



# A Soundscape Research on the Route Gezi Park–Tunel Square

Sercan BAHALI<sup>1</sup>; Nurgün TAMER BAYAZIT<sup>2</sup>

<sup>1</sup> Istanbul Technical University, Turkey

<sup>2</sup> Istanbul Technical University, Turkey

## ABSTRACT

Field studies suggest that the perceived soundscape quality of urban environments is more often related to the informational properties of the soundscape than its acoustic measures. This paper describes the perceived soundscape characteristics of the approximately two kilometer long route of Gezi Park–Tunel Square in Istanbul. To study listeners' relationships with contemporary urban environments, 30 minute soundwalks were conducted on the Gezi Park-Tunel Square route. Gezi Park, Taksim Square, Galatasaray and Tunel Square were determined as key locations on the specified route. The conducted soundwalk method combines the Positive Soundscape Project (1) and Schafer's World Soundscape Project (2). For each key location questionnaires having semantic descriptors were handed out to participants to understand their personal impressions of the key location. At the end of the route, a questionnaire with general to specific questions was distributed to evaluate the soundscape of the whole route. This paper presents the soundscape characteristics of the route and discusses the effects of the four key locations on the total soundscape perception of the route.

Keywords: Soundscape, Soundwalk, Istanbul, I-INCE Classification of Subjects Number: 56.3

## 1. INTRODUCTION

The phrase soundscape is often accredited to Murray R. Schafer's work on the World Soundscape Project. He defined soundscape as the sonic environment engaged with multiple factors like history, culture, sociology and even ecology (1). Following Schafer, numerous studies have underlined the importance of soundscape perceptions when designing sustainable urban environments. 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. As defined in these studies, the term soundscape refers to all sounds in a location and their effects on people's perception (1).

As social and demographic factors play an important role, the soundscape research may change for each country, region and culture (2). When collecting useful soundscape data it is very important that a route fulfills special requirements to be used for soundwalking; for example, identifying specific types of key location (having an urban square, a busy shopping street, shopping precinct, urban green space and a pedestrianized street) and ensuring that they are close enough together to allow for a 30 minute walk. Key locations within the main route must provide opportunities to interview participants and to make a variety of recordings, if necessary (3). There are many places to perform urban soundscape studies in Istanbul which meet these requirements. When the number of people using the route, their purpose of use, the historical and cultural effects, and the sound environment are taken into consideration, the first place that comes to mind is Taksim and its surrounding areas including Gezi Park and Istiklal Avenue, Galatasaray and Tunel Square. Gezi Park is a small urban green space and Istiklal Avenue is the most vivacious, pedestrianized street in Turkey; millions of people pass through and shop in Istiklal Avenue every day. At weekends, the number of people who visit Istiklal Avenue exceeds three million.

Gezi Park stretches over a small area covered by medium dense trees and surrounded by a number of roads. During the daytime it is mostly used by transient pedestrians, thus it also provides a green escape for citizens. Taksim is one of the most important squares of Istanbul. In 2013 Taksim Square underwent a major

---

<sup>1</sup> bahali@itu.edu.tr

<sup>2</sup> nurgun@itu.edu.tr

refurbishment project to return the square into a pedestrian area by placing road traffic underground. Istiklal Avenue is a long, wide boulevard connecting Taksim and Tunel Squares. As the most important pedestrian avenue in Istanbul, it is in use by people at any time of the day or night. Istiklal Avenue not only provides a link between major points of interest in the city (Galata tower, Karakoy, etc.), it also contains Galatasaray Square, which is one of the major key points of the soundwalk route (Figure 1). These conditions make the area more attractive and significant for urban soundscape studies.

After the Gezi Park protests in May-June/2013, it has become an even more vivid park and its unity with Taksim Square has solidified. For this soundscape study, the route began at Gezi Park, passed through Taksim Square, continued along Istiklal Avenue and ended in Tunel Square, which can be described as the end of Istiklal Avenue (Figure 1). The following section describes the soundwalk procedures that were conducted in the study and discusses the results in detail.



Gezi Park



Taksim Square



Istiklal Avenue



Galatasaray Square



Tunel Square



Street Musicians at Tunel Square

Figure 1. Soundwalk route and key locations

## 2. QUESTIONNAIRE DESIGN AND SURVEY

### 2.1 Participants

It is known that social, demographic and psychological factors play an important role in soundscape evaluation. During this study, soundwalks were conducted with 40 participants consisting of 25 males and 15 females. The ages of the participants ranged between 19 and 35. Although the ages and gender were found to be generally insignificant in terms of sound field evaluations, education level was kept high based on its high correlation in relation to loudness evaluations as was proven in the Positive Soundscape Project (4). Therefore, most participants selected were students of engineering, architecture or philosophy. The soundwalks were focused on the everyday practices of people moving along the route where their senses were directed only towards sound. In the questionnaires, their visual experiences were taken into account as well. The selected participants had been living in Istanbul for at least one year and most of them knew the route well. Soundwalks were conducted several times a week, usually with a group of at least three people.

### 2.2 Questionnaire

The perception and evaluation of soundscapes were examined at three stages (pre soundwalk, during soundwalk and after soundwalk) for the route overall and for key locations. Before the method was derived, two pilot studies were performed in December 2013. The first was dependent on the method used in the Positive Soundscape Project. The participants stopped at each key location and were given questionnaires (3); but this took too long, focusing became difficult towards the end and efficiency was reduced. For the second pilot study Schafer's Method was applied. The participants walked along the route silently and at the end of the walk were given questionnaires (2). This method also proved not to be efficient for the route, since there are important transitions on it. It starts from a park, continues to a wide square and then passes through a historical street with mostly stone buildings. For these reasons a combination of the two methods was applied: The participants walked the route silently focusing on the sounds, they stopped at each key location and marked some given descriptive words according to the sound environment of the location and at the end of the soundwalks were given questionnaires that evaluated the soundscape characteristics of the whole route.

The descriptors given to the participants at each key location to evaluate the soundscape characteristics of the location were chosen from previous studies (3, 5). The words were translated and adapted to Turkish with the help of results from the pilot studies. These words were given under three headlines in order to understand how the acoustic environment is perceived in technical terms, how it is defined with reflected words and how the sound environment makes one feel. The constitution of the sounds and the harmony of the sound environment for each location can be understood from these results. The words also refer to the cacophony-hubbub and constant-temporal axes of the soundscapes, which are mentioned in the Positive Soundscape Project (3). The technical and feeling words help to establish the transitions of the soundscapes on the route and enabled us to analyze the soundscape characteristics of each key location. The descriptors define the sound environment with regards to technical properties and feelings.

Questionnaires applied before and after the soundwalks were prepared based on the questions used in previous research (2, 3). Pre-soundwalk questionnaires contained questions to explore the expectations of participants from the route. After-soundwalk questionnaires included questions about the sound environment and soundscape characteristics of the route. In this section, four tables were given to the participants – the first about the effecting rates of the sound sources and the second about the positiveness rate of these sources; the other tables are subjective evaluations of loudness and acoustic comfort evaluations for the whole route. Almost all important sound sources on the route were determined by means of the pilot studies and tables of effecting rate and positiveness rate were created according to the results. Effecting rate was given to determine how much the sound source affects the sound environment (it may be positive or negative), while positiveness was given to determine how positive were its effects. After-soundwalk questionnaires also included questions about sound sources and their effects; these tables are given after they answer these questions.



## 2.3 Methodology and Procedure

Four specific spaces within the Taksim-Tunnel route were identified as key locations: Gezi Park (A), Taksim (B), Galatasaray (C) and Tunnel Square (D) (Figure-2).

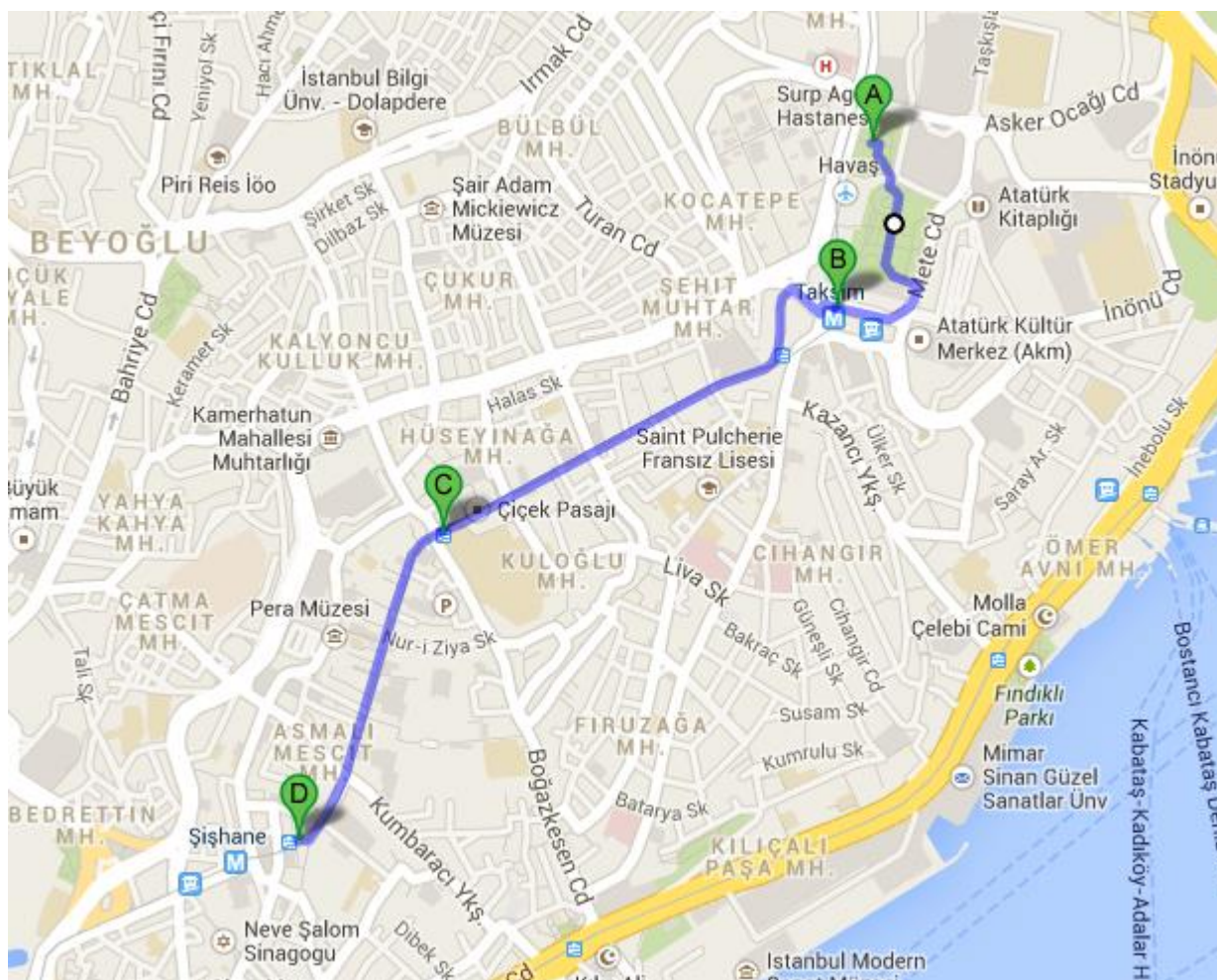


Figure 2 – Route of the soundwalk: A – Gezi Park, B – Taksim Square, C – Galatasaray, D – Tunnel Square

The procedure was separated into three stages (Figure 3). The first stage included the period before the soundwalk. After brief information was given about the study, the participants were asked to answer a short questionnaire including questions which focused on their expectations of the sound environment on the route. Then the soundwalks were started from the Gezi Park subway exit. The participants walked through the park and came to Taksim Square. After that they entered Istiklal Avenue and walked along the avenue passing through Galatasaray. The soundwalks ended in Tunnel Square. The second stage continued as long as the soundwalk and a questionnaire including five tables was given to participants for each key location. The participants were given descriptive words (three tables of technical words, mimetic words and feeling words), which described the sound environment of the location and evaluated them relating to the sound environment. Also, again for each key location, two tables were given to the participants (as subjective evaluation of loudness and acoustic comfort evaluation) in order to determine their thoughts concerning to what extent the acoustic environment was silent and comfortable. Then the soundwalks continued. The participants did not talk during the soundwalks but focused on the sounds. Before the soundwalk, participants were warned not to speak when they stopped at key locations during the soundwalk and that soundwalk conditions would continue at all times. The third stage contained the questionnaires given to participants at the end of the

soundwalk, including questions and tables evaluating the soundscape properties of the whole route; tables of effecting rate of sound sources, positiveness rate of sound source, subjective evaluation of loudness of the whole route and acoustic comfort evaluation of the whole route, respectively.

The route is approximately two kilometers long and it takes about 30 minutes to walk from Gezi Park to Tunel Square. However, since participants stopped at each key location to complete the questionnaires, the soundwalks usually took about 40 minutes.

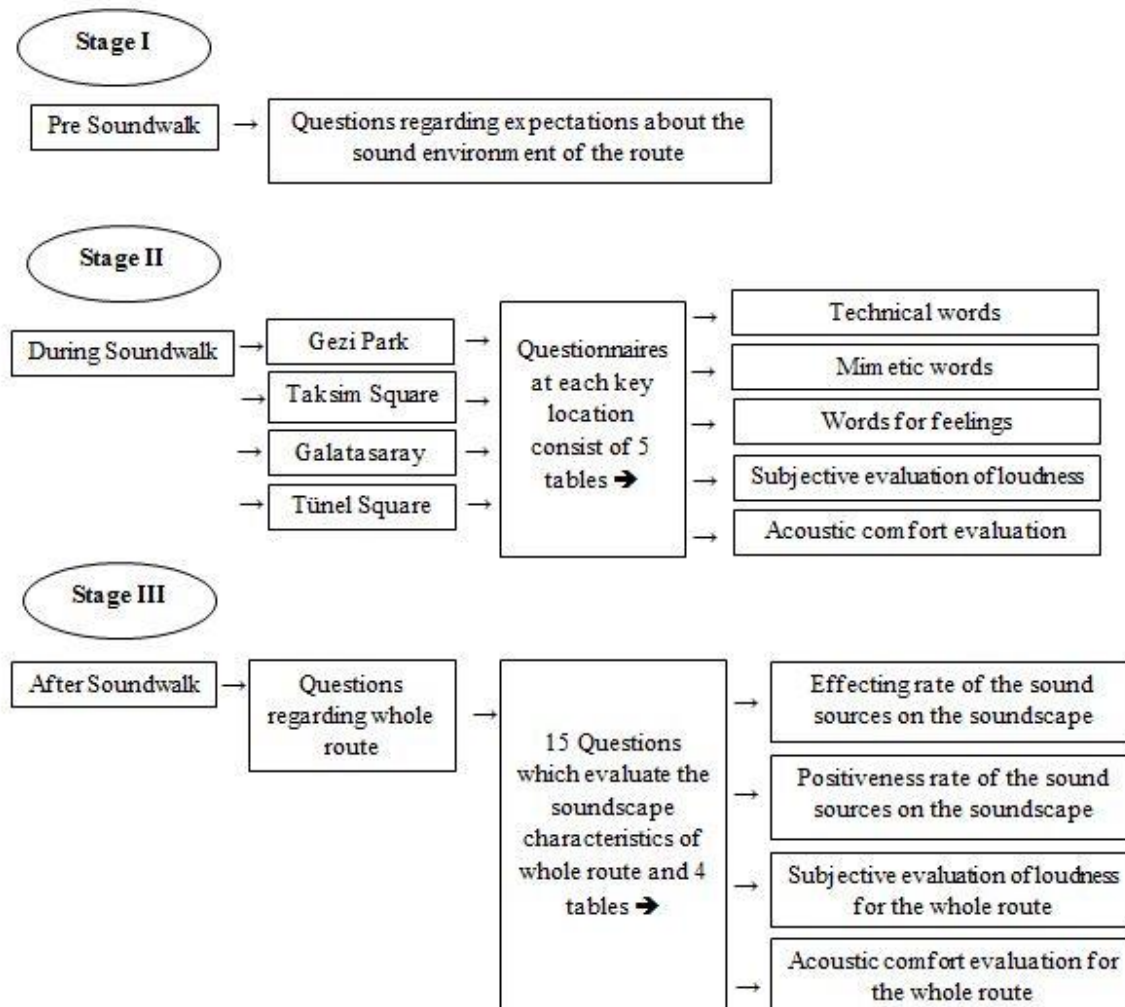


Figure 3 – Three stages of the applied method.

### 3. RESULTS

In this paper the results of technical words and feeling words; subjective evaluation of loudness and acoustic comfort evaluation for each key location; and effecting rate and positiveness rate of the sound sources along the route are presented.

#### 3.1 Technical Words

Table 1 shows the comparison of four key locations according to the technical characteristics of the acoustic environment.

The highest percentage for each word is shown in red. On this route the most *coherent*, *subdued* and *uniform* place can be seen as Gezi Park; the *dullest* and the most *diffuse* and *monotonous* one is Taksim Square; the *richest* and the most *diffuse*, *complex* and *varied* one is Galatasaray; and finally the most

*homogenous* and *rhythmic* location is Tunel.

Although they do not have the highest points for the words, considering the words for which each key location took high points, these inferences can also be made: Gezi Park is *varied*; Taksim is *complex*, *rich* and *varied*; Galatasaray is *diffuse* and *rhythmic*; Tunel is *coherent*, *complex*, *rich* and *varied*.

As can be seen from the results, despite having very different features and purposes of use, Gezi Park and Tunel become prominent as positive compared to Taksim and Galatasaray.

Table 1 – Results of the technical words

	Gezi Park	Taksim	Galatasaray	Tunel
<i>Uyumlu</i> (Coherent)	0.48	0.08	0.08	0.43
<i>Karışık</i> (Complex)	0.23	0.70	0.88	0.55
<i>Dağınık</i> (Diffuse)	0.25	0.63	0.63	0.25
<i>Canısız</i> (Dull)	0.03	0.23	0.05	0.03
<i>Homojen</i> (Homogenous)	0.20	0.13	0.10	0.35
<i>Monoton</i> (Monotonous)	0.15	0.25	0.13	0.05
<i>Ritmik</i> (Rhythmic)	0.25	0.10	0.33	0.40
<i>Yoğun</i> (Rich)	0.15	0.58	0.83	0.58
<i>Hafif</i> (Subdued)	0.53	0.10	0.00	0.25
<i>Tekdüze</i> (Uniform)	0.20	0.10	0.10	0.05
<i>Çeşitli</i> (Varied)	0.68	0.65	0.90	0.78

### 3.2 Words for Feelings

The results of these words given in Table 2 parallel the technical words.

According to this table, Gezi Park took the highest points for the words *calm*, *calming*, *comfortable*, *familiar*, *happy*, *mild*, *peaceful*, *serene* and *wonderful*.

Taksim Square was the most *boring* and *repulsive* location on the route.

Galatasaray was seen as a *chaotic*, *disturbing*, *melancholic*, *mighty*, *spooky*, *threatening* and *tiring* place compared to the other locations.

Tunel Square had the highest points for the words *impressive*, *lively*, *pleasant* and *safe* according to Table 2.

Parallel to Table 1, words for feelings also represent Gezi Park and Tunel Square as more positive. It can be said that Gezi Park and Tunel Square are the most liked locations on the route.

On the other hand, the results can be evaluated for each location separately. In addition to the results above, these points can also be made:

- Gezi Park is *lively*
- Taksim is *chaotic*, *disturbing*, *familiar* and *tiring*
- Galatasaray is *familiar* and *lively*
- Tunel is *familiar* and *mighty*.

Although Istiklal Avenue is a pedestrianized street, there are some intersections with traffic. Most of these intersections are between Taksim and Galatasaray. After Galatasaray there are few intersections until Tunel Square. This also makes Tunel more positive and comfortable (Table 2).

Table 2 – Results of the feeling words

	Gezi Park	Taksim	Galatasaray	Tunel
<i>Sıkıcı</i> (Boring)	0.00	0.35	0.18	0.10
<i>Sakin</i> (Calm)	0.73	0.03	0.03	0.25
<i>Dinlendirici</i> (Calming)	0.78	0.00	0.00	0.23
<i>Karmakarışık</i> (Chaotic)	0.03	0.55	0.78	0.43
<i>Huzurlu</i> (Comfortable)	0.58	0.03	0.03	0.20
<i>Rahatsız edici</i> (Disturbing)	0.00	0.40	0.53	0.18
<i>Tanıdık</i> (Familiar)	0.50	0.43	0.48	0.45
<i>Mutlu</i> (Happy)	0.38	0.03	0.15	0.30
<i>Etkileyici</i> (Impressive)	0.18	0.15	0.20	0.35
<i>Canlı</i> (Lively)	0.65	0.40	0.58	0.68
<i>Melankolik</i> (Melancholic)	0.05	0.10	0.15	0.15
<i>Güçlü</i> (Mighty)	0.05	0.25	0.60	0.40
<i>Hafif</i> (Mild)	0.40	0.15	0.05	0.15
<i>Uysal</i> (Peaceful)	0.28	0.05	0.05	0.18
<i>Zevkli</i> (Pleasant)	0.35	0.13	0.30	0.48
<i>İtici</i> (Repulsive)	0.00	0.23	0.18	0.10
<i>Güvenilir</i> (Safe)	0.25	0.08	0.05	0.28
<i>Durgun</i> (Serene)	0.30	0.13	0.00	0.15
<i>Ürkütücü</i> (Spooky)	0.00	0.10	0.15	0.08
<i>Tehditkar</i> (Threatening)	0.00	0.08	0.23	0.05
<i>Yorucu</i> (Tiring)	0.00	0.50	0.73	0.30
<i>Harika</i> (Wonderful)	0.25	0.00	0.08	0.18

### 3.3 Subjective evaluation of loudness and acoustic comfort

According to the results of subjective evaluation of loudness (Table 3) and acoustic comfort evaluation (Table 4):

- Gezi Park is *neither quiet nor noisy* and *comfortable*;
- Taksim is *noisy* and *uncomfortable* (this result is too close to '*neither comfortable nor uncomfortable*');;
- Galatasaray is *very noisy* (the result is very close to the '*noisy*') and *uncomfortable*;
- Tunel is *neither quiet nor noisy* and *neither comfortable nor uncomfortable*.

The results show that Galatasaray is the most noisy and uncomfortable location on the route. In comparison with results of technical and feeling words, it is as expected. Istiklal Avenue can be separated into two parts; one from Taksim Square to Galatasaray and the other from Galatasaray to Tunel Square. People mostly start from the Taksim entrance of Istiklal Avenue and walk towards Galatasaray and Tunel. The people density usually decreases visibly after Galatasaray. On the first part (Taksim-Galatasaray) the number of traffic intersections is higher than on the other (Galatasaray-Tunel). Even in Galatasaray Square there is a busy traffic intersection and it causes serious levels of noise. Along the whole avenue there are mostly stone buildings which cause higher reverberations (in comparison with Gezi Park and Taksim Square). Tunel has the most street artists, which is mostly perceived as positive. When all of these points are taken into consideration the results become more meaningful.

Table 3 – The results of subjective evaluation of loudness for each location

	Gezi Park	Taksim	Galatasaray	Tunel
Very quiet	0.00	0.00	0.00	0.00
Quiet	0.13	0.05	0.00	0.08
Neither quiet nor noisy	0.83	0.23	0.10	0.48
Noisy	0.05	0.63	0.43	0.38
Very noisy	0.00	0.10	0.48	0.08

Table 4 – The results of acoustic comfort evaluation for each location

	Gezi Park	Taksim	Galatasaray	Tunel
Very comfortable	0.05	0.00	0.00	0.05
Comfortable	0.68	0.08	0.00	0.15
Neither comfortable nor uncomfortable	0.28	0.43	0.38	0.53
Uncomfortable	0.00	0.45	0.48	0.25
Very uncomfortable	0.00	0.05	0.15	0.03

### 3.4 Effecting Rate and Positiveness Rate

Effecting rate shows how the sound sources affect the soundscape characteristics of the whole route (the effects of these sources can be either positive or negative); positiveness rate shows how positive their effects are. The participants gave points to the sound sources from 1 to 5. The graphics show the average ratings for each sound source.

For effecting rate: 1; ineffective, 2; little effective, 3; moderate effective, 4; effective, 5; very effective

For positiveness rate: 1; the most negative, 2; negative, 3; neutral, 4; positive, 5; the most positive

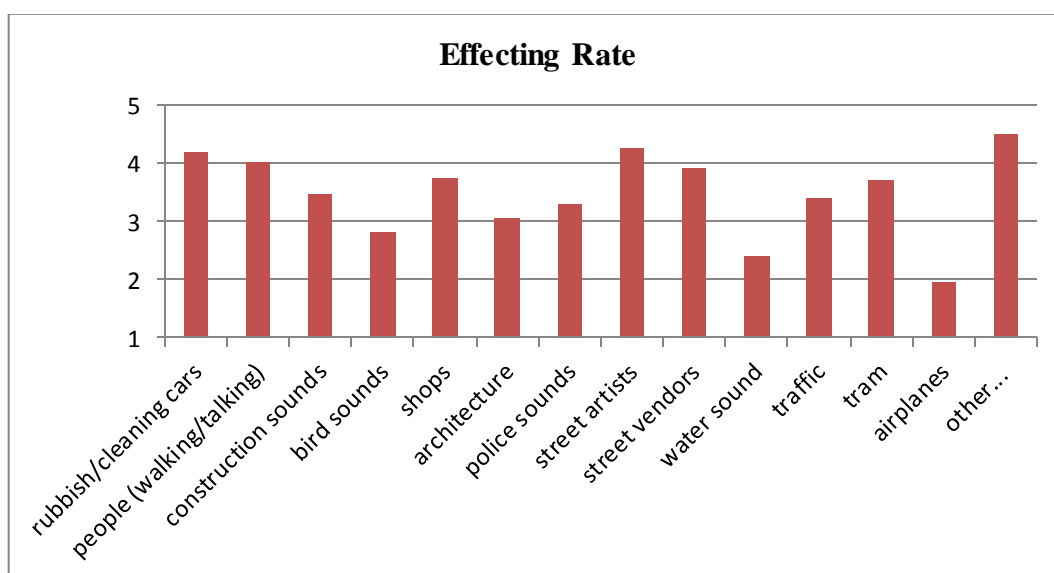


Figure 4 – The average effecting rates of the sound sources



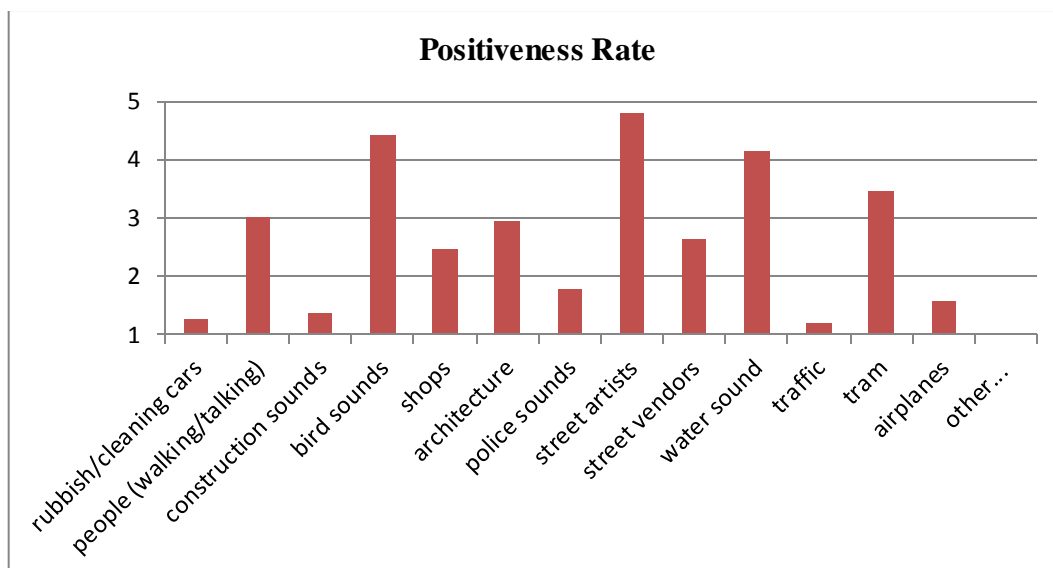


Figure 5 – The average positiveness rates of the sound sources

The soundscape of the route is mostly affected by rubbish/cleaning cars, people who are walking/talking, street artists and street vendors (Figure 4). The most positive sounds are from birds, street artists and water (Figure 5). Street artists usually perform in Tunel; this makes Tunel more positive than Taksim and Galatasaray. The most negative sounds are rubbish/cleaning cars sound, traffic sound, and construction sounds. Gezi Park is the most silent location with the bird and water sounds; for that it is also the most positive location with Tunel Square.

‘Tram’, which is a significant symbol of Istiklal Avenue, was expected to be a more effective and positive sound source, however it had average points for these two topics.

#### 4. CONCLUSIONS

In this paper the results of the study are presented. The soundscape characteristics of the route Gezi Park–Tunel Square have been revealed to a certain extent. As expected, there are multi soundscapes along the route. Gezi Park has a totally different soundscape from the other locations. The architectural characteristics and purpose of use are important factors for this result. Taksim Square and Galatasaray (with the first part of Istiklal Avenue) have similar features, which are usually perceived as negative. Besides, Tunel Square (along the second part of the avenue) has a more positive soundscape perceptively. Although the architectural characteristic is similar along the avenue, in the second part with Tunel Square, the people density and the traffic transitions on the avenue decrease, and the number of street artists increases, which makes this part more positive and comfortable.

In the next steps of the study, relationships between the tables, results and the other collected data will be associated. Soundwalks will continue to be done and the number of participants will be increased. The soundscape characteristics on the route of Gezi Park–Tunel Square will then be revealed to a broader extent.

#### REFERENCES

1. Davies WJ, et al. The positive soundscape project: a synthesis of results from many disciplines, Inter – Noise 2009, Ottawa, Canada 2009
2. Schafer RM. Our Sonic Environment and the Soundscape the Tuning of the World, Destiny Books, Rochester, Vermont, USA 1994
3. Davies WJ, et al. Perception of soundscapes: an interdisciplinary approach. Applied Acoustics 74. 2012. pp: 224–231
4. Kang J. Noise Management: Soundscape Approach. Elsevier B.V. 2011 p. 174-187
5. Hedfords P. Site Soundscapes: Landscape Architecture in the Light of Sound. VDM Verlag Dr. Müller Aktiengesellschaft & Co., Saarbrücken, Germany 2008. p. 47-49.
6. Kang J. Urban Sound Environment. Taylor & Francis group. London and New York. 2007. p. 83-85.