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ARTICLE / ARAŞTIRMA

Detection and Analysis Approach of The Threshold Spaces: The Case of Sakarya/Adapazarı City Center

Eşik Mekânlarının Tespit ve Analizi Üzerine Bir Yaklaşım: Sakarya/Adapazarı Kent Merkezi Örneği

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ABSTRACT

While there are several studies on space analysis in the literature, the analysis of threshold spaces is a subject that has received insufficient attention. To address this insufficiency, the study aims to test the approach proposed for the detection and analysis of threshold spaces, using the example of Atatürk Park/ Şemsiyeli Bahçe (Umbrella Garden) in the city center of Adapazarı / Sakarya, Turkey. The three-stage study was carried out by determining potential threshold spaces in the first stage; selecting the threshold space to be analyzed among potential threshold spaces and conducting the document analysis and on-site detection of this threshold area in the second stage; and observing the selected potential threshold space using the behavioral mapping technique in the third stage. The observation criteria used in the study (observation days, periods, the number of observed places and the additional techniques used) were developed by taking reference from research in the literature. In this way, a detection and analysis model that provides a clearer workflow to the behavioral mapping method and is more specific and suitable for the analysis of threshold spaces was explained and tested with a case study. As a result of the study, by interpreting the space observed on site, it was revealed that threshold spaces can contain thresholds of many different sizes. The study proposes a roadmap for the analysis of threshold spaces or spaces in general, containing valuable data for researchers interested in observing the actions that define spaces and creating designs appropriate to these actions.

Keywords: Adapazarı/Sakarya city center; behavioral mapping techniques; on-site observation; threshold space, threshold space analysis.

ÖZ

Literatürde mekan analizi ile ilgili birçok çalışma olmasına rağmen, eşik mekanlarının analizi yeterince ilgi görmeyen bir konudur. Bu yetersizliği gidermek amacıyla çalışma, literatürdeki boşluğa yanıt olarak geliştirilen eşik mekan tespit ve analiz yaklaşımı önerisinin Adapazarı/ Sakarya kent merkezindeki Atatürk Parkı/ Şemsiyeli Bahçe örneğinde test edilmesini amaçlamaktadır. Gerçekleştirilen üç aşamalı çalışma, ilk aşamada potansiyel eşik mekanlarının belirlenmesi; ikinci aşamada analiz edilecek eşik mekanının potansiyel eşik mekanları arasından seçimi, döküman analizi ve bu eşik alanının yerinde tespiti; üçüncü aşamada ise davranışsal haritalama tekniği kullanılarak seçilen potansiyel eşik mekanının yerinde gözlemlenmesi ile gerçekleştirilmiştir. Çalışmada kullanılan gözlem kriterleri (gözlem günleri, aralıkları, gözlemlenen mekan sayısı ve kullanılan ek teknikler), literatürdeki araştırmalardan referans alınarak eşik mekanların araştırılmasını mümkün kılacak şekilde yapılan önerilerle geliştirilmiştir. Bu sayede davranışsal haritalama yöntemine daha net bir iş akışı kazandıran, eşik mekanların analizi için ise daha spesifik ve amaca uygun olarak önerilen bir tespit ve analiz modeli açıklanmış ve bir vaka çalışmasında denenmiştir. Çalışma sonucunda yerinde gözlemlenen mekanın yorumlanmasıyla eşik mekanlarının birçok farklı boyutta eşik içerebildiği ortaya çıkarılmıştır. Çalışma eşik mekanların veya genel olarak mekanların analizi için bir yol haritası önermektedir, dolayısıyla mekanları tanımlayan eylemleri gözlemlemek ve bu eylemlere uygun tasarımlar oluşturmakla ilgilenen araştırmacılar için değerli veriler içermektedir.

Anahtar sözcükler: Adapazarı/Sakarya kent merkezi; davranış haritası tekniği; yerinde gözlem; eşik mekân, eşik mekân analizi.

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1. Introduction

Approaches to defining the concept of threshold as a space have gained momentum since the 20th century, which has been defined in terms of concrete and abstract, geographical, musical, spatial and spiritual, etc. Although some regard threshold spaces as a "border" that does not occupy space (Le Corbusier, 1911 – as cited in Şevik, 2018; Hall, 1990; Bhonsle, 2010); others describe them as an "intermediate space" (Benjamin, 2002) that takes up space. In this study, the types of spaces examined by the researchers as the threshold space were evaluated and classified. It has been observed that the features of threshold spaces can be explained through four distinct types of spaces: "transition space" (Van Gennep, 1960; Turner et al., 1969; Kapstein, 1988 – as cited in Maragno & Roura, 2011, p. 2; Dee, 2001; Chun et al., 2004; Ambroziak, 2005; Preamechai, 2006 – as cited in Khelifi et al., 2015; Zimmerman, 2008; Deshmukh, 2009 – as cited in Singh, 2015; Kaza, 2010; Bhonsle, 2010; Kray et al., 2013; Boettger, 2014; Singh, 2015; Perugia & Mancini, 2020), "In-between Space" (Le Corbusier, 1911 – as cited in Şevik, 2018; Kultermann, 1993; Dee, 2001; Benjamin, 2002; Hasarlıgil, 2007; Thomassen, 2009; Turner, 2012; Boettger, 2014; Heidegger, 2017; Soderlund & Borg, 2018), "Change Space" (Öymen Gür, 1996; Asiliskender, 2002; Von-Meiss, 2013; Boettger, 2014; Lefebvre, 2015), "Liminal Space" (Thomassen, 2009; Horvath et al., 2014; Szakolczai, 2017; Soderlund & Borg, 2018; Holloway, 2020). This may be because threshold spaces exhibit the characteristics of different types of spaces. These notions can be combined under the umbrella title of threshold space, and they can be interchangeably substituted. However, as long as their relations are not established under the title of threshold spaces, these concepts remain distinct from one another and are defined differently in the sources.

Threshold spaces may vary depending on the point of viewpoint, making it difficult to propose a method for their analysis. In addition, it was established during the research that there are not as many studies on the analysis of threshold spaces as other spaces. This fact highlights the absence of a piece of the puzzle and prevents both examination of the whole and a better understanding of the two spaces it divides.

Individuals use threshold spaces as architectural spaces to regulate their own perception as well as how others perceive them (Lefebvre, 2015). Through subtle movements, they can adjust their visual, auditory, and physical impressions on others. This control over perception allows people the freedom to assume different roles. It is evident that the quality of threshold spaces plays a crucial role in shaping user behavior. Analyzing these spaces provides designers with the opportunity to establish the relationship between the space and its users, ensuring its integration into daily life. In this regard, a well-designed urban threshold space prepares users by offering glimpses of the main space, ensuring continuity between spaces, facilitating easier navigation, and establishing an effective human-space relationship.

The study aims to test the approach proposed for the detection and analysis of threshold spaces, which was developed in response to the gap in the literature, using the example of Atatürk Park / Şemsiyeli Bahçe (Umbrella Garden) in the city center of Adapazarı / Sakarya, Turkey. In accordance with this purpose, answers were sought to the following questions:

1. Can the various dimensions of a city (historical development, social use, physical characteristics, user behavior, user actions and social interaction-number of people dimensions) and its threshold spaces be read? What kind of approach can be proposed for this?
2. Can the discovery, detection and analysis of threshold spaces be provided in the case of Adapazarı / Sakarya city center through the proposed approach to the analysis and detection of threshold spaces while also determining the "being a threshold" situation through user behaviors observed in the detected threshold spaces?

The study seeking answers to these questions focuses on behavioral mapping analysis methods, which are difficult to be widely adopted due to their complexity (Tièche & Hügli, 1998), are difficult to compare between studies because they are handled in different ways by each researcher, and have low "reliability" (Battistin, 2021). It is an important study as it is a detection and analysis approach developed to be a road map for researchers, and at the same time, it is an attempt at an approach for the detection and analysis of threshold spaces, which have not been studied as much as other spaces and can vary from person to person (Lefebvre, 2015). The experiment carried out in the study provides important information about how user perception works by revealing the understanding of actions and high-level social inferences (Thurman & Lu, 2014), and allows the evaluation of daily behavioral patterns and socio-demographic profiles that can affect physical activity levels (Perchoux et al., 2014), serves a special purpose as it makes it possible to develop interpretations on "spatial behavior" in the context of threshold spaces.

The case study was conducted in the Adapazarı district of Sakarya province, which is a historical city in Turkey. The study area was selected as Atatürk Park / Şemsiyeli Bahçe (Umbrella Garden) in the city center of Adapazarı / Sakarya due to the examination of "studies on threshold spaces". In the study, the case study was sequentially reduced from the macro-scale to the micro-scale covering two city parks. During this reduction, it was evaluated how the thresholds in the province, in the district and in the city center (the mentioned thresholds at different scales are explained in detail under the title "Preliminary Research") could cause effects on the

threshold spaces of the micro-scale city parks. This approach has enabled a better understanding of threshold spaces and the elements caused by these spaces, helping to obtain comprehensive outputs with a more integrated perspective in the analysis of a space. Therefore, in the study, a threshold space analysis approach that can be listed at different scales from macro to micro-scale is tested.

The threshold space detection and analysis approach proposal explained and applied in the study is discussed in detail in the article titled "A Proposal on Detection and Analysis of Threshold Public Spaces Using On-Site Observation and Behavioral Mapping Technique"[1] (Çilli & Özbayraktar, 2024). In this study, the three-stage threshold space detection and analysis approach was tested on the selected area. With this test, the thresholds of the Atatürk Park / Umbrella Garden public space and the threshold status of the park itself were evaluated, and the approach proposal was interpreted based on this evaluation. The testing process was carried out by determining potential threshold spaces in the first stage; selecting the threshold space to be analyzed among potential threshold spaces and conducting the document analysis and on-site detection of this threshold area in the second stage; and observing the selected potential threshold space using the behavioral mapping technique in the third stage. The observation criteria used in the study were developed with suggestions made to enable the investigation of threshold spaces, taking reference from research in the literature. In this context, observation days, observation intervals and the number of places to be observed appropriate to the subject and field of study were suggested and tested in the study area. In this way, a clearer workflow was introduced to the behavioral mapping method, and a more specific and purposeful model was introduced for the analysis of threshold spaces.

As a result of testing the approach proposal in the study area, it was determined that there were significant thresholds in Atatürk Park /Şemsiyeli Bahçe (Umbrella Garden), first of them being the three significant historical thresholds uncovered during the second stage of the analysis approach. Additionally, there are other historical developments influenced by these thresholds, though their effects are minor, making it difficult to classify them as thresholds. These historical thresholds have led to social thresholds, impacting social usage patterns and changing user-profiles in the area.

Observations in the third stage, utilizing the behavior map technique adapted from the literature review, indicated variations in the type and intensity of user actions in Atatürk Park / Şemsiyeli Bahçe (Umbrella Garden). Thus, the changes in general user behavior were able to be observed, resulting in conclusions being drawn about social interactions and the number of people, providing an inference that will form the basis for the analysis of the effects of space on behavior by evaluating the thresholds such changes caused in the study area. An evaluation was made on the limitations that arose/may arise as a result of the implementation of the study, and suggestions were developed in response to these. Thus, a road map proposal on the analysis of threshold spaces was tested, and the study was carried out from a holistic perspective by evaluating the limitations that may arise for future studies.

Theoretical Background: Studies on the Analysis of Threshold Spaces and the Techniques Used

In this section, the studies on threshold space in the literature so far and the techniques frequently used in such studies were examined. When such studies were examined, it can be determined that there are differences in the workplaces, methods and techniques used:

- When studies on threshold spaces were classified in terms of workplace, it can be seen that mostly public spaces (Chun et al., 2004; Zimmerman, 2008; Eltan et al., 2016; Wu et al., 2019) and regions (Diren Akartuna, 2017; Güngen, 2018; Alakavuk, 2018; Şevik, 2018) were selected for the case study. However, in addition to these, a single building (Eisenman, 1997 – as cited in Perugia & Mancini, 2020; Danilina & Privezentseva, 2020), a virtual space (Yılmaz, 2016) and private/semi-private/public spaces (Chun et al., 2004) were also selected for analysis as a threshold space.
- When studies on threshold spaces are classified in terms of methods and techniques, it can be determined that more than one technique could be used in the same study. When viewed individually, these techniques can be grouped under the following headings:
  - Determination of threshold spaces by examining maps and historical layers on top of each other (Alkaya, 2015; Eltan et al., 2016; Diren Akartuna, 2017; Danilina & Privezentseva, 2020; Eisenman, 1997 – as cited in Perugia & Mancini, 2020; Zimmerman, 2008),
  - Document analysis method (Alkaya, 2015; Güngen, 2018),
  - Recording human behavior through observation (Chun et al., 2004; Wu et al., 2019; Danilina & Privezentseva, 2020),
  - Survey and in-depth interviews (Diren Akartuna, 2017; Şevik, 2018; Wu et al., 2019).

Among these techniques, the "observation and processing of observation data into maps" method, also known as the "be-

[1] In the article in which the detection and analysis approach was proposed (Çilli & Özbayraktar, 2024), the equivalent of the concepts of threshold and threshold space in the literature; the gap in the literature that the three-stage approach proposal fills; the qualities of other studies produced on the concept of behavior mapping and threshold space; the justifications-purposes of the detection and analysis stages produced and production processes are explained in detail. In this study, the approach proposal was tested with a case study and evaluated and interpreted in the light of the data obtained.

havioral mapping technique", is one of the techniques used extensively in threshold space studies. The technique was first used in 1960 (Barker, 1968 – as cited in National Recreation and Park Association, 1993, p. 58). To create a behavioral map, it is necessary to examine the behavior in the place over time, follow the routines of the users, observe their various activities and with whom they interact, and mark the behavioral observations on a chart or map (National Recreation and Park Association, 1993, p. 59). Two types of behavior maps are used in the literature: Place-oriented and user-oriented (National Recreation and Park Association, 1993, p. 60). For a space-oriented map, it is necessary to first sketch the space, have the observer stand or walk at a certain point, and determine in advance which behaviors can be recorded and how. In the user-oriented behavior map, the user should be defined, how he/she participates in the space should be examined, and user time should be divided into time periods.

When the studies using behavior maps in the literature are examined, significant differences in the number of days of observation, duration of observation, and additional techniques used can be discovered. According to another inference, researchers conducting behavioral observations mostly focused on the analysis of three user-profiles (children, patients and general user profile) (Fairclough et al., 2015; Bürgi et al., 2016; Sikes et al., 2021; Sigmundová et al., 2016; Morgan et al., 2005; Shoham & Shemer-Shalman, 2003; Campbell, 1979; Karadeniz et al., 2018; Mandel, 2016; Lee et al., 2015; McQuilkin, 2016; Ozbil et al., 2018; Al-Maimani et al., 2014; Ward et al., 2014; Choi, 2015; Zacharias et al., 2004; Vanderhoven et al., 2014; Cash et al., 2015; Benton et al., 2020). Observations on children, one of the user-profiles where behavioral observations are most frequently carried out on, are generally carried out for 1 week (Fairclough et al., 2015; Bürgi et al., 2016; Sigmundová et al., 2016; Morgan et al., 2005), "during the "usage hours" of the space (Shoham & Shemer-Shalman, 2003; Morgan et al., 2005; Campbell, 1979; Karadeniz et al., 2018; Mandel, 2016) and in educational spaces where users are constantly present.

It was discovered that the patient profile, another frequently observed user profile, was observed all day long, with an interval of 1 week, covering weekdays and weekends (Sikes et al., 2021; Lee et al., 2015; McQuilkin, 2016). However, studies where the general user profile was observed were mostly carried out in public places, at wider intervals between 2 weeks and 6 months, and at limited hours on certain days of the week, unlike the other two user profile observations (Ozbil et al., 2018; Al-Maimani et al., 2014; Gharib, 2019; Wang & Wu, 2020). While some studies made observations on certain weekdays and weekends in different seasons throughout the year (Ward et al., 2014; Ozbil et al., 2018), others made observations at "random" and "various" times (Choi, 2015; Zacharias et al., 2004; Vanderhoven et al., 2014; Cash et al., 2015; Benton et al., 2020; Onojeghuo et al., 2019).

The observation range used in various studies that observed the general user profile in public spaces, the profile which this study also observes, varies. Observations were made 10 minutes each (Goličnik Marušić, 2010; Ozbil et al., 2018; Istrate et al., 2020; Wang & Wu, 2020), or four 30-minutes observations in each location (Al-Maimani et al., 2014), or 15 minutes each (Guinther et al., 2014). Even though observation intervals vary, it has been determined that observations are made for 10-50 minutes in each location.

Methodology: Detection and Analysis of Threshold Spaces

Based on the theoretical studies above, a three-stage approach has been utilized for the case study. The stages of the approach are explained below.

- First stage/ Pre-determination of potential threshold spaces: During the first stage of the approach proposal based on the detection and analysis of threshold spaces, original criteria developed by three researchers (Dee, 2001; Güngen, 2018; Van Gennep, 1960) were used to define threshold spaces. According to these researchers, spaces that could be threshold spaces were determined and called "potential threshold spaces".
- Second stage/ Selection of threshold space, document analysis and on-site detection of this threshold space: In the second stage, a place was selected from among the places determined in the first stage for on-site observations using the document analysis/on-site detection and behavior map technique.

In the continuation of the second stage, three analyses were performed by taking advantage of Güngen's (2018) threshold space criteria:

1. Historical development analysis: Measuring the chronological change of the place through document analysis, scanning archive photographs of demolished and reconstructed buildings/volumes.
2. Social usage analysis: Examining the use of the space through document scanning, on-site detection through personal observations, and determining what hours of the day/week the space is used.
3. Physical characteristics analysis: Determination of physical features, social facilities and urban furniture (seating units, lighting, signage, security, garbage bin, signboard, ornamental pool, border elements, sculptures/objects) in the space through personal observation.

- Third stage/ on-site observation of selected potential threshold space using behavioral mapping technique: As a result of the research conducted in the background section, observations were made in the selected place in

the second stage, with several dimensions (user behavior, user actions and social interaction-number of people).

In line with the criteria set above, for the observation, the "Behavioral Mapping" technique (a technique utilized for on-site observation of user actions) (Section 2) was selected to be used. Some decisions for the observation stage were made to be used during behavioral mapping. These decisions were determined by taking reference from some observed studies (references are given under the title "Theoretical Background: Studies on the Analysis of Threshold Spaces and The Techniques Used"). According to the inference from the studies, behavioral observations mostly focused on analyzing the behavior of three user-profiles (children, patients and the general user profile). Observation time, interval, observation days and additional techniques used vary depending on the observed user profile. It has been determined that when the observed user profile is a general user, the observations are carried out in public places, wider intervals between 2 weeks and 6 months are generally preferred, and observations are made at limited hours on certain days of the week. Some studies carried out observation studies on certain days during the week and on weekends in different seasons throughout the year, while others carried out observation studies at "random" and "various" times. However, in most studies, observations were made on both weekdays and weekends in order to compare the results obtained.

In the proposal of the approach used in this study, which observes and analyzes the general user profile, observation criteria are proposed by taking as reference the studies that conduct research on the public space and the general user profile. However, studies on the subject in the literature are few and in the studies examined, expressions such as "random", "various", "when the place is used" are frequently used. Therefore, in the recommendation study, a clearer recommendation was developed for each observation criterion and used in the case study. Recommendations developed and implemented for on-site observation based on this information are as follows:

- Observation in two different areas of the selected place - the inside and the entrance of the place: The reason for this choice (dividing the region into sub-regions) comes from another researcher, Van Gennep (1960), who helped determine the approach proposal used in the study. According to Van Gennep, in order for a space to qualify as a threshold space, the rituals and user-profiles (states) need to undergo a transformation upon entering the space. In order to measure this change, the inside and entrance of the region were observed and compared afterward.

- Observation time: 11.30 a.m. to 1.30 p.m. (When public places are used the most). It was aimed to observe a broader range of user-profiles and actions, and observations were made in a venue for 120 minutes, between 11.30 am and 01:30 pm, and 60 minutes in each region, during noon when the sub-regions are most heavily used. These observations were made on a weekday (Thursday) due to the pandemic-related restrictions and for 8 weeks/16 hours in total for each sub-region. (Goličnik Marušić, 2010; Ozbil et al., 2018, 2018; Wang & Wu, 2020; Istrate et al., 2020).

- Observation time planning: It was decided that five users in each sub-region would be observed for 10 minutes. In addition, a time interval of 10 minutes was determined for the location-age map (Goličnik Marušić, 2010). As a result of these decisions, a location-age map was drawn for 10 minutes in each sub-region, and five users' behavior maps and observation forms were drawn within the next 50 minutes. Thus, observations were made for one hour, totaling two hours, at the inside and entrance of the sub-region. The observations made were recorded in the "observation form."

- Using the user observation paper created (by taking advantage of the work of Malkoç True & Sönmez Türel, 2017).

    - Draft observation form: Within the scope of the techniques used for behavior mapping, a specified number of users should be observed for a certain period of time in each sub-region. Their actions should be documented in the observation form, and their routes should be recorded on the behavior map. Therefore, the actions observed were initially written on paper as notes and later processed on maps using symbols.

    - Detailed observation form: After the observation, the observation form was rearranged and each behavior, activity, number of people and their age were placed back on the observation form with the developed symbols.

The approach proposal was adapted to the Atatürk Park / Şemsiyeli Bahçe (Umbrella Garden) space and is shown in Figure 1.

Implementation of Recommendation Approach

Preliminary Research: Examination of Adapazarı City Center as A Threshold Space

Prior to the implementation of the detection and analysis approach proposal, preliminary research on the study area was conducted. The preliminary research includes an investigation of the physical, socio-cultural, and historical characteristics of Sakarya province and the Adapazarı (Center) district, which was determined as the threshold place for observation.

Sakarya is described as a threshold space located on the eastern border of the Marmara Region, the most economically developed region of Turkey, and marks the transition to the region from Anatolia (Elmas, 2013 – as cited in Beksaç, 2005). For this reason, it is feasible to associate the province of Sakarya

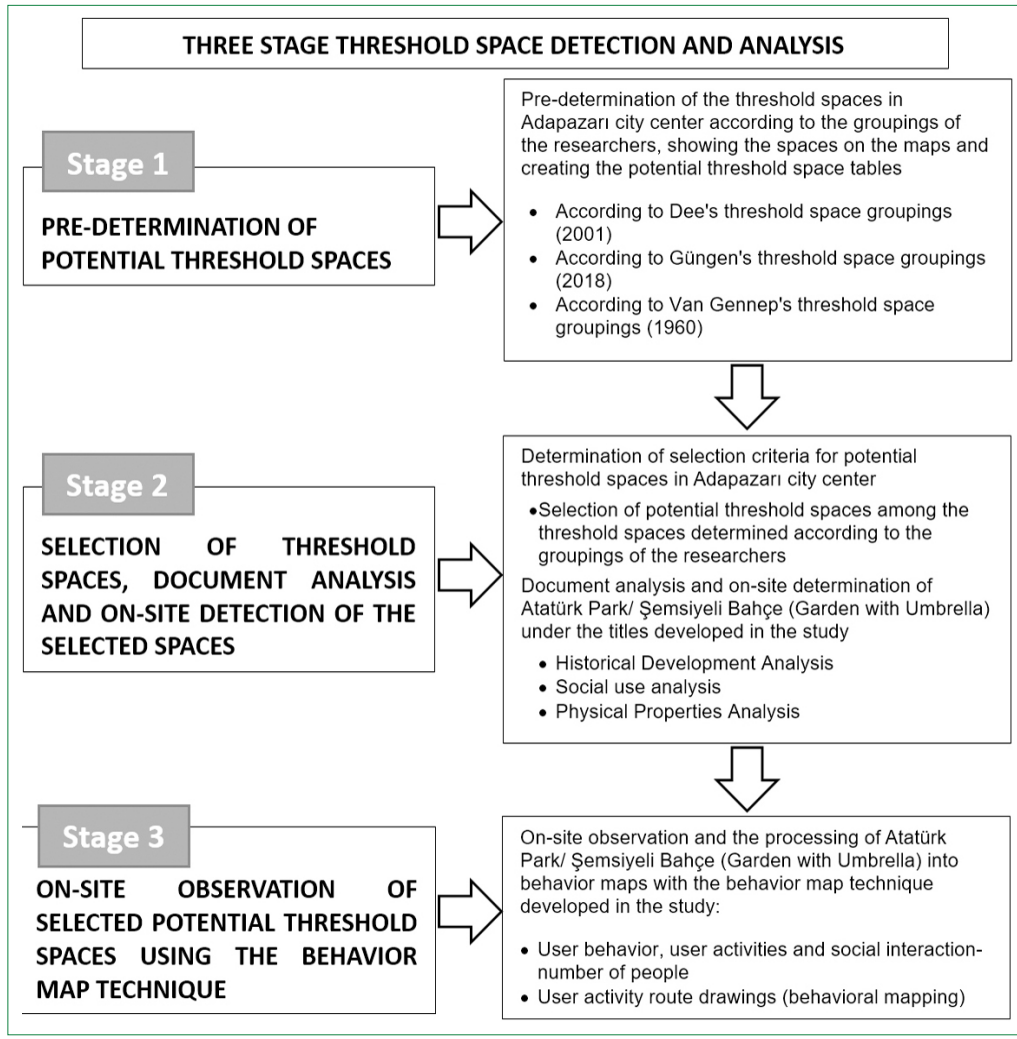


Figure 1. The workflow chart obtained as a result of adopting the approach proposal for threshold space detection and analysis to the study area.

Source: Prepared by authors.

with Istanbul province, where it serves as a transportation route, providing the continuity of the economic axis. Sakarya is a transition/threshold region not only geographically but also climatically. According to Pekcan's (1996) data, Sakarya serves as a transition space between the climates dominating the Mediterranean and the Black Sea. Being on the TEM highway, which provides railway and international traffic, makes Sakarya a unique junction point. Due to being located on the Silk Road, which connects many civilizations and provides a transit/trade route, makes Sakarya very popular in terms of its geographical location and strengthens its features as a threshold place. Sakarya is not only a provincial threshold; it also contains thresholds within itself. The most important of these thresholds is the Sakarya River, which starts in Afyon and flows through Sakarya towards Pamukova. This river divides Sakarya into two parts, forming a water threshold between them. Adapazarı is the central district of Sakarya province, whose coast borders the Black Sea and has 16 districts (Fig. 2). The reason why Adapazarı is the central district is that, in addition to being economically superior to other districts (Adapazarı Belediyesi, 2019), the settlement process in Sakarya started from this district's city center. Although Adapazarı has a relatively recent history (Narin, 2014; Sakarya Büyükşehir Belediyesi, 2015; Fındıkoğlu, 2011; Öztürk, 2005; Konukçu, 2005), it is located on the road connecting Istanbul to Anatolia and the surrounding areas. It is a place where villagers gather and set up a temporary market. This market has become permanent over time and the tradesmen who frequent it have established permanent residences and businesses here (Yavuz, 1999).

Scope of the Study: Determining the Boundaries of Adapazarı City Center

It was observed that the boundaries of Adapazarı city center, which was chosen as the study area during the research,

Figure 2. (a) Location of Sakarya province in Turkey (Dilsiz- boş- Türkiye haritaları, n.d.), **(b)** Sakarya district map (Sakarya İl Kültür ve Turizm Müdürlüğü, n.d.).

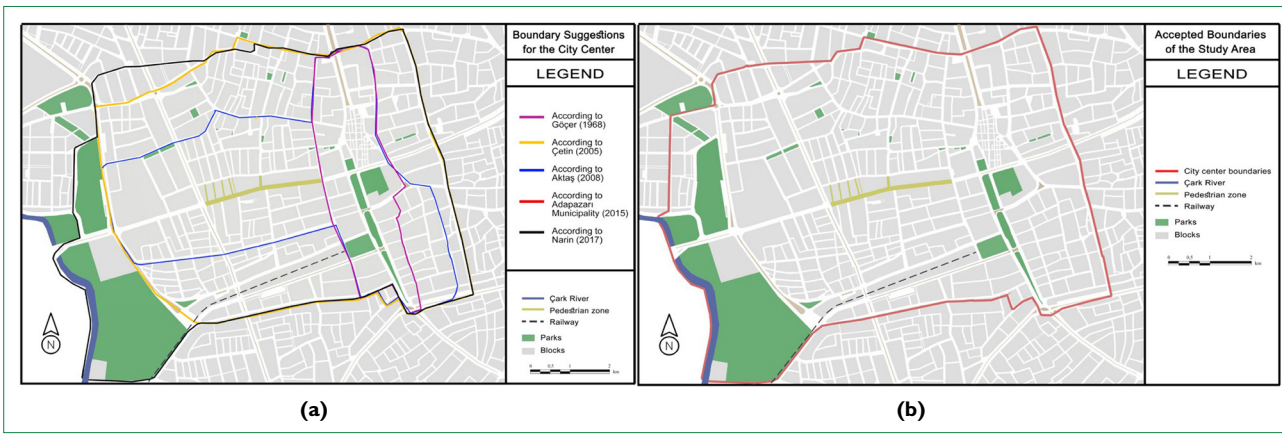


Figure 3. (a) Suggested city center boundaries of Aktaş (2008), Göçer (1968), Narin (2014), Çetin (2005), Sakarya Provincial Directorate of Culture and Tourism (n.d.), **(b)** Study area boundaries- The city center border suggested in Adapazarı Municipality (2015).

were drawn differently at various points in time (Göçer, 1968; Çetin, 2005; Aktaş, 2008, Narin, 2014; Sakarya İl Kültür ve Turizm Müdürlüğü, n.d.). Based on the research mentioned in this study and the Adapazarı Municipality promotion, publications, and maps; the suggested city center boundaries mentioned by the researchers are unearthed and shown on Figure 3a. The border suggested in the promotion, publication and maps of Sakarya Provincial Culture and Tourism Directorate has been accepted as the border of the Adapazarı/ Sakarya city center (Fig. 3b), which includes all other suggested borders (Sakarya İl Kültür ve Turizm Müdürlüğü, n.d.).

While conducting an environmental analysis on the Adapazarı/ Sakarya city center (Fig. 4), it was determined that the city center is a place with the feature of being an urban focus. It is an indispensable place for meeting, gathering, spending time and resolving official affairs for Sakarya's locals with its numerous monumental and natural assets, while also serving as a trade and historical center, hosting the last bus and minibus stops in transportation, and having many open spaces and the railway line nearby. The presence of many official and social facilities in the region also results in great diversity in the profiles of the people who use the city center.

First Stage: Pre-Determination of Potential Threshold Spaces in Adapazarı/Sakarya City Center

In this section, the spaces that fit the threshold space definitions of Dee (2001), Güngen (2018) and Van Gennep (1960) are observed in the selected study area and labeled with numbers. The examination is a preliminary determination and constitutes a basis for further detailed investigation. As a result of this stage, potential threshold spaces in the Adapazarı/ Sakarya city center that are shared by all three scholars' groupings can be identified (Fig. 5): Millet Bahçesi, Kentpark, Çark Street Pedestrian Zone, Atatürk Park / Şemsiyeli Bahçe (Umbrella Garden), Gar Meydanı/ Station Square. It has been decided that the place to be selected for the case study will be chosen among these common potential spaces in order to conduct extensive determinations and analyses.

Among these places, "Atatürk Park / Şemsiyeli Bahçe (Umbrella Garden)" was selected to be evaluated in the second and third stages. The reasons for choosing this place are as follows:

- Being one of the potential threshold spaces discovered in the first-stage of the analysis (Pre-Determination of Potential Threshold Spaces in Adapazarı),

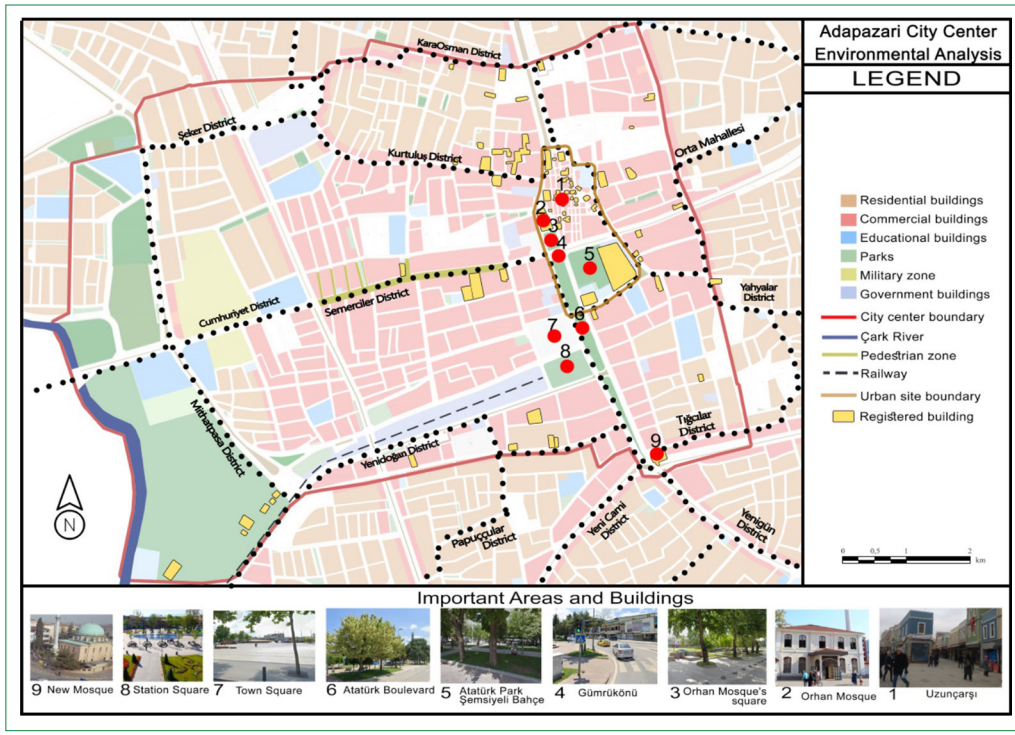


Figure 4. Adapazarı Sakarya city center environmental analysis.

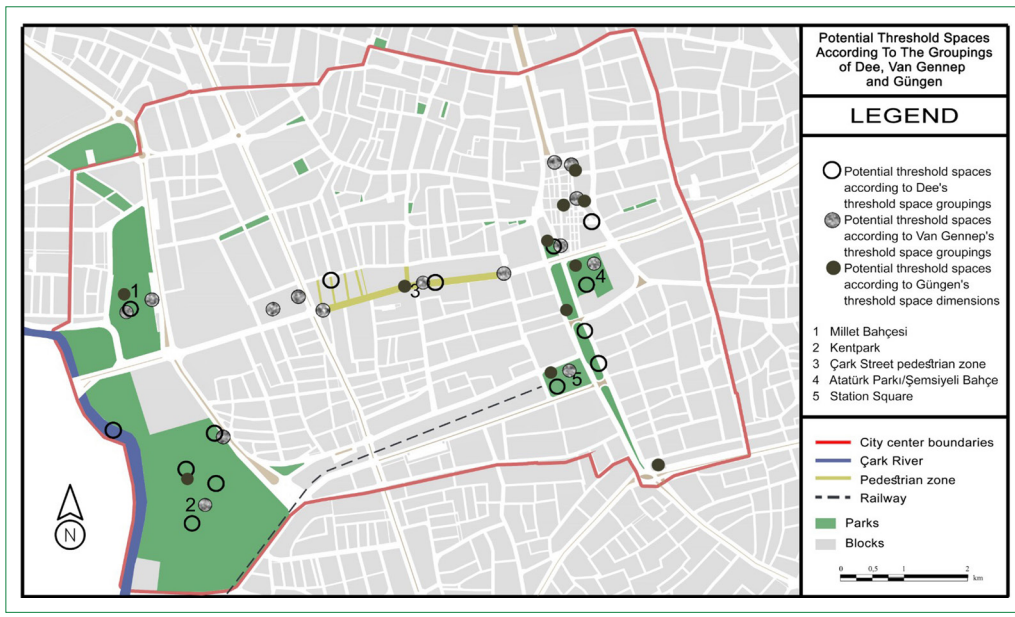


Figure 5. Common potential threshold spaces according to the threshold space groupings of Dee, Van Gennep and Güngen.

Source: Prepared by authors.

- Being a public space,
- Covering different types of activities that can be observed,
- Minimum level of control mechanisms that will restrict or change activities,
- Being accessible and observable on weekdays and weekends,
- As in the behavior map studies of Marusic (2010), Al-Maimani et al. (2016), Karadeniz et al. (2018), Wang and Wu (2020), being a space where users can be easily monitored from one point and without visual restrictions.

Therefore, these features enable Atatürk Park / Şemsiyeli Bahçe (Umbrella Garden) to be determined as a suitable

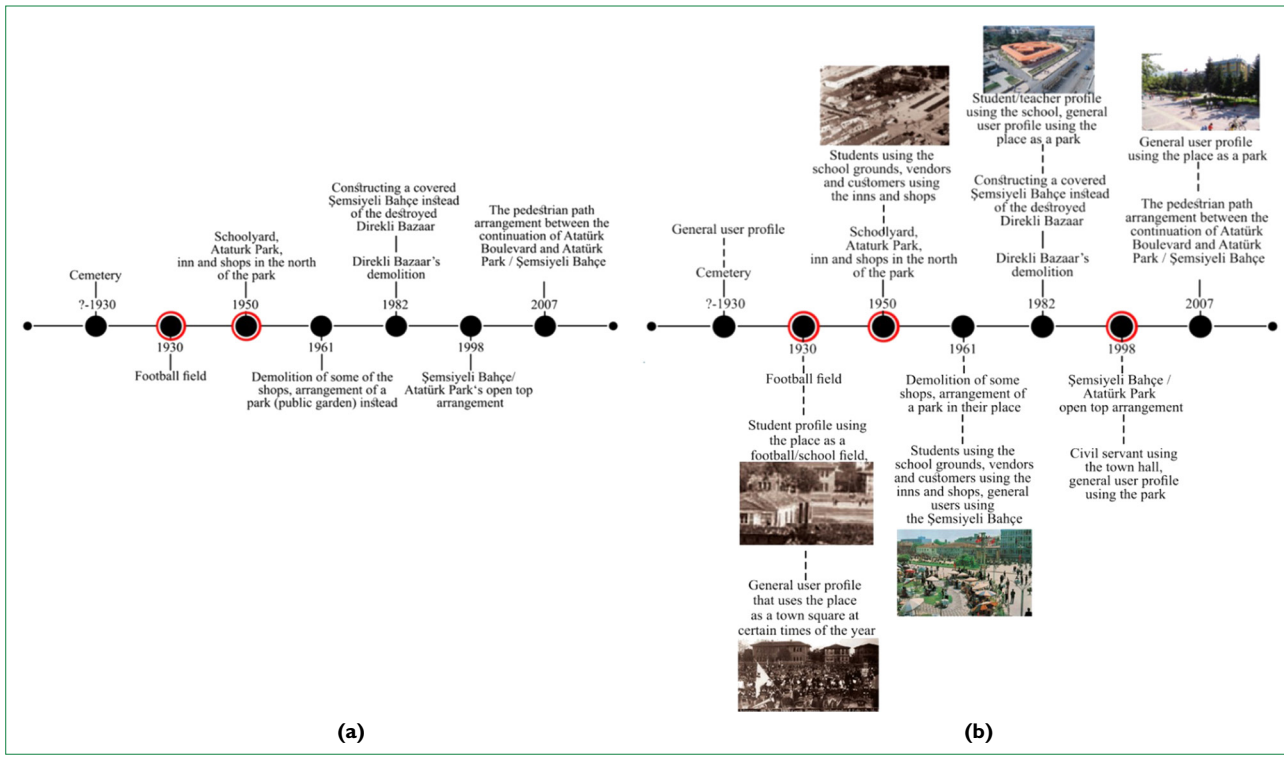


Figure 6. Diagrams created as a result of examining Atatürk Park Şemsiyeli Bahçe (Umbrella Garden) in terms of historical development analysis **(a)** and social use analysis **(b)**.

Source: Prepared by authors.

choice for the second and the third stages of the threshold detection and analysis approach.

Second Stage: Selection of Threshold Spaces, Document Analysis and On-Site Detection of

These titles were examined on Atatürk Park / Şemsiyeli Bahçe (Umbrella Garden), the location chosen according to the criteria determined in the first stage, as shown in Figure 6.

- Historical development analysis: The place, initially only called Atatürk Park, was merged with Şemsiyeli Bahçe (Umbrella Garden), which was created in 1961 following the demolition of the two-story buildings adjacent to the park in 1982 and began to be referred to by both names. As can be seen in the two diagrams in Figure 6a, Atatürk Park / Şemsiyeli Bahçe (Umbrella Garden) experienced a number of historical developments between 1930-2021.
- Social use analysis: The evolution of the user profile and function is one of the factors that contribute to the differentiation of the actions performed in the space. The area contains two important historical thresholds, while other developments have emerged as a result of these critical changes. Since 1930, the area has served as a school-square-trade place (1930), school-park (1950), and official-park (1998). From this, it is reasonable to deduce that the area contains at least three social usage thresholds. The historical and social thresholds discovered in the city center are denoted by red circles in Figure 6b.
- Physical characteristics analysis: The urban furniture in the region is insufficient in quantity and position to adequately respond to the observed user actions. The seating elements in the park, in particular, were found to be greatly deficient. Users who purchase food and beverages from the park's kiosk utilize the electrical panels beneath the trees as a table for their drinks because they cannot find a space/element to perform their eating-drinking-chat actions, and they carry out smoking actions around these panels and trees. In cases where 4 benches in the region are insufficient, users have been observed standing around these trees. Due to the pandemic, the Bal54 building is temporarily closed to service. For this reason, it has not been determined what kind of physical features this building, which is thought to provide crucial user density in the region, possesses. All of the urban furniture and buildings observed in the region are shown in Table 1.

Third Stage: On-Site Observation of Atatürk Park / Şemsiyeli Bahçe (Umbrella Garden) Using Behavioral Mapping Technique

In the third stage, observations were made in the selected Atatürk Park / Şemsiyeli Bahçe (Umbrella Garden) through the dimensions "user behavior, user actions and social interaction-

Figure 7. Showing the Atatürk Park Şemsiyeli Bahçe (Umbrella Garden) inside and entrance together.

Source: Prepared by authors.

number of people." Atatürk Park / Şemsiyeli Bahçe (Umbrella Garden) was divided into two sub-regions to allow for the measurement of the threshold status of the spaces during the on-site observation stage. While determining these regions, it was decided to use the first sub-region as the inside of the space and the second sub-region as the western entrance of the space (entrance from the direction of Atatürk Boulevard). In order to examine the study areas in conjunction with Atatürk Boulevard in terms of action, a portion of the Atatürk Boulevard pedestrian path was included in the entrance sub-areas of the venues. The entrance to Atatürk Park / Şemsiyeli Bahçe (Umbrella Garden) includes the Atatürk Boulevard pedestrian path to the west of the park, as seen in Figure 7.

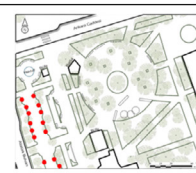
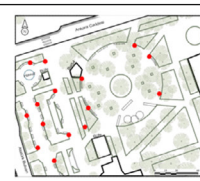
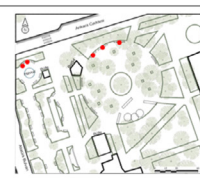
The primary criterion when observing spaces is the correct comparison of space sub-regions, namely the inside and the entrance of the space. For this reason, observations made in these two places were recorded on the same kind of maps and observation papers at the exact same time. For example, behavior maps, location-age maps and observation forms were filled in separately both at the entrance and inside of Atatürk Park / Şemsiyeli Bahçe (Umbrella Garden). At the end of a day in which the Park is examined, two behavioral maps, two location-age maps, and two observation forms are created. In order to be able to compare the inside and entrance of the sub-regions with each other, physical and social conditions should be as similar as possible. Therefore, these two sites were examined consecutively on the same day. The inside of the space was observed first, followed by the entrance.

During the on-site observation, the actions noted on the blank observation form were recorded on the observation forms, as were the age ranges and action routes shown on the map (Table 2), and a total of 16 forms were produced. As a result of the interpretation of the observation forms, the findings of the third stage were acquired. The actions observed in the region are shown on separate maps for each sub-region, and "user behavior," "user actions," and "social interaction-number of people" maps were created for each day observed for each sub-region. The graphs shown in Table 2 were constructed by comparing the maps created by overlaying the 8-day observations in a sub-region.

According to the third stage findings;

- General user behavior findings: According to the findings, there is no threshold in terms of general user behavior between Atatürk Park / Şemsiyeli Bahçe's (Umbrella Garden) inside and entrance (Table 3).
- User actions findings: When the user actions findings comparison diagram is examined, it is clear that certain actions are observed in one of the sub-regions but not in the other, such as chatting while standing, eating-drinking, standing etc. Such actions have been observed to differ significantly between the inside and the entrance of the space. For this reason, it has been decided that Atatürk Park / Şemsiyeli Bahçe (Umbrella Garden) provides a threshold in terms of user actions (Table 4).
- Social interaction-number of people findings: There was no significant difference in the social interaction-person number finding among the sub-regions (Table 5).

Table 1. Demonstration of all of the observed furniture and buildings / prefabricated structures in the example of Atatürk Park/ Şemsiyeli Bahçe (Umbrella Garden) (physical characteristics analysis)

	Physical characteristics	Location on the map		Physical characteristics	Location on the map
Urban Furniture	Circular bench. 5 in the park.		Building/prefabricated structure	Buffet located in the southwest direction. It appeals to users who use the park entrance and pedestrian path as circulation.	
	Bench for 3 people. 10 at the west entrance of the park.			Halk ekmek (Folk bread)	
	Bench with backrest for 3 people. 14 at the west entrance of the park.			Buffet located in the northwest direction. It appeals to users within the park.	
	Bin. 15 garbage bins in total, 9 at the park entrance and 6 inside.			Bal 54	
	Bicycle parking elements			AKM building	
	Ornamental pool			Metropolitan Municipality Building	

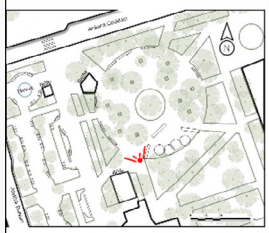
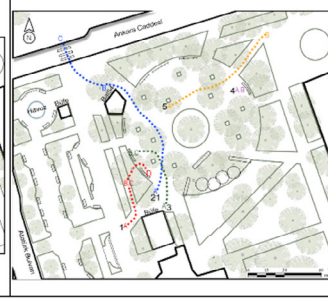
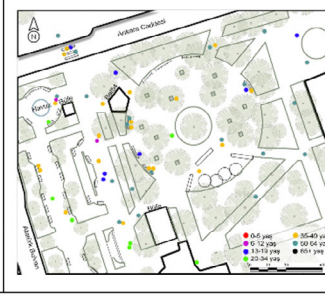
Source: Prepared by authors.

Conclusions and Recommendations

In line with the study's first objective, a three-stage approach proposal was developed in which the various dimensions of a city (historical development, social use, physical characteristics, user behavior, user actions and social interaction-number of people) and threshold spaces can be read, and the approach can be tested on sample spaces. In addition, as a result of the proposed approach, the "threshold" status of the spaces could be interpreted through user behavior.

The approach proposal for the detection and analysis of threshold spaces entails determining whether this space meets the threshold criteria from the Atatürk Park / Şemsiyeli Bahçe (Umbrella Garden) document analysis, on-site determinations, observation papers and observation maps, and interpretations of these findings. As a result of the document analysis and on-site determination made according to the dimensions (historical development, social use and physical characteristics dimensions) established during the second stage of the developed approach proposal, Atatürk Park / Şemsiyeli Bahçe (Umbrella Garden) contains three critical historical thresholds. In addition to these critical historical thresholds, historical developments influenced by them but whose effects were smaller, were also seen. However, since their effects are smaller, it is not possible to comment on whether or not they serve as a threshold.

Table 2. Atatürk Park/ Şemsiyeli Bahçe's (Umbrella Garden) inside sub-region, 26th of November 2020, observation form

Observed Sub-Region: Ataturk Park/ Şemsiyeli Bahçe Inside	**Display of activities in the observed area on the map**		**Photos of the activities of the users observed in the area**
Observer's Position	Behavior map	Age group and location map (10 minutes observation)	
			

Urban furniture		
Sitting element	**Lighting element**	**Shade**
		

	Date:	26.11.2020 - Thursday	**Period:**	11:30-12:30	**Weather:**	Sunny

	User Data			**User activity**						
	Number of people	**Age group**	**User behavior**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
1	1 person	65+	Verbal interaction	Entered the area near the buffet.	Spoke to the shoe shiner while standing.	Had his shoes painted	Sat on a bench			
2	2 people	50-64	Verbal interaction	Talking while standing	Examined Bal54 while standing	Walking together				
3	2 people	20-34	Verbal interaction	Shopped at the buffet.	Sitting on a bench	Eating				
4	4 people	35-49 50-64	Verbal interaction	Sitting on a bench and talking	2 more people joined					
5	1 person	35-49	Self-focused user	Sitting under the tree	Walking					

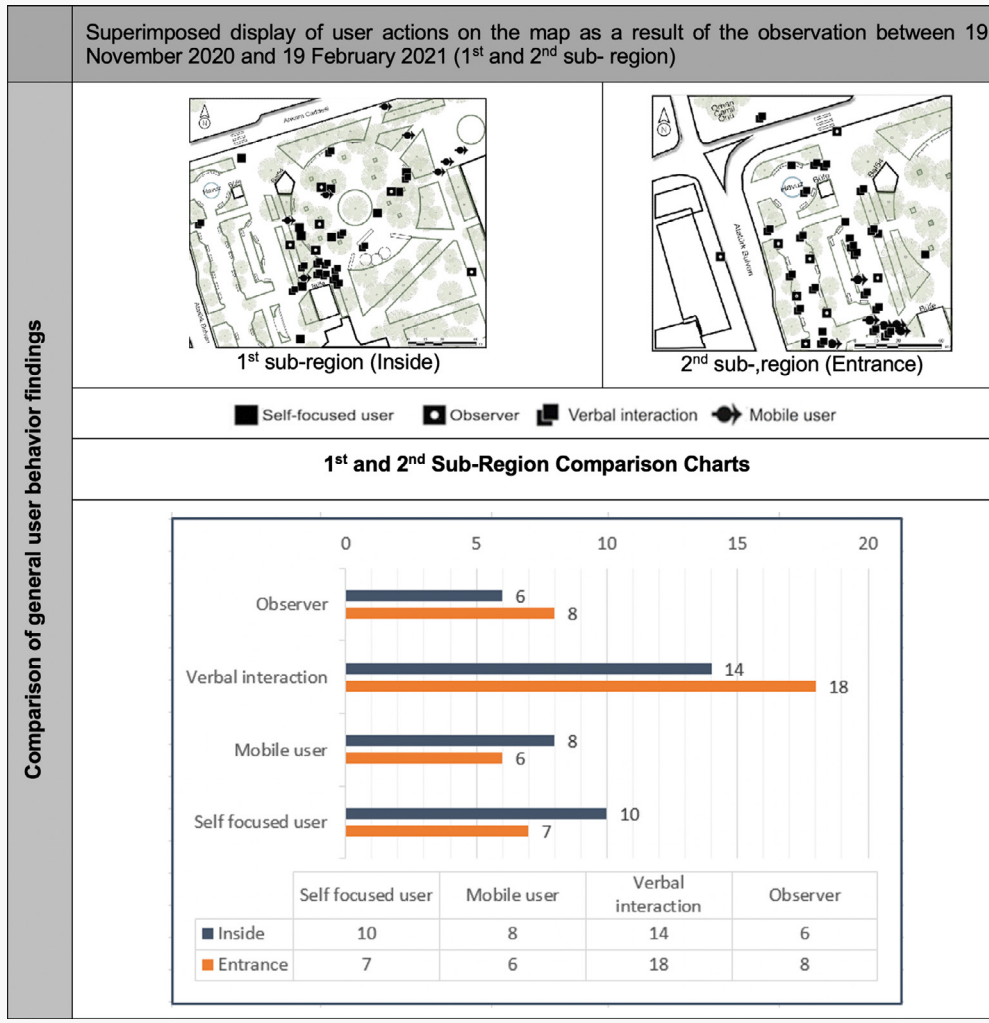
Source: Prepared by authors.

These historical thresholds have resulted in social thresholds, that is, social usage changes, according to the dimensions on the approach proposal. They provided social thresholds as they affected the change of user-profiles in the region.

As evidenced by the observations of the actions in the third stage, which includes the behavior map technique adapted and developed from the literature review, and the observations of social interaction and number of people, user actions in Atatürk Park / Şemsiyeli Bahçe (Umbrella Garden) exhibit differentiation in the type and intensity of the action. On the other hand, no variation was observed in general user behavior, and a definite result could not be obtained in the observations of the type of social interaction-the number of people. This type of observation requires a longer period of time to complete. However, due to the limitations imposed by the pandemic period (restriction of certain age groups during the observation period, removal of some urban furniture in the spaces, interruption of services of some of the social facilities, etc.) it was impossible to make a judgment about the threshold spaces of the observed spaces. Observations of the current situation were made, and the limitations encountered highlighted the necessity of making additional observations.

The conclusions reached regarding the fulfillment of the threshold space criteria of the space observed over the current situation can be viewed in Table 6.

Table 3. Comparisons of general user behaviour findings the inside and the entrance of Atatürk Park/ Şemsiyeli Bahçe (Umbrella Garden)



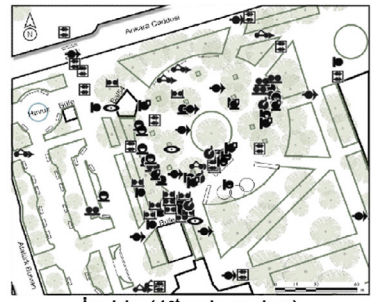
Source: Prepared by authors.

With the proposed approach utilized in this study, a clearer workflow has been provided to the behavioral mapping method with the observation criteria (observation days, intervals, number of observed places and additional techniques used) and workflow, and a more specific and purposeful model has been proposed for the analysis of threshold places. According to the outputs from the literature review, similar studies using the behavioral mapping method cannot be compared and evaluated with each other because different criteria and observation parameters are used in each study. Due to data processing with different techniques, complete data cannot be accessed (Mandel, 2016; Liao et al., 2022), the data collection and analysis phase becomes difficult (Marusic, 2011; Sommer and Sommer, 1991), and the method is insufficient to measure the spatial and cultural character of the study area (Al-Maimani et al., 2014; Guinter et al., 2014). The analysis method is also described as a complex method, which cannot easily be adopted as a publication. The approach proposal used in this study provides researchers with a three-stage approach from the beginning to the end of the analysis and detection process, providing more stable and clear outputs. Therefore, it is possible to develop interpretations in the context of threshold spaces on "spatial behavior," which allows a clear and comparable evaluation of daily behavioral patterns and socio-demographic profiles that can affect physical activity levels and provides important information about how user perception works by revealing the understanding of action and high-level social inferences. Thus, the study serves a special purpose because of such functions.

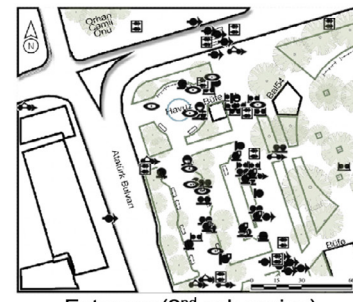
On the other hand, in the context of evaluation of threshold spaces, as can be seen in the literature studies conducted throughout the study, no approach has been put forward for the detection and analysis of threshold spaces in the literature so far. The most progress in this regard has been made by the

Table 4. Comparisons of user actions findings the inside and the entrance of Atatürk Park/ Şemsiyeli Bahçe (Umbrella Garden)

Superimposed display of user actions on the map as a result of the observation between 19 November 2020 and 19 February 2021 (1st and 2nd sub- region)



İnside (1st sub-region)

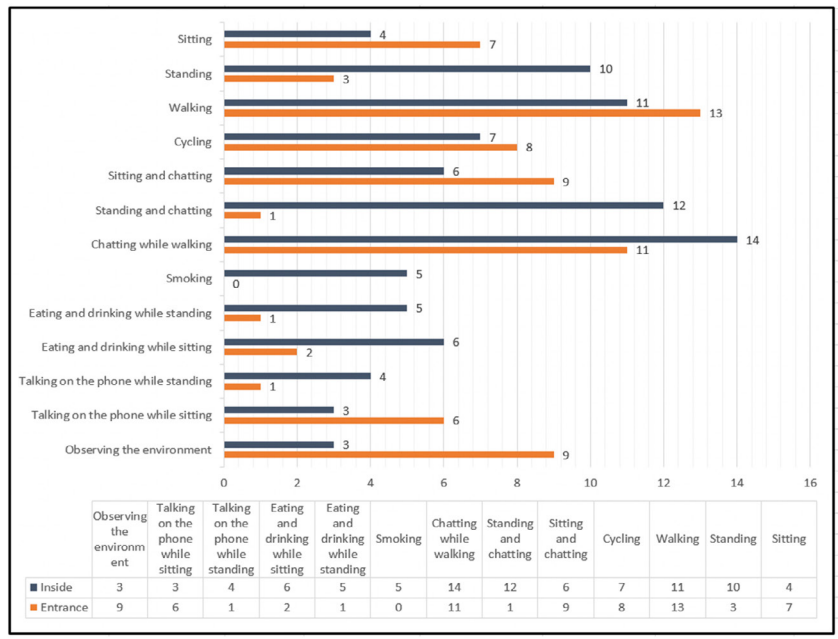


Entrance (2nd sub-region)

Comparison of user actions findings

Sitting
Standing
Walking
Cycling
Chatting while sitting
Chatting while standing
Chattingwhile walking
Smoking
Eating
Eating while standing
Eating while standing
Watching the environment
Talking on the phone while sitting
Talking on the phone while standing

1st and 2nd Sub-Region Comparison Charts



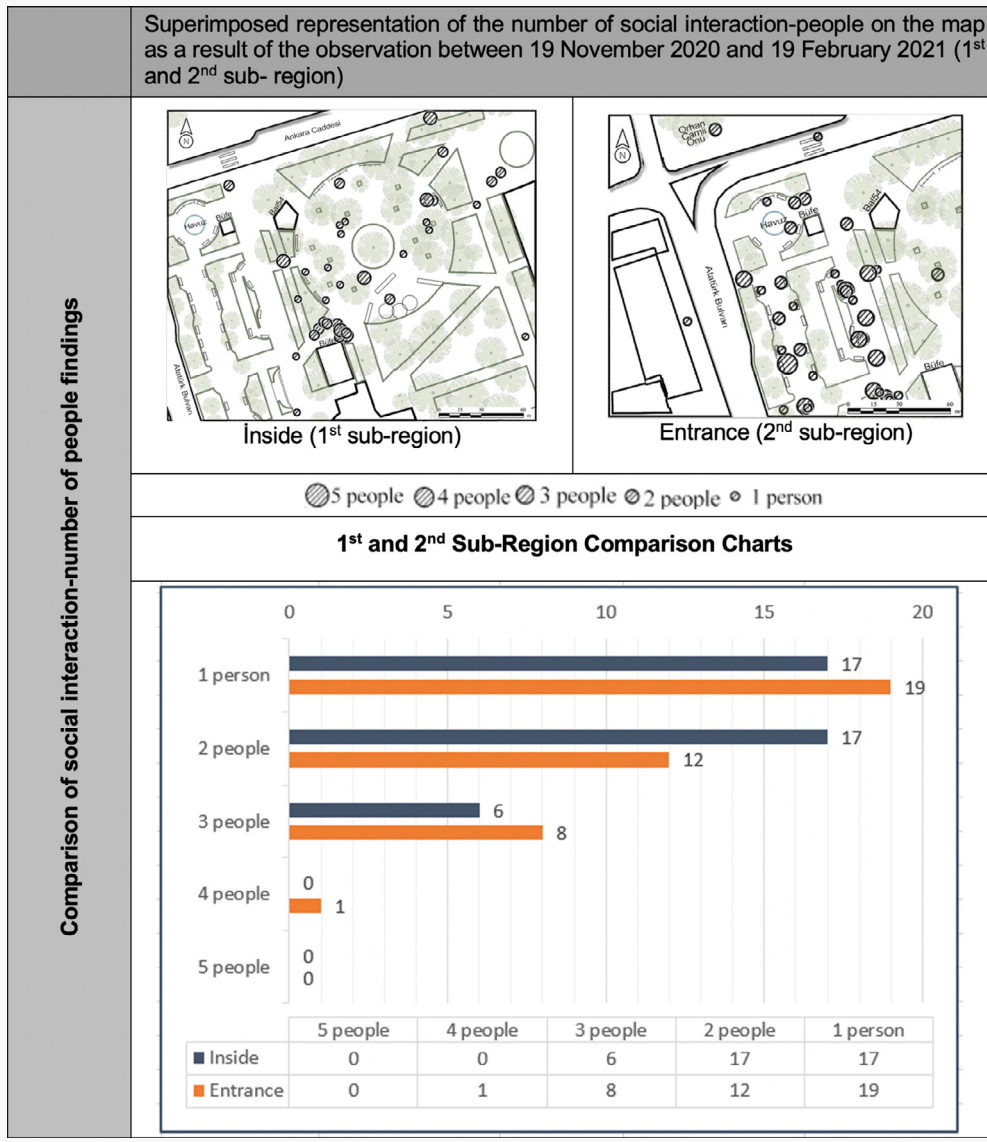
	Observing the environment	Talking on the phone while sitting	Talking on the phone while standing	Eating and drinking while sitting	Eating and drinking while standing	Smoking	Chatting while walking	Standing and chatting	Sitting and chatting	Cycling	Walking	Standing	Sitting
Inside	3	3	4	6	5	5	14	12	6	7	11	10	4
Entrance	9	6	1	2	1	0	11	1	9	8	13	3	7

Source: Prepared by authors.

researchers who grouped the threshold spaces. Although the aforementioned groupings do not suggest a specific "technique," a technique can be sought by considering the threshold space criteria included in the groupings. However, the lack of technical suggestions in this context causes the studies to be inadequate in terms of directing the researcher to a particular point. The approach proposal used in this study brings to the agenda these inadequate evaluations in the context of the analysis of threshold spaces, bringing a new perspective and the threshold spaces back into focus.

Therefore, the objective of this study is to utilize threshold spaces as a factor in spatial analysis, identifying them in public spaces and integrating them into design and space organization. Researchers focusing on space analysis and threshold spaces, those interested in investigating the relationships between spaces, observing the actions that define spaces, and creating designs aligned with these actions, as well as identifying the types of actions present in public spaces, can benefit from this study. The findings can provide valuable input for the design process and analysis.

Table 5. Comparisons of social interaction-number of people findings the inside and the entrance of Atatürk Park/ Şemsiyeli Bahçe (Umbrella Garden)



Source: Prepared by authors.

During the examination of Atatürk Park / Şemsiyeli Bahçe's (Umbrella Garden) inside and entrance, the observations of the two sub-regions could not be made during the same time period but were made at consecutive hours. This time frame variation may cause a slight deviation from reality when comparing the findings of the two sub-regions. In order to address this issue, a method of positioning an observer in each sub-region and observing and documenting sub-regions within the same time period is suggested. It was intended to compare different actions with each other by making observations on one day during the week and two days throughout the weekend. However, this objective could not be achieved due to the pandemic-related restrictions, and the planned number of days could be met by continuing the observations on one day of the week. In order to avoid this problem, future possibilities should be considered.

The unique circumstances and experiences of users observed during the third stage of threshold space detection and analysis can influence their behavior and actions. In this study, the users were conceived of as a body, and the way the bodies used the space and the types of actions they performed were observed. However, the observations and analyses alone are not sufficient to detect the threshold space. Due to the nature of the pandemic, supportive analyses such as surveys, interviews, etc. could not be conducted. However, the approach used in the study should be supported by further analysis methods.

Table 6. Evaluations of Atatürk Park/ Şemsiyeli Bahçe (Umbrella Garden) as a threshold space

Document analysis and on-site detection		On-site observation with the behavior map technique	
Historical development	**1. Historical Threshold:** year 1930 The removal of the city cemetery in the region and the construction of a football field and a secondary school building adjacent to it/ its east **2. Historical Threshold:** year 1950 Recreation of the space as a park	**General user behavior**	There is no critical differentiation between the sub-regions. The region **does not meet the criteria of being a threshold space in terms of general user behavior**.
Social use	**1. Social Use Threshold:** 1930 The addition of the student/teacher profile to the general user profile in the area, and the transformation of the area function to the square/education function **2. Social Use Threshold:** 1950 The transformation of the square function in the area to the green area function (the user profile has not changed) **3. Social Use Threshold:** 1998 The transformation of teacher/student profile in the area into a general user profile, forming a single user profile. The education function is abolished and replaced by official use.	**User actions**	Critical differences can be observed between sub-regions in the number of some actions. This difference can be seen especially in the actions of standing, chatting, smoking, eating and drinking while standing, sitting, standing or sitting while on phone, and watching the environment. The region **provides the criterion of being a threshold space in terms of user actions.**
Physical properties	In terms of physical properties, the threshold is not space: Although the urban furniture in the area is sufficient at the entrance of the place, it is not in the amount and position to adequately respond to the user actions observed in the space (especially the large deficiencies in the seating elements in the park). The above-mentioned situations do not lead to significant differences in the entrance and interior of the venue. The region **doesn't provide the criterion of being a threshold space in terms of physical properties**.	**Social interaction – number of people**	No critical differentiation was observed between the sub-regions in the 1, 2 and 3-person user/group types. No groups of 5 people were found in either sub-region. However, while no groups of 4 people were observed at the inside of the region, single users were observed at the entrance of the region. Observation for a longer period of time is required in order to draw a remarkable conclusion from the social interaction-number of people findings. Since a definite judgment cannot be made, the region **does not meet the criteria of being a threshold place in terms of social interaction-person number**.

Source: Prepared by authors.

Due to the limited number of observers and the desire to examine the sub-regions of the study space concurrently, two sub-regions were determined as the "inside" and "entrance" of the region. However, in order to measure the threshold status of a space, it is necessary to examine its surroundings together with the sub-regions. Therefore, not only the entrance and inside of the study area, but also its surroundings, should be examined as sub-regions and interpreted together.

The assessment that the number of observed users is insufficient can also be made for this study. Therefore, it is possible to infer that the generalizability and reliability of the data obtained is low. The limited sample size made it difficult for the results to be statistically significant. The inability to adequately observe user trends has prevented obtaining comprehensive and in-depth information about user behavior and preferences. This affected the scope and accuracy of the study's results.

In order to reduce the impact of these limitations, it is recommended for future studies to create a sample group that is large and diverse enough to obtain sufficient data about the context and user group in which the study is conducted. This will increase the generalizability and reliability of the results and ensure that statistical analyses are robust. In order to better understand user trends, long-term observations are recommended. Tracking changes in user behavior over time will help obtain comprehensive and accurate results. Expanding the study to include different demographic groups will enable a comprehensive analysis by revealing the differences in user trends and behaviors. Diversifying the data collection methods used in the study will allow obtaining sufficiently rich and detailed data about user trends. Taking these suggestions produced as a result of the study into consideration in future research will help to eliminate the limitations of the study and base the research on solid foundations.

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