sight, information from other sensory sources such as hearing, touch and smell are also very important data for perceiving the urban environment and communicating with the world (Lang, 2005; Yang and Kang, 2005). Designing the cities always refers to the construction of the visual environment, but human cognition of the environment includes not only visual but also acoustic and tactual cognition. Sound, olfactory, and tactile sensations are rather important (Jialing and Xinbo, 2015).

While sound can be defined as one of the basic ways and psychological functions for us to perceive the environment, soundscape refers to a perceived acoustic environment and the combination of sounds originating from this environment, which plays an important role in the formation and understanding of urban space. The assessment of soundscape is a part of sensory aesthetics research that is concerned with the delightfulness of the sensations one receives from the environment. Therefore, evaluating the perceptual values of the auditory landscape of an environment can increase the person's pleasure from the environment by increasing the level of sensorial aesthetics. For this reason, it is of great importance in the design of a sustainable urban environment that visual characteristics as a part of urban aesthetics and design studies, as well as accompanying soundscape or perceptual studies, are not ignored (Porteous and Mastin, 1985; Porteous, 1996; Apfel, 1998, Yang and Kang, 2005; Bahalı and Tamer Bayazıt, 2017). The importance of this subject is emphasized by numerous studies. As defined in these studies, the term soundscape refers to all sounds in a location and their effects on people's perceptions. Since it is no longer sufficient to design urban built environments that satisfy the eye alone, the term 'soundscape' becomes more important when explaining the close relationship between the visual experience of cities and the sounds accompanying them (Bahalı and Tamer Bayazıt, 2017). In this respect, Kastka wrote, 'the same noise level produces more annoyance in less attractive streets than in streets with a higher level of arousal quality' (Viollon et al. 2002).

Compared to the values seen, sounds can be thought of as more temporary, more fluid, more unfocused, less in context, more uncertain in terms of orientation and localization, ubiquitous, non-specific, global, more elusive, and without a clear boundary. However, since the sounds define the space itself rather than the objects in the space, although it is temporary and invisible, it is rich in information and emotion that it conveys to the person. The soundscape, which contains a dynamic structure that makes people feel the progress of time and a feature that gives a sense of reality, leaves a hidden but very deep effect on the perception and evaluation of the urban environment. With the help of auditory features, which are one of the main components of the entire sensory environment, people can attach meanings to the space, feel a sense of belonging, connect to a space, and transform the space into a 'living space'. The people may be stimulated by the sound of music or soothed by natural sounds such as the rustling of water or leaves. It is undeniable that the auditory environment is directly related to the psychology of the person. For this reason, an approach that ignores the auditory features and focuses only on the visuality of the urban space will not go beyond producing empty and meaningless spaces (Porteous and Mastin, 1985; Porteous, 1996; Apfel, 1998, Yang and Kang, 2005).

Based on this framework, the starting points of the study were *'whether the soundscape is effective in people's experience of the space*' and *'how is the relationship between the soundscape and the visual environment'*. The main purpose of this study is to understand the interaction of the visual and auditory characteristics of the urban space with each other and how these interactions are evaluated by the individuals using the space with inquiries such as *'Is the visual value also high in areas with high soundscape value?' or 'Does the visuality of the urban environment affect sound quality assessments?*

To achieve this aim, one of the important 2,8 km long axis from the city of Konya, which has a high historical identity value, is centrally located, has high accessibility, and forms the image of the city

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with its landmarks, has been chosen as a sample area. This axis, which is frequently used by local and foreign tourists coming to Konya by high-speed train, on their way to Mevlâna Tomb, is also valuable because it is one of the vision axes of the city. With the presence of religious centers such as Mevlana Tomb, the perceptibility of the chosen axis throughout the city is high. Sound walks with a total of 92 people using a random sampling technique on the determined axis and the accompanying questionnaire application to understand both the audio and visual quality of the area formed the method of the study. The inquiries made were combined in the next stage and an attempt was made to seek answers to the research questions in line with the aim of the study and to obtain a cumulative result.

This study focused only on auditory and visual qualities and left the perceptual, tactile, and olfactory senses out of the scope. Addressing these senses in the following studies is very valuable for a more holistic approach to the space.

2. AN APPROACH TO URBAN SPACE IN TERMS OF SOUNDSCAPE

There must be sound to communicate with the outside world that surrounds us. In the absence of sound, the world will become lifeless (Yang and Kang, 2005). Instead of the concept of 'sound', concepts such as 'sonic' and 'acoustic' are also used in the literature to describe sound environments and materials. While 'sonic' is defined as any physical or conceptual object created by sound, 'acoustic' appears as an adjective expressing the interpretation and reaction of the sound (Farina, 2013).

Influencing the 'place' experience of people, contributing to the perceived quality of the environment/space, acquiring information about the place, and increasing the comfort of the living environment are very important features of the 'sound' in its relationship with the space (Liu et al., 2013; Jialing et al., 2015). Schafer (1977) defined sound as *'one of the means of touch created from a distance'* and emphasized how effective sound is from a sensory point of view. For example, positive effects such as triggering a pleasant experience that a person has had before, relaxing, and healing a person can also be achieved with sound (Payne, 2008).

The Canadian composer and researcher R. Murray Schafer (1977) introduced the concept of 'soundscape' and defined it as *"...the sound variations in space and time caused by the topography of the natural environment, the buildings, and their different sound sources*" And, the term 'soundscape', according to Schafer (1977), refers to '*the study of the effects of the acoustic environment on the physical responses or behavioral characteristics of creatures living within it*' (Liu and Kang, 2016). According to the research, soundscape can be defined as *'perceiving and evaluating the auditory features of an urban environment, leaving a deep impact on the person with its dynamic and realistic features that make them feel the progress of time*'.

In his classic book, *The Tuning of the World*, Schafer (1977) specified several ways to classify sounds. He classified these sounds according to their physical characteristics (acoustics), how they are perceived (psychoacoustics), their function and meaning (semiotics and semantics), and their emotional or affective qualities (aesthetics) (Schafer 1977; Yelmi, 2016). Besides this classification, to recognize a location based on auditory experiences, Schafer (1977) defined sounds as (1) keynote sounds, (2) signals/foreground sounds, and (3) soundmarks.

-*Keynote sounds;* Keynotes are in analogy to music, where a keynote identifies the fundamental tonality of a composition around which the music modulates. It is the common and dominant sound, which means the main note in music, which is usually in the background in the perception of the person in soundscape studies and is associated with all other sounds (*i.e., the sound of water for a settlement by the sea, sound of wind, sound of traffic in a modern and crowded city*).

-*Signals:* It is also termed foreground sounds. These are sounds which often consciously listened to, contain information or messages, and are intended to attract attention (i.e., siren or ambulance sound, call to prayer *(azan sound).*

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- *Soundmarks:* It denotes local and unique, iconic sound sources. Sounds that are particularly regarded by a community and its visitors are called 'soundmarks', in analogy to landmarks *(i.e., the sound of the nostalgic tram on Istiklal Street or the sounds of seagulls can be considered a unique sound for Istanbul)* (Schafer, 1977; Yang and Kang, 2005; Yelmi, 2016; Bahalı and Tamer Bayazıt, 2017).

Further pioneering research was carried out by Michael Southworth in 1969. In this research, he assessed audiovisual interactions in an urban context by exploring the reactions of different population groups to the soundscape. The population groups were asked to describe spontaneously their impressions of various urban places through which they traveled during a real walk around Boston. The study evaluated the identity of the sounds and analyzed their pleasantness. The results supported the prediction that the visual experience of cities is not independent of the sound experience, but rather linked to the sounds that accompany it (Viollon et al, 2002). It was suggested that the pleasantness of a sound is much more complicated than its physical qualities. Generally, sounds of low to middle frequency and intensity were preferred, but delight increased when sounds were novel, informative, responsive to personal action, and culturally approved. It was concluded that the information contained in the sound, the context in which it is perceived, and its level are three aspects that influence people's evaluation of a city's soundscape (Southworth, 1969; Yang and Kang, 2005). Another study on this topic was studied by Carles et al. more than twenty years later in a laboratory setting. They searched for the influence of audiovisual interactions on preferences for combinations of soundscapes (*many types of sounds*) and landscapes (*many types of visual scenes*) (Viollon et al, 2002).

In addition to the physical characteristics (acoustics) of the sounds based on the above classifications, as stated before, how they are perceived and what kind of emotions they evoke are very important as can be understood from the study by Southworth (1969). Schafer (1977) classified it as psychoacoustics and sound aesthetics. For instance, a place that 'sounds good' is not necessarily quiet. It depends on the people's viewpoint. According to Hellström et. al. (2008), a functional soundscape supports the activities of the place, its visual design, buildings, and cultural and aesthetical connotations. Sound sources in urban environments may have different effects on people who perceive them in different environments. These effects depend on acoustic, environmental, or personal factors (Jeon et al, 2011). For example, human voices may have positive or negative effects on soundscape depending on the sounds and the content (van Kamp et al, 2016). Evaluating the effects of sounds on people is primarily a subjective issue rather than one merely based on objective parameters (Liu and Kang, 2016).

Music can change the appearance of sound in many ways, as it is associated with art and human emotions (Truax, 2016). While it sometimes rests on the human soul, sometimes it can turn into a very disturbing noise form. According to many field studies, it has been found that areas with lower noise levels do not always have better acoustic comfort. Therefore, sound preferences may vary from person to person, from environment to environment, depending on the location, age, education level, memories, and so on (Farina, 2013; Ouis, 2001).

It is only possible to measure how the sounds in the urban environment are perceived and what kind of emotions they evoke by defining them. To be able to make this definition, a language map was created from the descriptive words that people use when talking about sounds and auditory environments, obtained through the studies conducted in the Positive Soundscape Project (PSP) (2006-2009) (Figure 1). These words are grouped into three groups: sound sources, sound descriptors, and soundscape descriptors. Sound sources include the physical entities, and objects that make up the sound, while sound descriptors show how sounds are defined. Soundscape descriptors, on the other hand, enable the identification of all the sounds heard. According to its sources, the sound is examined in 3 groups natural, mechanical, and human voices in the related literature. In the sample field inquiries within the scope of this study, sound sources and soundscape descriptors were tried to be understood.

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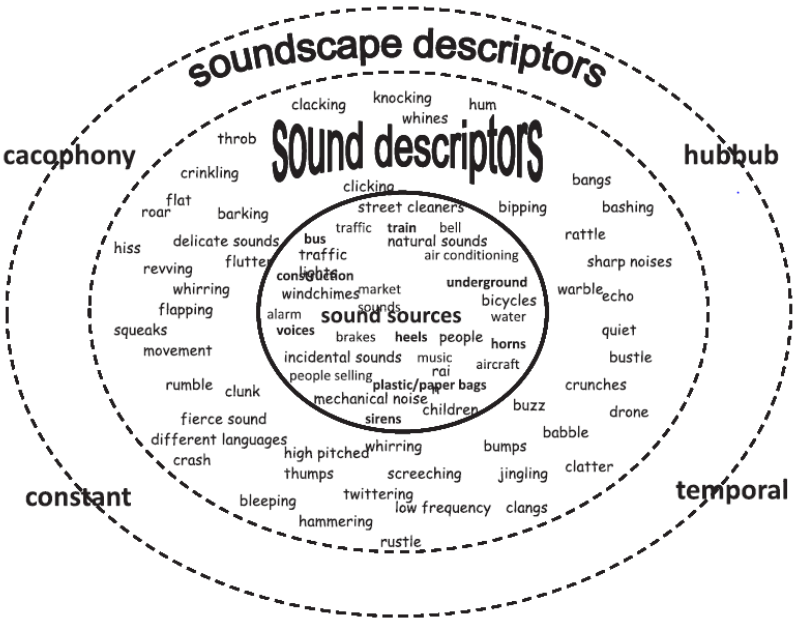

Figure 1. Language map of descriptors used to describe sounds and soundscapes (Davies et al, 2013)

Another point of view on the subject is to consider the soundscape in cities at noise and sound intensity levels (dB-decibel). However, sound intensity level (dB) alone is not an accurate and sufficient factor in soundscape assessments. At this point, Hallgren (2012) indicates that the decibel levels (dB) point to a one-dimensional understanding and handling of complex sonic realities. According to him, moving around an environment in situ involves a sense of variation through the very act of transition. It is therefore not sufficient to only use measured and calculated sound pressure levels as guidance for offensive strategies for the design of urban environments (Hallgren, 2012). Rather than evaluating it in this way, it would be a more accurate approach to rethink noise and its effects and consider the phenomenon of sound as a resource as one of the components of the spatial planning and design process (Brown and Muhar, 2004; Brown, 2004; Cain et al, 2008; Akpınar et al, 2013). As a matter of fact, in this study, sound intensity measurements (dB levels) were used as supporting data, which is necessary but not sufficient for understanding the soundscape of the sample area.

Toprak and Aktürk (2004) define noise as a very important environmental pollution that can affect people's health, disrupt the balance, cause hearing loss, and reduce the ability to work, in their study titled *'The Negative Effects of Noise on Human Health'*. In addition, its negative effects on human health are as important as air pollution and water pollution. It also has effects on the psychological, neurovegetative, and cardiovascular systems. According to international standards, the noise level threshold that damages the hearing system is 100-10,000 Mhz and 85 dB. In the table below, the sound sources, the noise levels created by these sources, and the emotional states that these levels create in people are given (Table 1).

Sounds originating from transportation or industrial facilities generally have a negative effect on human health (Berglund et al., 1999). Traffic is the most common source of noise in today's cities and is one of the most widely known environmental pollutants. They also cause high costs in terms of the economy and public health (Brown, 2015). And sounds from construction and other technological sources have negative effects on health (Berglund and Lindvall, 1995).

Medvedev et al. (2015) revealed that natural sounds are more pleasant and exciting than anthropic noise. In addition, it has been observed that the presence of natural sound has beneficial effects on sleep. It can also help to get rid of stress by lowering the heart rate (Kogan et al. 2018). In this sense,

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De Coensel et al. (2011) emphasized that the sound of a fountain can reduce the perceived sound level in traffic noise. Thus, the negative effects of urban life on health can be alleviated by parks and natural areas in cities (Booi and van den Berg, 2012; Kogan et al., 2018). Muriel (2013) states that the greatest contribution to the mental health and well-being of the population is urban green spaces. The biggest reason for this is that the noise level in these environments is much lower than in the chaotic environment of the city, where the sound level is generally high. For individuals escaping from the noise of the city, such hidden natural corners have a very important place in the design of the city. Soundscape can be used for stimulating, relaxing, and surprising elements in the city.

Table 1. Sound sources, the sound levels created by these sources, and the emotional states they create in people (Doğan and Çataltepe, 2018)

Effects on people	Sound intensity level (dB)	Sound Source
	140	Jet engine
Very harmful	130	Rivet
		Hammer
	120	Propeller
		planes
		Rock drill
	110	Chain saw
Harmful	100	Sheet metal workshop
	90	Heavy cam
Risky	80	Heavy traffic
Curtains the speech	70	Automobile
	60	Speak normally
Disturbing	50	Speak lowly
	40	Light radio music
	30	Whispering
	20	Quiet apartment in the city
	10	Rustling leaves

3. METHOD

In the discovery of the soundscapes, the most used method is 'soundwalking' which is a trip for the main purpose of listening to the environment (Westerkamp, 1974; Bora, 2013). It is a subjective empirical method first introduced by Schafer (1977), developed by Semidor (2006), and firstly used by the World Soundscape Project (WSP) team members. With this method, it has been tried to understand the sound diversity on the selected axis within the scope of the study and the effects of these sound environments on the user.

The soundscape of an environment consists of acoustic values for the people as highlighted earlier. Therefore, consulting with locals is a key research strategy by questionnaire application for drawing the outlines of their sonic environment as well as soundwalking. In other words, the methods of the study are the 'soundwalking' and the questionnaire application which examines the auditory and visual aspects of the area that accompanies this walk. In addition to these methods, sound intensity measurements (dB levels) on the selected axis were also supportive data. The sound environment also varies greatly at different times or in different spaces (Jialing and Xinbo, 2015). Therefore, dB measurements were carried out in two different periods including the morning and afternoon hours (*about 10 to 11 o'clock and 2 to 3 o'clock*) by using the 'sound meter' software at the central points where the chosen focal points and the routes could be fully felt. And the surveys were also carried out at a point where the user would dominate the focus.

Before the sound walk, the participants were informed about the survey, then they stopped at each determined focal point from Konya High-Speed Train Station to Mevlâna Tomb and answered the questions about the audio and visual conditions of the area. At the Mevlâna Tomb Square, which is the final point of the soundwalking and the surveys carried out, the participant both answered the

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questions about the last focal point he/she was in, and answered the questions prepared for the whole axis about what he/she experienced along the entire axis he/she walked. The questionnaire application, which examines the visual characteristics of the axis from the user's point of view, and the photographs taken from the area during the walk were used to reveal the visual attractiveness of the axis.

The questionnaire used during the study has two stages: the first stage consists of questions regarding the evaluation of the focal points in terms of the auditory and visual properties, and the second was for the entire axis. During the questionnaire application which was carried out with a total of 92 people using the random sampling technique, care was taken to ensure that the participants had a different demographic profile. The application of the questionnaire was carried out in 2019.

4. CASE STUDY

4.1. A Glimpse of the Sample Axis

The sample axis is one of the important axes that form the image of the city with the important landmarks, has a high historical identity value with the city's important and unique historical buildings, and has high accessibility due to its central location. It is in the center of the city between the Mevlâna Tomb and Konya High-Speed Train Station. On the selected axis there are very valuable urban identity elements such as the internationally renowned Mevlâna Tomb, which forms the most important identity value and image of the city, İplikçi Mosque, Alaeddin Mosque which are important examples of Seljuk architecture, Şerafettin Mosque, Old Industrial School which has survived from the Ottoman Period, and Atatürk House which is used as a museum, State Theater and Konya High School adding value to the city with the Republican period. As well as valuable historical structures, the axis includes important avenues and squares. In addition to these, the sample axis is of great importance for the city as it is frequently used by local and foreign tourists coming to Konya by high-speed train while going to Mevlâna Tomb. For this reason, it can be said that this axis is one of the vision points or the main backbones of the city. It is 2,8 km long and partly enters the borders of the Karatay, Selçuklu, and Meram districts (Figure 2).

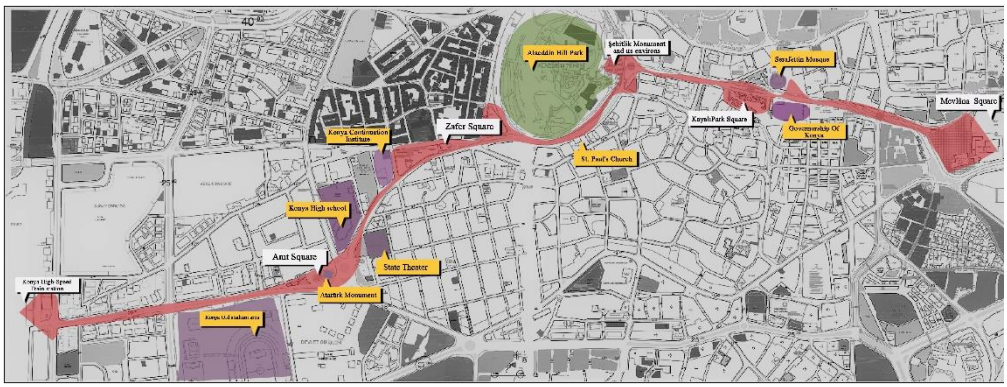

Figure 2. Location of the sample axis within the city

Since the sample axis has different characteristics within itself, the entire axis has been divided into 5 routes to facilitate the research, reflecting these differences. Each route also includes a focal point with different characteristics. When Konya High-Speed Train Station is considered the first focal point, the axis consists of a total of 5 routes and 6 focal points. These focal points and routes are as follows (Figure 3, Figure 4).

- **1st focal point:** Konya High-Speed Train Station
- **Route 1:** Konya High-Speed Train Station to Anıt Square
- **2nd focal point:** Anıt Square

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- **Route 2:** Anıt Square to Zafer Square
- **3rd focal point:** Zafer Square
- **Route 3:** Zafer Square to Şehitler Monument and its environs
- **4th focal point:** Şehitler Monument and its environs
- **Route 4:** Şehitler Monument and its environs to Kayalıpark Square
- **5th focal point:** Kayalıpark Square
- **Route 5:** Kayalıpark Square to Mevlâna Square
- **6th focal point:** Mevlâna Square

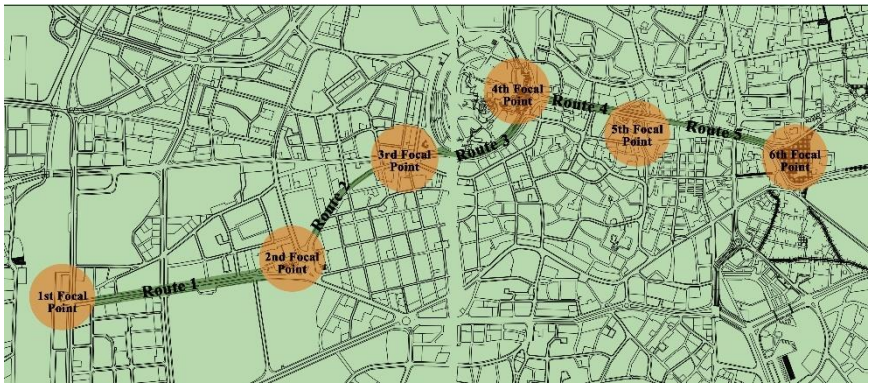

Figure 3. Determined focal points on the sample axis and the routes connecting these points

Figure 4. Visuals showing the focal points

4.2. Findings

User profiles are given in the table below according to the findings obtained from the questionnaire application accompanying the sound walk (Table 2).

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Table 2. User profiles of the research

User profile		Number of people	Percentage (%)
Gender	Female	45	48,9
	Male	47	51,1
Age	18-24	38	41,3
	25-34	44	47,8
	35-44	6	6,5
	45-54	4	4,3
Education	Illiterate	5	5,4
	Primary school	8	9,8
	High school	24	25
	University	55	59,8
Occupation	Civil servant	25	27,2
	Paid in the private sector	24	26,1
	Student	34	37
	Housewife	2	2,2
	Unemployed	7	7,6
From Konya or not?	Yes	39	42,3
	No	53	57,7
Residency time	0-5 years	29	31,5
	6-10 years	11	12
	11-15 years	1	1,1
	16-20 years	7	7
	21-25 years	3	3,3
	26-30 years	2	2,2

Afterward, the purpose of using the axis was questioned. Due to the wide variety of answers obtained, Jan Gehl's classification was taken as a basis while making the evaluations; (1) necessary activities, (2) optional activities, and (3) social activities. For Gehl (2010) while necessary activities are done for needs, optional activities indicate activities done for desires. Social activities, on the other hand, constitute the combination of both activities. According to the findings, 40.2% of the participants use this axis for both necessary and optional activities. Optional activities follow this rate with 32.6% and 27.2% use this axis only for necessary activities. The use of the axis for both necessary and optional activities can be explained by the fact that many businesses, shopping venues, and historical values of the city are located on this axis. In addition, for those living in the city, voluntarily shopping for requests or compulsory commuting increases the use of the axis. And the fact that the axis contains very different characteristics in parts enables the participants to use this axis for both necessary and optional activities.

In the next stage of the study, the questionnaire data containing the sensory evaluations of the participants towards the axis were analyzed. In the previous parts of the study, it was mentioned that a questionnaire was prepared for both the divided parts of the axis and the whole axis. For this reason, the findings were evaluated under separate headings, both for the separated parts and for the whole axis.

4.2.1. Soundscape Evaluations

- ***Evaluations for the parts of the axis***

The first inquiry into the soundscape assessment was aimed at understanding the dominant sound sources in the study area. In this questioning, sound sources are grouped as natural (*i.e., water, bird, wind sound, the rustle of leaves*), human voices (*i.e., the sounds from azan or street vendors*), and mechanical sounds (*i.e., the sound of vehicles, construction, or sirens*) as mentioned before. The findings for each focal point and the routes between the focal points are given in the figure below (Figure 5). Since no questionnaire application was conducted on the routes between the focal points, only sound intensity measurements (dB levels) were given for these areas.

As can be seen from Figure 5, the dominant sound heard in **the high-speed train station focal point** is of mechanical origin. In this focal point where the sounds of traffic and sirens are

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predominantly heard, natural sounds such as the sound of the wind, rustling leaves, bird sounds, and the like can be heard as well as the azan sound. The presence of a small park in front of the station allows natural sounds to be heard. According to sound intensity measurements, the average at the maximum value is 79 decibels (*74.6 – 83.4 decibels*) at this point.

The maximum sound intensity measured on the axis from the high-speed train station to the Anıt square, which forms the **1st route,** varies between 79.9 and 84.4 decibels. Its average at the maximum value is 82 decibels.

Mechanical sounds took first place and dominated the acoustic environment among the sounds heard by the participants in **the focus of the Anıt square**. Among the mechanical sounds, the traffic noise is quite dominant. And human voices and natural sounds followed the mechanical sounds in this focus, respectively. Differences were observed according to the sound intensity measurements at different times of the day. While the sound intensity was 69.2 decibels in the measurements carried out in the early hours, it reached the maximum value in the middle of the day and increased to 90 decibels. This high sound intensity value can be explained by its central location and the fact that many public transport routes pass through this focus. For this reason, traffic noise appears as a keynote sound in this focus. Natural sounds originating from the water element in the area could not be audibly effective due to the dominance of mechanical sounds.

It is seen that the maximum sound intensity level reaches 81.1 in the first hours of the day on the **2nd route** between Anıt Square and Zafer Square, and the level rises to 83 decibels in the middle of the day (*the average at the max. value: 82 decibels*).

As can be seen from Figure 5, in **the Zafer Square focus**, which is observed to be quite crowded at different times of the day (*morning and afternoon hours as mentioned in the method section*), sound sources are diverse and vary. The sound most heard by the participants is human voices in this focus. This is followed by mechanical sounds such as traffic, tram sounds and music sounds from shops. Natural sounds are in the last place. In this focus, while the maximum sound intensity value was 74.4 decibels in the early hours of the day, the value increased to 78.8 decibels in the afternoon *(the average at the max. value: 76.6 decibels).* Although Zafer Square is one of the most central areas in the city and the tram line passes very close to the square, the dominant sound heard by the participants is human voices. It can be said that the results of pedestrianization and the existence of the diversity of functions (shops, cafes, etc.) in the area direct the pedestrian to this area, causing them to use it more often and thus suppress the mechanical sounds. Music and water sound also recorded high scores in the Zafer Square focus compared to the previous acoustic environments.

The 3rd route (*Zafer square to Şehitler Monument and its environs*) is a very important line for the city as it includes Alaeddin Hill which is one of the most valuable landmarks of the city. It is one of the main streets connecting different parts of the city and the center line of the tram passes through this route. According to sound intensity measurements, the maximum sound intensity level of this route in the first hours of the day was 76.1 decibels, while it was recorded as 82.3 decibels in the afternoon (max. average 79.2 decibels). Both levels are high sound frequencies that reflect the noise of the existing acoustic environment.

In the focus of **the Şehitler Monument and its environs**, it is seen that the mechanical sounds created by both traffic and tram sounds reach the highest value among the sounds heard. This is followed by human voices and natural sounds, respectively. Due to the water element along the Alaeddin Hill, natural sounds are also perceived in this focus. Sound intensity measurements at this focus range from a maximum of 80 to 83 decibels.

Along the route between the Şehitler Monument and its environs to Kayalıpark **(4th route)**, there are many stores for shopping. Therefore, this route is also used as a shopping area. According to the

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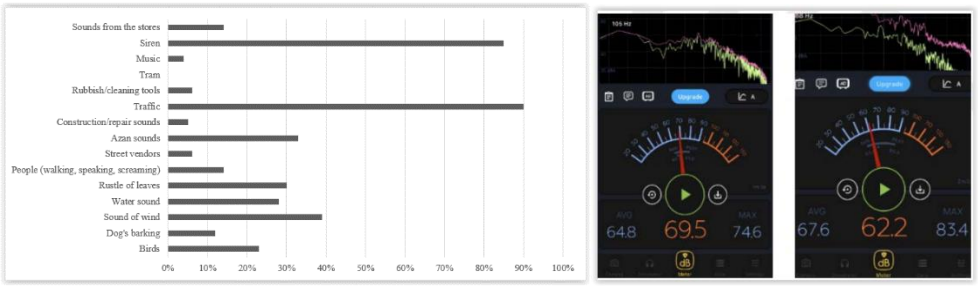
sound intensity measurements on the route, the maximum degrees vary between 81 and 82.5 decibels at different times of the day.

In **the focus of Kayalıpark,** which is also important as it is located on an important axis that constitutes the identity of Konya, all 3 sound types (mechanical, human voices, and natural sounds) that were distinguished at the beginning of the study appear as the sounds that dominate the focus. Traffic and tram noise, human voices, water, and bird sounds were the most heard sounds in this focus and were homogeneously distributed over the area. According to the results of the sound intensity measurement, while the highest value is 63.6 decibels in the first hours of the morning, it rises to 87.8 in the afternoon (*the average at the max. value: 75.7 decibels*).

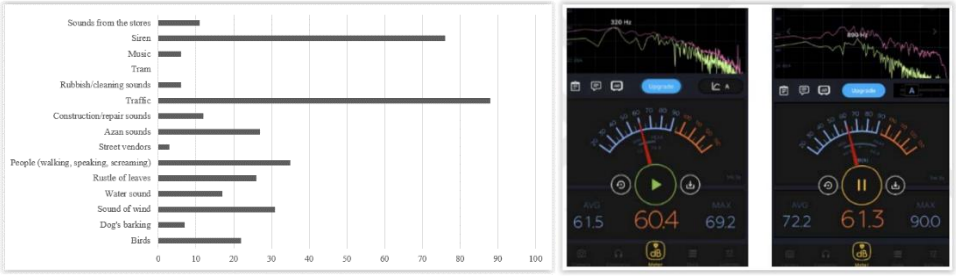
The route between Kayalıpark and Mevlana Tomb **(5th route)** has very high pedestrian traffic as it is the entrance to historical Konya Bazaar (Bedesten), it contains shopping places and hotels and is an axis leading to Mevlana Tomb. The maximum sound intensity in this acoustic environment varies between 74-75.9 decibels.

The focus of Mevlana Square, which is a very important landmark for the city of Konya in general, is an area frequently visited by local and foreign tourists who come to visit the Mevlana Tomb. According to the results of the questionnaires, the sound types with the highest values in this focus are human voices and mechanical sounds. As mechanical sounds, traffic and tram sounds are the dominant sound types. Azan sound is also at an important level among the sounds heard in this focus. According to the sound intensity measurement results, the sound intensity of the focus varies between 81.9 and 82.5 decibels.



1st focal point: Konya High-Speed Train Station

Route 1: Konya High-Speed Train Station to Anıt Square



2nd focal point: Anıt Square

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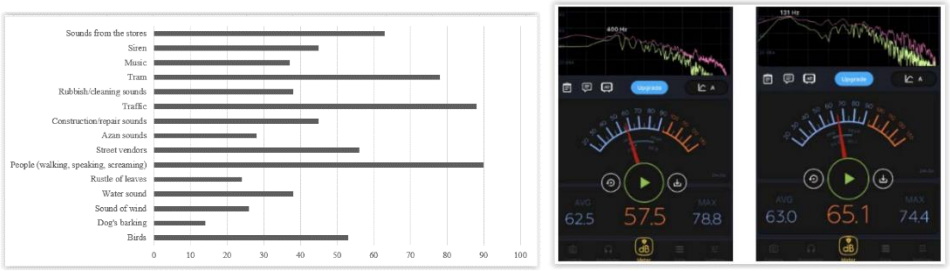
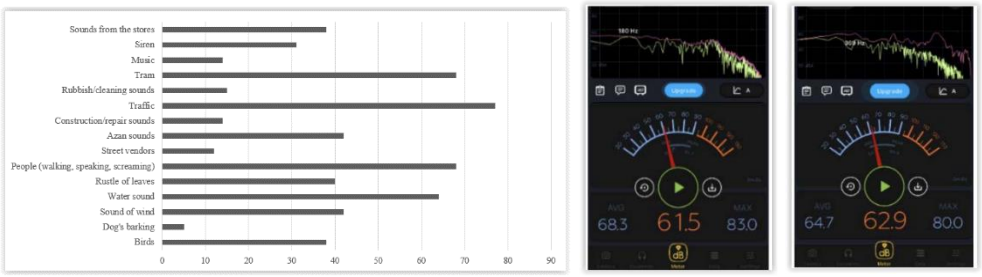
Route 2: Anıt Square to Zafer Square



3rd focal point: Zafer Square

Route 3: Zafer Square to Şehitlik Monument and its environs



4th focal point: Şehitlik Monument and its environs

Route 4: Şehitlik Monument and its environs to Kayalıpark Square

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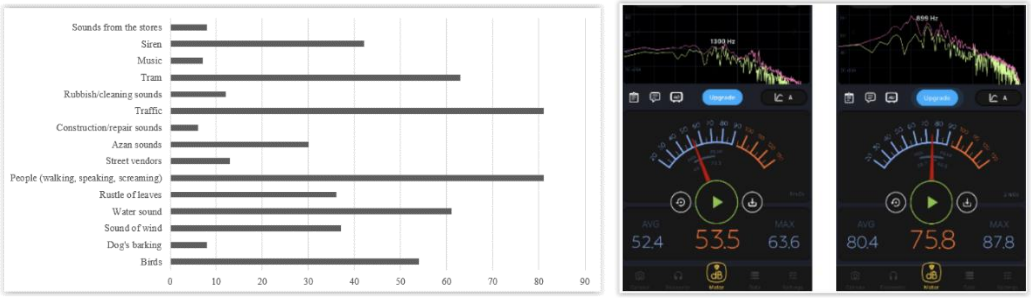
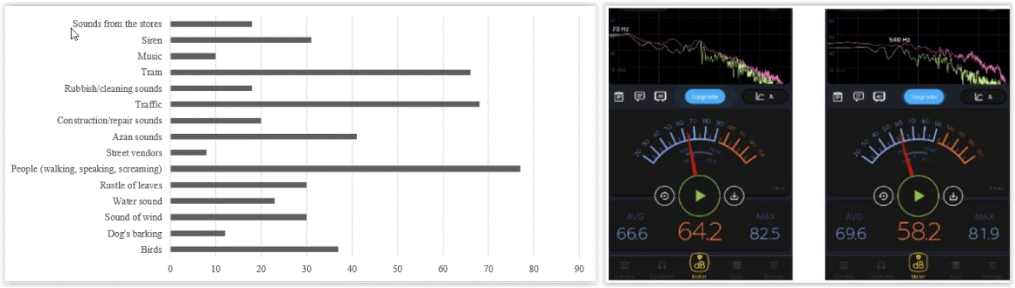


5th focal point: Kayalıpark Square

Route 5: Kayalıpark Square to Mevlâna Square



6th focal point: Mevlâna Square

Figure 5. Predominantly heard sound sources by the participants at focal points and dB levels for all parts of the axis

As a result of combining the dominant sound source data felt in each focus and route under 3 headings (*mechanical-natural sounds and human voices*), when evaluated comparatively across the entire axis, the highest values of mechanical sound sources (63%) were recorded in the focus of Zafer Square, as given in the figure below (Figure 7). This is followed by the Şehitler Monument (61%) and the Anıt Square (57%) respectively. Although human voice sources record different values in all acoustic environments, it is felt more intensely in the focus of Zafer Square (67%). This is followed by the Şehitler Monument (63%) and the Mevlana Tomb (61%). In terms of natural sounds, Şehitler Monument focus (60%) takes the first place, followed by Kayalıpark (56%) and High-Speed train station focus (53%) (Figure 7a). When sound intensity measurements are evaluated comparatively; it is seen that the Mevlana Tomb square has the highest sound intensity (*the average at the max. value: 82.2 dB*). This is followed by the 1st (*the average at the max. value: 82 dB*), 2nd parts (*the average at the max. value: 82 dB*), and the Şehitler Monument focus with a maximum value of 81.5 dB respectively (Figure 7b).

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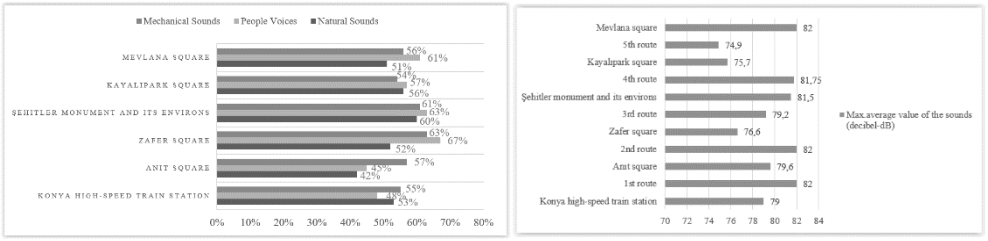

(a) (b)

Figure 7. Predominantly heard sound sources by participants at focal points (a) and sound intensity measurements for the entire route (b)

In the next stage of the questionnaire application, to understand what kind of effects the soundscape creates on emotions, the participants were asked to define the focal points with some adjectives given using a 5-point Likert scale (*such as unpleasant-pleasant, standard-original, rhythmic-non-rhythmic, annoying-relaxing, noisy-calm, mixed-uniform, monotonous-full of life, etc.*). The findings are given below (Figure 8). As can be seen from Figure 8, while the focus of Mevlana Tomb represents the calmest environment, the focus of Zafer Square represents the loudest environment for the participants. In terms of originality and relaxation, the focus of Mevlana Tomb is superior to the others. The greatest value of this focus in terms of originality is the voices of azan coming out of the mosques, which are included in the verbal expressions of the participants. While the focus of Zafer Square was the most pleasant acoustic environment, the High-Speed Train Station was the most unpleasant. However, while the High-Speed Train Station focus was defined as the most rhythmic acoustic focus, the Kayalıpark focus was the most non-rhythmic acoustic environment. While Kayalıpark is considered the liveliest acoustic environment due to its diversity in function, the lowest rate in this respect belongs to the High-Speed Train Station focus. The reason for this situation can be shown as the fact that human mobility in this focus is only during the train departure and arrival times during the day. The data obtained from this question for the focal points can be briefly summarized as follows (Figure 8).

- Konya high-speed train station focus; *disgruntled, ordinary, mismatched, unknown*
- Anıt square; *ordinary, distasteful, unknown, artificial, noisy*
- Zafer square; *noisy, intense, unknown, artificial, distasteful*
- Şehitler Monument focus; *discontented, unknown, ordinary, original, noisy*
- Kayalıpark square; *disgruntled, non-rhythmic, noisy, ordinary, confused*
- Mevlana Tomb square; *calm, discontented, original, restful, artificial*

Then, the participants were asked questions about the perceived noise and comfort evaluations. As a result of the analysis of the data obtained, the noisiest area is the focus of Zafer Square, while the quietest area is the focus of the High-Speed Train Station. While the Mevlana Tomb square was evaluated by the participants as the most comfortable area in terms of soundscape, the Zafer Square was determined as the area with the lowest comfort among acoustic environments (Figure 9, Figure 10). At this point, it is possible to conclude that the areas where the noise ratio is felt intensely have a low level of comfort for the users. In other words, there is an inversely proportional relationship between comfort and noise factors (Figure 11).

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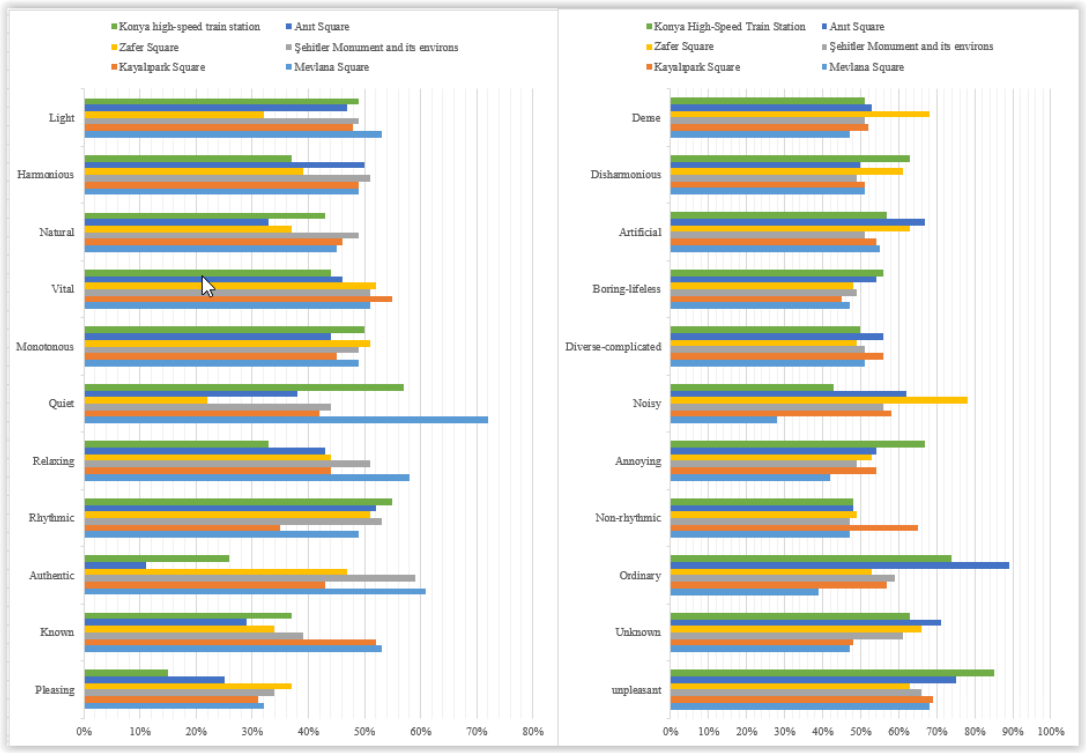

Figure 8. Adjectives describing sound environments in terms of participants

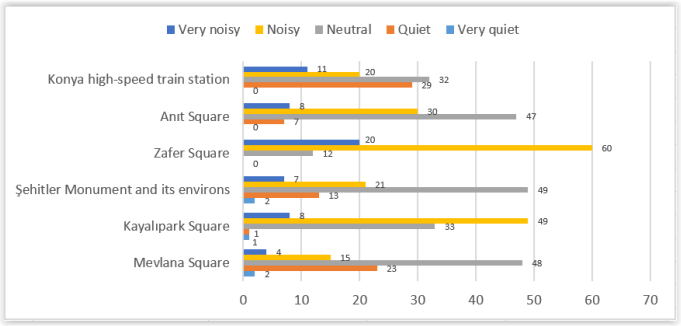

Figure 9. Noise evaluations for the focal points by participants

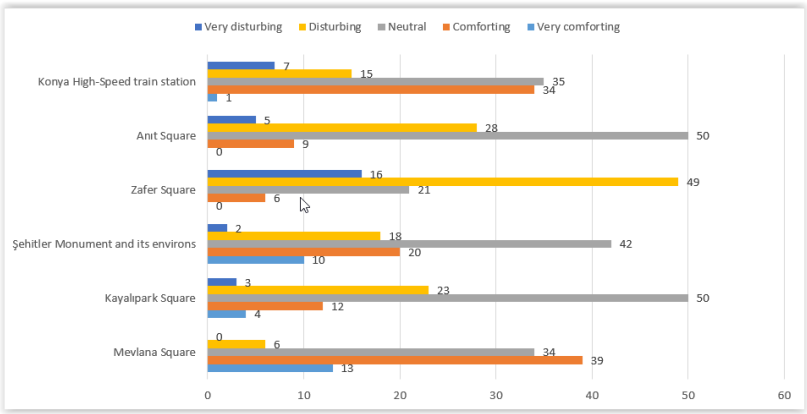

Figure 10. Comfort evaluations for the focal points by participants

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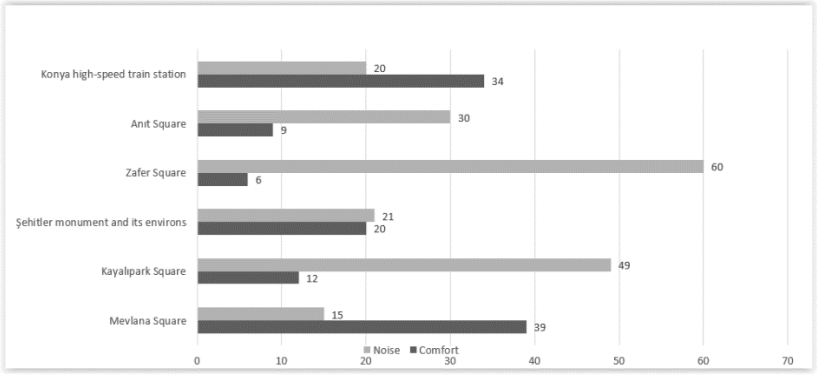

Figure 11. Comfort and noise evaluations for the focal points by participants

- ***Evaluations for the entire axis***

In the process following the evaluation of the parts one by one, after the sound walk ended, the participants were asked to evaluate the whole axis in terms of the soundscape. The general sound environment of the entire axis, evaluated according to the 5-point Likert scale, is '*neither good nor bad*' (35.8%) according to the findings. While 23.9% of the participants evaluated the general sound environment as bad, 22.8% evaluated it as good. To make a comparative evaluation of all focal points, in the next step, the participants were asked which of the different sound environments they experienced was better. According to the findings, Mevlana Tomb Square has the best sound environment on the entire axis. This can be explained by the fact that the focus has a rather large square free from vehicular traffic. This was followed by the Şehitler Monument and its environs and the High-Speed Train Station focus (Figure 12). The presence of the green texture of Alaeddin Hill in the focus of the Şehitler Monument and its environs, and the presence of a parking area, albeit small, in the focus of the High-Speed Train Station positively affected the sound environment of the two focuses. There are green areas in some other focal points, but this cannot be felt because other sound sources are more dominant (*i.e., although there is a park in the focus of Kayalıpark, the busy bus stops right in front of it reverse this situation*).

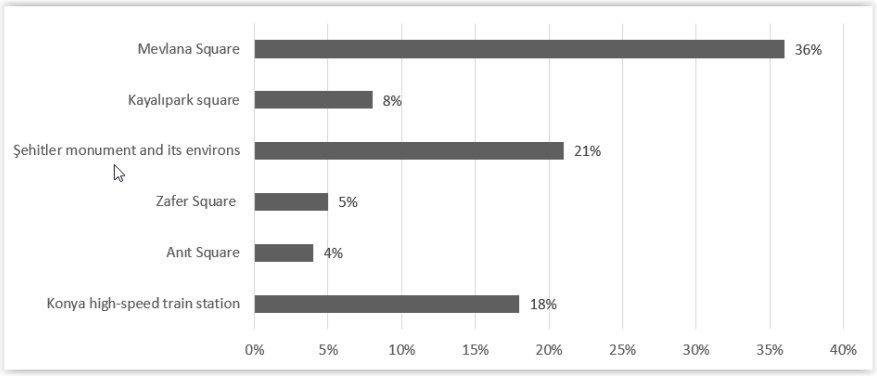

Figure 12. Comparison of sound environments of focal points

Afterward, the question '*what kind of suggestions can be made to improve the soundscape?*' was asked to the participants. 26.4% of the participants mentioned the necessity of facilitating and encouraging the use of bicycles to reduce the noise caused by vehicles. 20.6% of the participants mentioned that the number of trees and water elements should be increased especially in the focal points. In this way, they stated that by increasing the natural sound level of this axis, which is in the heart of the city and cannot be completely disconnected from vehicle traffic, the noise felt can be reduced and it will be more livable. Apart from this, 7.6% of the participants recommended the use of relaxing and original music sources in some parts of the axis, and they underlined the necessity of controlling the loud music sounds reflected on the streets, especially from cafes and shops.

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4.2.2. Visual Evaluations

- ***Evaluations for the parts of the axis***

After soundscape evaluations, the questions asked for the part and the whole of the sample axis had been a guide to understanding its relevance to visual appeals. In light of the data obtained, the findings regarding the visual appeal of selected focal points and the entire axis are given in the table below (Table 2). Visual evaluations include both focal points and routes between them. However, the liked and disliked features were asked only at the focal points in order not to prolong the interview time.

Table 2. Urban elements with high visual values in focal points and the routes between them and liked/disliked features of focal points

Focal points and the routes between them	Urban elements with visual aesthetic value (number of people)	Liked features (number of people)	Disliked features (number of people)
1st focal point Konya High-Speed Train Station	-Konya Train Station Building (24) -The fountain and the plane trees (19) -TCDD Guesthouse (17) -City Design Workshop Building (11) -German Houses around the Station (6) - Not visually impressed (15)	- No features that I like (38) - General layout of the station area (15) -Small Park with a water element in front of the situation (14) - Historical buildings around (10) -Having a colorful place (10) -Maintenance (5)	-Being a lifeless place (21) - Traffic density (21) -Away from public transport stops, access to other parts of the city is problematic (15) - Inadequate use of different functional areas around the station (14) -The smallness of the square and park, being weak in open-green spaces (14)
Route 1 Konya High-Speed Train Station to Anıt Square	-There are no visually affected elements (25) -The image created by the cafes (21) -Florists along the street (14) - Old stadium gate (14) - Trees extending from the station to the square (8)		
2nd focal point Anıt Square	-Atatürk Monument (34) -State Theater Building (15) - There are no visually affected elements (13) - Konya High School (12) - Amber Reis Mosque (11) - Surrounding trees (4)	-There is no feature that I like (47) -Atatürk Monument (20) - Trees (5) -Other (having a taxi stop, being livable in the early hours when there is no traffic, presence of the square, etc.) (20)	- Not using the square as a 'square' (30) - Does not have an aesthetic value, its ordinariness (17) -Not having enough open-green space to sit and rest-weak relationship with nature (11) -Not well-maintained (15) -The traffic density of the square and its vehicle-oriented feature (13)
Route 2 Anıt Square to Zafer Square	-Konya Olgunlaşma Institute (28) -Atatürk Museum (15) -Konya High School (13) -Kafem Cafe and its environs (12) -Cafes on the route (9)		
3rd focal point Zafer Square	-The water element in the square (17) - Kibrit apartment on the corner (13) -Konya Olgunlaşma Institute (13) -Shop fronts (12) -The green texture of Alaeddin Hill (9) - Ezel coffee shop on the corner (9)	-The clock in the square ground (26) -Restaurants and shops in the square activate the exterior of the buildings (20) -The effect of the water element and trees in the square (10) -The visual effect of the green texture of Alaeddin Hill (13) -I didn't like any of its features (10)	-Old and deteriorated buildings (45) -Maintenance of the square (18) -There is no feature that I don't like (29)
Route 3 Zafer Square to Şehitlik Monument and its environs	-Green texture of Alaedin Hill (28) -St. Paul's Church (23) - View of the cafes on Alaeddin Hill from the axis (8) - The visual effect of the tram (8) - Any urban elements affected (13)		
4th focal point Şehitlik Monument and its environs	-Alaeddin Hill (35) -The water element at the entrance of the hill (18) - Şehitler Monument (13) -Alaeddin Mosque (11) -Is Bank building (8)	-The natural environment that Alaeddin Hill added to the city (30) - Presence of water element (25) - Overview of Mevlâna Tomb, street opening (18)	- Not walkable, insufficient pedestrian areas (24) -Vehicle density (23) -Crowd (18) -It is so wide around that the user can lose his/her way-exceeds the human scale (17)
Route 4 Şehitlik Monument and its environs to Kayalıpark Square	-İplikçi Mosque (27) -Karatay Social Assistance and Solidarity Foundation Building (16) -The minaret of Şerafettin Mosque (15) - Tram line (6)		
5th focal point Kayalıpark Square	-Water element (19) -PTT old building (15) -Old Industrial School building (15) -Şerafettin Mosque (9)	- Water element (22) - Green area and sitting/resting places integrated with the green area (22) - The presence of mosques and the visual impact they add to the	- Bus stops are visually unattractive (40) -The buildings are inharmonious with each other (15) -There is no feature that I don't like (37)

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		environment, and the spiritual climate (17) -Historical buildings and their unique architectural characteristics (16) -Green area and trees (6)	
Route 5 Kayalıpark Square to Mevlâna Square	-Konya Governorship Building (19) - Traditional Konya Bazaar (Bedesten) entrance (17) -Yapı-Kredi Bank Building (12) -Şerafettin Mosque and the square in front of it (8) -Dergâh Hotel frontage (6) - Green Dome-Dome of Hadra (Kubbe-i Hadra) (3) - The minaret of Aziziye Mosque (5) -LC Waikiki Building (8)		
6th focal point Mevlâna Square	- Mevlâna Tomb (45) -The main entrance door of Sultan Selim Mosque (19) - Ablution area in the square (10) -Green Dome-Dome of Hadra (Kubbe-i Hadra) (10)	- The authenticity of the historical buildings surrounding the square from all sides, and the spiritual atmosphere they give to the place (37) - The square is organized and airy (18) -The magnificence scale of the square (13) -Sultan Selim Mosque (9) -Cleaning and well-maintenance of the area (4)	- Hard ground effect in the square, lack of green spaces (31) - Absence of an urban element that defines the square and draws attention visually (water element, landmark, etc.) (19) - Exceeding the human scale (feeling of limitlessness) (13) -Problems experienced by the pedestrian while reaching the square because of vehicle density and lack of direction (14) -There is no feature that I don't like (15)

Considering the number of attractive urban elements and unaffected people on all focal points and routes on the axis, as given in the figure below, if a general evaluation of the entire axis is made in terms of visual aesthetics, it can be said that the Kayalıpark focal point and the axis from the Kayalıpark focus to the Mevlâna Tomb (*5th route*) contain the most visually positive features among all other focuses and routes. This is followed by the 2nd route (*Anıt Square to Zafer Square*) and the Zafer Square itself. The focal point of the Konya high-speed train station, Anıt square, and the route between them (*1st route*) remained visually weak compared to the other areas. Briefly, the section from the high-speed train station to the Anıt square of the entire axis is visually weak. The visual-aesthetic value of the whole axis increases towards the Mevlâna Tomb. It is seen that the place where the participants admire the features the most is the Mevlâna Tomb Square. The number of unaffected people is not included in this focus (Figure 13). The photographs of these visually appealing values are given in the figure below (Figure 14).

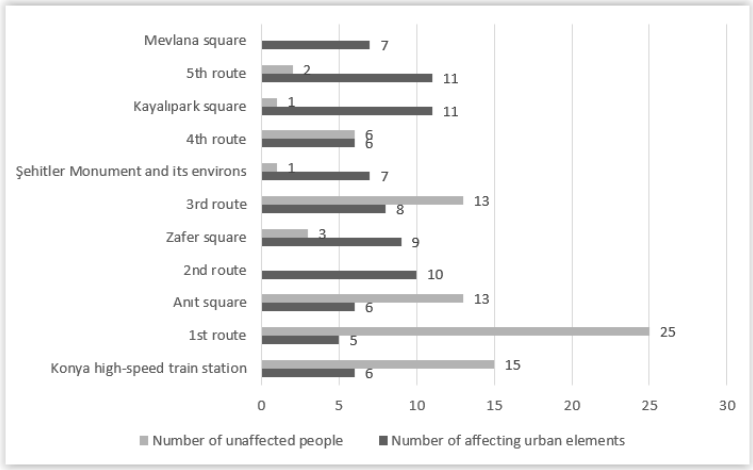

Figure 13. Ranking of focal points and routes in terms of visual-aesthetic effectiveness

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Figure 14. Photographs of visually effective urban elements on the entire axis

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- ***Evaluations for the entire axis***

After examining the parts visually, general evaluations for the whole axis are given in the following section. Primarily, the most impressive, memorable urban elements with the highest visual-aesthetic value along the entire axis were asked. Since it is an open-ended question, a total of 24 urban elements were specified for this question. Among the urban elements that the participants found most impressive, the Mevlâna Tomb took first place (19.5%). Afterward, the participants were asked which of the different visual environments they experienced was better. According to the findings, nearly 35% of the participants found the Mevlâna Tomb square more visually appealing. Zafer Square followed this result with 20.6% (Figure 15).

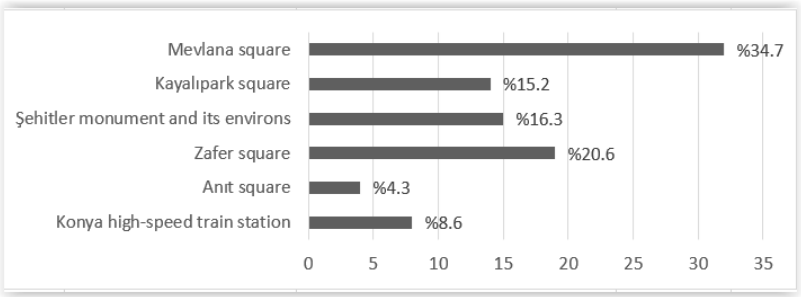

Figure 15. Comparison of visual-aesthetic environments of focal points

As in the case of the soundscape, the participants again emphasized the importance of afforestation and open-green areas for the improvement of the entire axis in the visual-aesthetic sense. 13% of the participants suggested increasing the afforestation and water elements in the squares. In addition, it was underlined that more efforts should be made in the visually unfavorable section, which includes the focal points and the route between the high-speed train station and the Anıt square, as supported by the findings obtained in the previous section. That is, the Atatürk monument and its surroundings, located in the center of Anıt Square, unfortunately, do not exhibit the quality of a square both visually and functionally. Under the pressure of traffic density, it remained on the sidelines for pedestrians and could not go beyond being just a transitional space. However, the city of Konya, it has a very valuable identity in sustaining the memory of the 'place' from the Republican period. Therefore, the necessary efforts should be taken to gain the quality of the square and to use it for voluntary activities.

5. GENERAL EVALUATION AND CONCLUSION

Considering all the findings obtained within the scope of the study, the following evaluations can be made:

- Although the focal point of the high-speed train station is the quietest and most comfortable area, the participants described this area with negative adjectives such as ordinary, dissatisfied, and incompatible. This area is also one of the weakest areas of the route in terms of visual-aesthetic appeal.
- The Anıt square is under very intense pressure in terms of mechanical sound. Participants described this focus as ordinary, distasteful, artificial, and noisy. Visual appeal is also poor compared to the other areas across the entire route.
- Zafer Square is the most dominant area in terms of human voices and mechanical sounds. It is also at the forefront of the perceived noise level and is the lowest comfort zone in terms of the soundscape. The participants evaluated this area as noisy, dense, artificial, and unpleasant. In terms of visual aesthetic values, it is the second attractive focus on the entire route.

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- In the Şehitler Monument and its surrounding focus, it has been observed that human voices, and especially mechanical voices, are predominant. The 2nd highest value in terms of sound intensity was recorded here. Participants rated this point as ordinary, disgruntled, noisy, and original. In addition to these, the 2nd best sound environment in the overall evaluation of the entire axis belongs here. The reason for this can be explained by the fact that Alaeddin Hill is located at the edge of this focal point.
- Although natural sounds are dominant in the Kayalıpark focal point, the participants described the sound in this area as dissatisfied, non-rhythmic, noisy, ordinary, and mixed. On the contrary, this focus has the highest qualities throughout the entire axis in terms of visual appeal.
- In the Mevlâna Tomb square, although human voices are the most dominant sound, the highest sound intensity values were recorded here. However, the participants still described this focus as the most comfortable area in terms of soundscape, defined it with adjectives such as calm, relaxing, and original, and stated that the best sound environment belonged to this focus. From a visual-aesthetic point of view, it was seen that it has many visual values, especially the Mevlâna Tomb, and it is defined as the most attractive focus for the participants.
- Looking at the routes in general, the sound intensity is high in all parts, and they are mechanically sourced. In addition, the visual appeal from the high-speed train station to the Anıt square (*including the square*) is poor. However, the visual appeal increases, especially on Alaeddin Avenue, as going towards the Mevlâna Tomb. On the contrary, soundscape evaluations tend toward negative features (Figure 16).
- It can be said that the noise level along the axis is quite high, and people are constantly exposed to this level of noise. This may lead to psychological and health problems in the long term. To prevent this, the presence of open green areas, trees, and water elements on the route will increase the quality of the axis both visually and audibly. Such areas will contribute to the creation of calm, peaceful, and quality environments by reducing noise. At the same time, the articulation of the spaces that produce activities in some areas will be able to transform such areas into pleasant places where voluntary activities are carried out, instead of being a transition place (*such as Anıt square*).

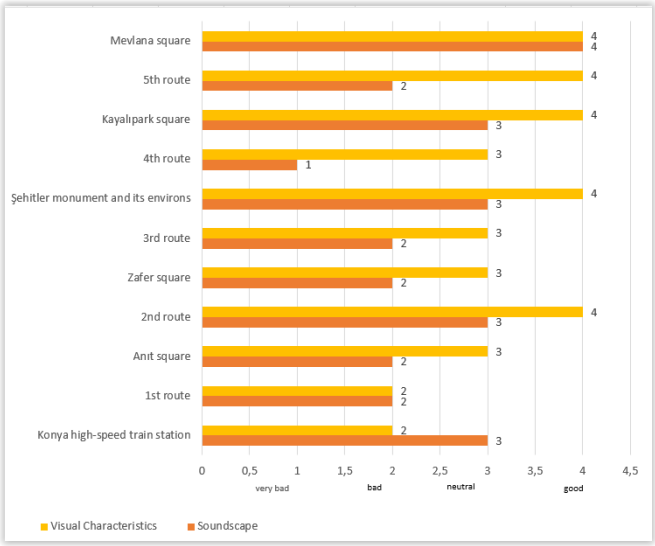

Figure 16. Comparative evaluation of focal points and routes between them according to the sensorial characteristics

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Based on all these evaluations, as a result, the research questions determined at the beginning of the study can be answered as the followings.

It was seen that the relationship between the auditory and visual environment was not directly proportional across the selected sample axis. While the sound level was disturbing in some parts that were perceived as having high visual value, the perceived visual values were weak in areas where the sound level was satisfactory. This situation can be explained by some reasons. The central location of the chosen axis, its high accessibility, the presence of buildings/spaces with high historical and identity value, and the fact that it has a wide variety of functions cause more pedestrian and vehicle traffic to concentrate in the area. This situation inevitably raises the sound intensity, even if the users are uncomfortable with the noise and the sound quality decreases. In other words, high sound intensity or noise is a sensation that people who come here must endure even if they do not want it or like it. That is, the visuality of the urban environment seems to affect sound quality assessments in this aspect in the selected case. At this point, it can be said that the importance of the context in which the auditory landscape is perceived is obvious.

Cities are serious tasks affecting many different aspects of life. To reach increased awareness and make a difference in future design processes we need to deepen our understanding of the existing urban environment and its adjoining sensory qualities. Based on the scope of this study, removing the disturbing effects of the rising sounds depending on the visual appeals, and taking precautions against these situations will lead to the production of much more sustainable, successful, and livable spaces. Increased attention to sensory qualities needs to be put on the agenda (Hallgren, 2012).

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