UDC: 614.8:351.76:711.5(560.11 Istanbul)
doi:10.5379/urbani-izziv-en-2025-36-01-02

Received: 16 December 2024
Accepted: 5 May 2025

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The effect of urban landmarks on urban safety perception: The case of Balat, Istanbul

Cities that have strong landmarks offer users effective orientation, comfortable experiences, and a heightened sense of safety. This study examines the impact of urban landmarks on pedestrian movements and orientations, and explores their relationship with perceptions of urban safety. The study area of Balat, Istanbul, was selected due to its abundance of urban landmarks as well as the presence of structures and spaces that create a negative perception of safety. Based on a review of literature on urban landmarks and spatial safety theories, complemented by field observations, a study involving 110 participants was conducted to analyse their route selections based on landmarks and their sense of safety along these routes. The findings revealed that streets with a high number of urban landmarks and those with higher attraction values play a significant role in shaping users' orientation preferences. In addition, a positive correlation was observed between the presence of urban landmarks and the perception of spatial safety, indicating that areas with more prominent landmarks are perceived as safer by users.

Keywords: landmarks, spatial orientation, spatial perception, urban safety, Balat, Istanbul

1 Introduction

Urban spaces convey various environmental stimuli to users, either directly or indirectly, through the artificial and natural elements they contain. Users perceive these stimuli through individual cognitive processes, transform them into mental images, and subsequently make decisions within urban space (Lynch, 1960; Göregenli, 2018; Cüceloğlu, 2019). Urban elements that encompass one or more social, historical, symbolic, economic, and aesthetic characteristics within urban space serve as urban landmarks. They draw the attention of users of space and, as a result, influence their perception and spatial orientation (Gibson, 1950; Gifford, 2002; Raubal & Winter, 2002; Santos-Delgado, 2005). Depending on the perception, landmarks may also function as elements of the urban image. Urban spaces with strong images facilitate navigation, provide comfortable user experiences, and foster a sense of safety (Lang, 1987; Lynch, 1960; Steck & Mallot, 2000; Köseoğlu & Önder, 2011). Several theories, including the broken windows theory, defensible space theory, rational choice theory, and environmental stress theory, have been developed to explain the sense of spatial safety, which refers to the feeling of peace and safety in the social lives of individuals residing in urban areas. According to these theories, spaces that are neglected, abandoned, or contain derelict buildings and elements are perceived as unsafe by users because they increase the likelihood of criminal activities.

Spatial perception and issues of safety are well-established areas of study within both urban planning and psychology. However, the relationship between urban images and the perception of urban safety has not been extensively explored. Based on Lynch's (1960) assertion that strong urban landmarks within a space enhance the sense of spatial safety, this study investigates the impact of urban landmarks, explores their influence on pedestrian movements and orientations, and examines their potential impact on the perception of urban safety. It addresses three fundamental research questions: 1) Is there a relationship between urban landmarks and pedestrian movement or orientation? 2) Which urban landmarks have a greater impact on perception and orientation processes? 3) Is there a relationship between urban landmarks and the perception of urban safety? The hypothesis of the study is that the presence of urban landmarks and their attraction power are directly proportional to user movements and contribute to an increased perception of safety in the city.

2 Spatial perception, behaviour, and perception of urban safety

Individuals continuously engage in interactions with their surrounding environment. They interpret the environment they inhabit through its physical features, organize it in their minds, or, in other words, perceive it. According to Lewin (1951), human behaviour is a function of the relationship between the individual and the environment. In other words, the way individuals perceive their environment, influenced by both personal and environmental characteristics, impacts their spatial behaviour. In addition, urban environments and the elements they encompass have a profound impact on the perception of urban safety. A positive perception of urban safety is crucial for enhancing the overall quality of life (Barker, 1968; Koca & Erkan, 2019).

2.1 Spatial perception and behaviour

Perception is the process of receiving information from the environment through the senses and organizing and interpreting it by categorizing it in the mind (Norberg-Schulz, 1966; Rapoport, 1977). There are numerous factors, stemming from either the individual or the environment, that influence perception. Factors such as age, sex, education level, occupation, knowledge, socioeconomic status, lifestyle, value judgments, needs, personality traits, and past experiences are among the individual-based elements that influence perception. These factors affect perception because they shape an individual's sensory attributes, cognitive processes, values, and priorities, which in turn influence how they interpret their environment (Broadbent, 1958; Lynch, 1960; Kaplan, 1973; Sayar-Avcıoğlu & Akın, 2017; Göregenli, 2018).

Environmental factors that influence perception include features such as colour, size, density, movement, orientation of other pedestrians, light and shadow, shape, proximity, depth, continuity, repetition, proportion, similarity, variety, topography, slope, weather conditions, sound, and smell (Broadbent, 1958; Lim, 2000; Kürkçüoğlu & Ocakçı, 2015; Diker & Erkan, 2017). Landmarks (Lynch, 1960; Santos-Delgado, 2005) are significant environmental factors that influence perception. The most important characteristic of these is that they are physically, functionally, or semantically different from other elements in the surrounding environment. Some landmarks are known by everyone and others are not. They do not have to be known or recognized by all. At the neighbourhood scale, coffeehouses, local leaders' offices, grocery stores, tombs, fountains, and structures with distinct differences in colour, shape, or material can also serve as landmarks (Abu-Obeid, 1998; Erkan-Biçer, 2002; Köseoğlu & Önder, 2011;

Zacharias, 2001). Santos-Delgado (2005) classified urban landmarks into five groups: social, historical, symbolic, economic, and aesthetic landmarks. Social landmarks are places that bring people together and facilitate interaction, such as places of worship, parks, and schools. Historical landmarks are locations with historical significance, having hosted important historical events. Monuments, graves, homes of significant individuals, historic buildings, and squares are examples of historical landmarks. Symbolic landmarks are elements that help people establish a connection with space when they see them. Economic landmarks are places with economic value, such as factories, ports, hotels, and shopping or office units of various scales. Aesthetic landmarks are locations that hold aesthetic value, distinguished by their architectural and landscape features (Lim, 2000; Santos-Delgado, 2005; Köseoğlu & Önder, 2011; Bratina Jurkovič, 2014).

In addition, environmental factors that influence perception can be classified into the following categories: physical, functional, and mobile sources. Physical stimulating sources refer to the form, material, colour, texture characteristics, fullness versus emptiness ratios of the built environment components that constitute space, and their interrelationships. Functional stimulating sources are those that create an image for the user based on the function of space. Mobile sources are primarily related to the crowd and the direction of its movement, which influence the psychology and preferences of the individual (Zacharias, 2001). Spatial behaviour is closely linked to spatial perception, with the latter serving as the foundation for the former. People move through space according to their perceptions. Therefore, factors that influence perception also impact spatial movement (Gibson, 1950). According to Kitazawa and Batty (2004), pedestrian movements in urban spaces and route selection are subject to change and sudden decisions. The time factor, physical elements within urban space, natural and artificial obstacles, and individuals' aesthetic and value judgments all play a role in these decision changes. In addition to individual-based factors and environmental factors that influence people's perception and behaviour, another factor affecting pedestrian movement and behaviour is the time factor, including season, month, week, day, and hour. Differences in time zones can alter stimuli and their intensity, influencing perceptions and behaviours accordingly (Banerjee & Southworth, 1990; Bradshaw, 1993; Carmona et al., 2003; Correa, 1983; Marshall, 2005; Massey, 1994; Moughtin & Mertens, 2003; Mumford, 1937; Özer, 2006; Relph, 1976; Rykwert, 1982).

2.2 Urban safety and spatial safety perception

Safety refers to both material and spiritual safety, as well as the absence of danger. It is a feeling and a perception. Moreover, safety is a fundamental right for everyone. Similarly, urban safety refers to the ability of individuals living in the city to feel secure both in fulfilling their needs and in their interpersonal relations, while being able to continue their lives in a peaceful and secure environment. Spatial safety theories have been proposed to explain the feelings of safety or insecurity in urban spaces (Akers, 2000; Anselin et al., 2000; Aksoy, 2007; Clarke, 1997; Elliott, 1952; Farrington, 2004; Ritts, 2024).

The broken windows theory focuses on how the presence of neglected, irregular, and broken structures and elements in an area evokes a sense of dereliction, which, in turn, leads to further deterioration over time. In this context, neglected or damaged buildings, dysfunctional landscape elements, uncollected garbage, and semantically or visually problematic graffiti and drawings cause a perception of neglect and insecurity (Welsh et al., 2015; Bilen & Büyüklü, 2018; Koca & Erkan, 2019). According to the defensible space theory, spaces lacking a clear distinction between public, semi-public, semi-private, and private areas, as well as crowded high-rise apartment buildings, dysfunctional and unused ground floors, blind walls, secluded spaces, and deserted areas resulting from planning errors and the improper positioning of buildings create a perception of insecurity. These conditions reduce the sense of belonging, spatial observability, and control, making such areas vulnerable to criminal activity (Koca & Erkan, 2019). According to the rational choice theory, crowded areas such as city centres, commercial streets that enable criminals to remain anonymous, poorly organized public spaces, abandoned areas occupied by gangs, and poorly lit, deserted urban spaces all cause an increased sense of insecurity (Cullen & Agnew, 1999). According to the environmental stress theory, environmental stressors such as poor quality of the environment and buildings can induce stress, tension, anxiety, restlessness, and fear in individuals. All of these cause an increased sense of insecurity. Factors such as building quality, noise, crowds, pollution, aging, and neglect are critical parameters that affect the quality of urban environment. Poor building quality is specifically associated with the aging and deterioration of structures (Clarke, 1997; Elliott, 1952; Farrington, 2004; Steg et al., 2015).

In summary, individuals perceive the elements of the urban environment in which they live and develop various behaviours and spatial orientations as a result of these perceptions. In this context, landmarks – points of attraction with social, historical, symbolic, economic, and aesthetic qualities – serve as powerful images of urban space and influence spatial behaviours and orientations through perception processes (Lynch, 1960; Santos-Delgado, 2005). Furthermore, spaces with strong images contribute to a heightened sense of safety for users. Based on this information, the relationship between landmarks, orientation preferences, and the perception of urban safety was examined through a field study.

3 Method

Based on Lynch's (1960) claim that urban landmarks increase the sense of spatial safety, the authors examined the impact of urban landmarks on pedestrian movement patterns and urban safety perception, structuring their study into five stages (Figure 1).

In the first stage, Balat was chosen as the study area due to its numerous and diverse urban landmarks, as well as its inclusion of spaces and elements that may create a negative perception of safety (Erbey & Erbaş, 2017; Özbilge, 2018).

In the second stage, a detailed built environment analysis of the selected study area was conducted, including factors such as building condition, number of floors, building type, registration status, topography, open space, transportation, and land use.

In the third stage, an analysis of landmarks and spatial safety perceptions was conducted, grounded in literature. The structures and elements in the study area were analysed separately based on their economic, aesthetic, social, historical, and symbolic characteristics (Stage 3a; Santos-Delgado, 2005). Structures and elements with multiple characteristics were assigned numbers corresponding to the number of characteristics they exhibited, thereby determining their level of attraction. Subsequently, the attraction value/power of each street in the study area was calculated by summing the attraction of the structures and elements located on that street or visible from it, even if they were not directly situated on the street. The attraction value/power of the streets in the study area was mapped accordingly. Balat's spatial characteristics were categorized in terms of their economic, aesthetic, social, historical, and symbolic features. Cafés, restaurants, vintage shops, craft workshops, banks, grocery stores/markets/pharmacies, boutiques, street vendors, hostels, and bazaars possess economic value. Building colour and form, building materials, historic buildings, ruined buildings, and architectural elements such as fountains, as well as natural landscapes, artificial landscapes, topography, curvilinearity, openness, street width, views, shadows, and light, may have aesthetic value. Museums, churches, mosques, synagogues, baths, schools, hospitals, police stations, research centres, sports clubs, graffiti, hanging laundry, and film sets possess social value. Historic residential, commercial, or religious buildings hold historical value, and structures generally associated with Balat are considered to have symbolic value (Erbey & Erbaş, 2017; Lim, 2000; Santos-Delgado, 2005; Köseoğlu & Önder, 2011; Özbilge, 2018). In addition, areas that could contribute to a negative perception of safety were examined based on the four theories presented above, and the locations in which these areas are concentrated were identified (Stage 3b; Cullen & Agnew, 1999; Koca & Erkan, 2019; Steg et al., 2015; Welsh et al., 2015).

In the fourth stage, a field study was conducted with a group of 110 participants that had not previously experienced the space, focusing on the relationship between identifying landmarks, selecting routes, and defining urban safety. Each participant walked around the study area with a map for one hour. To avoid any preconceived orientation, only individuals that had never visited Balat before were selected. Participants were free to choose their walking routes at each intersection, but the spatial configuration of the area naturally led them to traverse both highly attractive and less attractive streets in order to navigate the area. Therefore, even though route choice was voluntary, the continuity of the street network meant that a variety of spatial qualities were inevitably experienced. Because it was essential for the participants to be able to see and perceive landmarks and spatial safety parameters, fieldwork was conducted during daylight hours. In addition, to ensure comfortable pedestrian movements, the study was conducted on days with clear, rain-free weather. The study was conducted from August to October 2020, taking into account the general suitability of weather and the COVID-19 pandemic. These months were selected because they corresponded to periods with the lowest case numbers, no curfews or closures, and only a mandatory medical mask requirement. Because the study was conducted outdoors and the participants were required to wear masks, it is assumed that the effects of COVID-19 were minimized. Considering that the participants in the field study were required to have sufficient map-reading and marking skills, they included individuals age twenty or older. In addition, in light of the risk factors associated with the pandemic, the participants selected were younger than sixty. The participants were recruited on a voluntary basis through public announcements made via social media platforms and university mailing lists targeting individuals residing in Istanbul. Among the applicants, those that met the age criteria, had never visited Balat before, and were available during the study period were selected to participate.

As part of the study (Stage 4b), participants marked the route they chose on the provided map and identified the attraction factors influencing their orientation preferences at each intersection. They also rated their sense of urban safety at the intersection points they passed through using a Likert scale from −3 (most insecure) to +3 (most secure). In addition, a general pedestrian count was conducted for each street in the study area on Saturday afternoon for one hour (Stage 4b) and subsequently mapped. Saturday afternoon was chosen due to the high pedestrian density, as seen in various studies (Erbey & Erbaş, 2017; Özbilge, 2018).

In the fifth stage, the maps of all participants were overlapped to determine and map the number of participants passing through each street in the study area (Stage 5a). The attraction factors identified by participants at each intersection were categorized (5b). To avoid any influence, participants were not provided with any keywords, and the grouping was based on the keywords they wrote themselves. Because an element can possess more than one characteristic (economic, aesthetic, social, historical, or symbolic), participants' keywords were first categorized into five groups: architectural elements, physical environment, landscape and topography features, social and cultural characteristics, and commercial aspects. Architectural elements, physical environment, and landscape and topography features were associated with aesthetic value, social and cultural characteristics with social value, and commercial aspects with economic value. Historic buildings possess historical value, and the Fener Greek School, Naftalin Café, and houses on Merdivenli Yokuş Street hold symbolic value. In this context, a statistical analysis was conducted based on the keywords provided by the participants regarding the landmarks. Thus, the landmarks that had the greatest influence on route selection were identified.

The sense of safety was established (Stage 5c) by calculating and mapping the mean and median values of the safety scores provided by participants on each street, ranging from −3 to +3. These values were then overlapped, and streets with a score of 2 or higher were mapped. Because the sense of safety can vary from person to person and is thus a subjective assessment, the use of the median in addition to the mean helps mitigate exceptional cases. All spatial maps obtained (general pedestrian count, participant count, participant safety perception, attraction value/power of streets) were overlaid and compared. The results of the analysis and mapping conducted based on urban safety theories in Stage 3b were used to verify the participants' urban safety perception scores. In addition, the relationships between the general pedestrian count and the number of participants on individual streets (5a), as well as those between the participant number (5a), participant safety perception (5c), and street attraction value, along with the urban landmarks identified by the participants, were statistically analysed using Python (Figure 1).

4 Results

The Balat neighbourhood is located in the Fatih district, between the Fener and Ayvansaray neighbourhoods, on the European side of Istanbul. In the course of history, Balat has been home to Jews, Greeks, Armenians, and Turks. It houses numerous Byzantine and Ottoman-era structures and carries traces of three major religions (Ülke, 1957; Deleon, 1991; Türkoğlu, 2002; Önem & Kılınçarslan, 2005; Şenyapılı, 2009; Özbilge, 2018). The boundaries of the study area were determined based on the presence of landmarks and spatial elements such as old and dilapidated buildings, poor lighting, and narrow or dead-end streets, which create a negative perception of safety (Figure 2).

4.1 Physical structure analysis

The area features a hybrid street layout, dominated by a grid pattern. A large portion of the buildings in the area are in average condition. Most buildings in good condition are restored structures. Buildings in poor condition generally feature aging, dilapidated, and damaged walls and structural elements, with most of them still inhabited. Ruined buildings, on the other hand, have walls or portions of walls collapsed, lack structural elements, and are uninhabitable. Three- and four-story buildings predominate. Most structures are masonry buildings, with some wooden and other types of buildings present as well. Buildings of historical and cultural significance in the area are protected, with approximately one-third of them being registered. Among these registered buildings, a significant number are examples of residential architecture. The slope follows the shoreline of the Golden Horn, with areas near the Golden Horn being relatively flat and gradually increasing in incline toward the inner parts of the study area. There is no large green space within the study area, except for the Cantemir Palace garden, which is enclosed by high walls. The area features numerous trees and ivy, and stairways, reflecting the slope, can be found in various locations throughout the area. The main pedestrian street of Balat and the study area is Vodina Street, which hosts food, beverage, and shopping establishments. Other key pedestrian corridors include Kürkçü Çeşmesi Street, Yıldırım Street, Ayan Street, and Lavanta Street. According to the ground floor use distribution, the area consists of three main categories: housing (79.3%), commercial areas (18.4%), and social infrastructure (2.3%; Table 1, Figure 3).

4.1.1 Analysis of urban landmarks

Landmarks in the study area were analysed based on their economic, aesthetic, social, historical, and symbolic characteristics, and their concentrations were determined and mapped. In this context, eight mosques, five churches, three synagogues, two baths, and two schools were categorized as historical landmarks. A total of 241 cafés and restaurants; eight antique shops; four workshops; four post offices and bank branches; thirty-six grocery stores, markets, and pharmacies; four boutiques; two gyms and yoga studios; and six accommodation facilities were identified as economic landmarks. Furthermore, four museums, five churches, nine mosques, three synagogues, two Turkish baths, two primary schools, two middle schools,

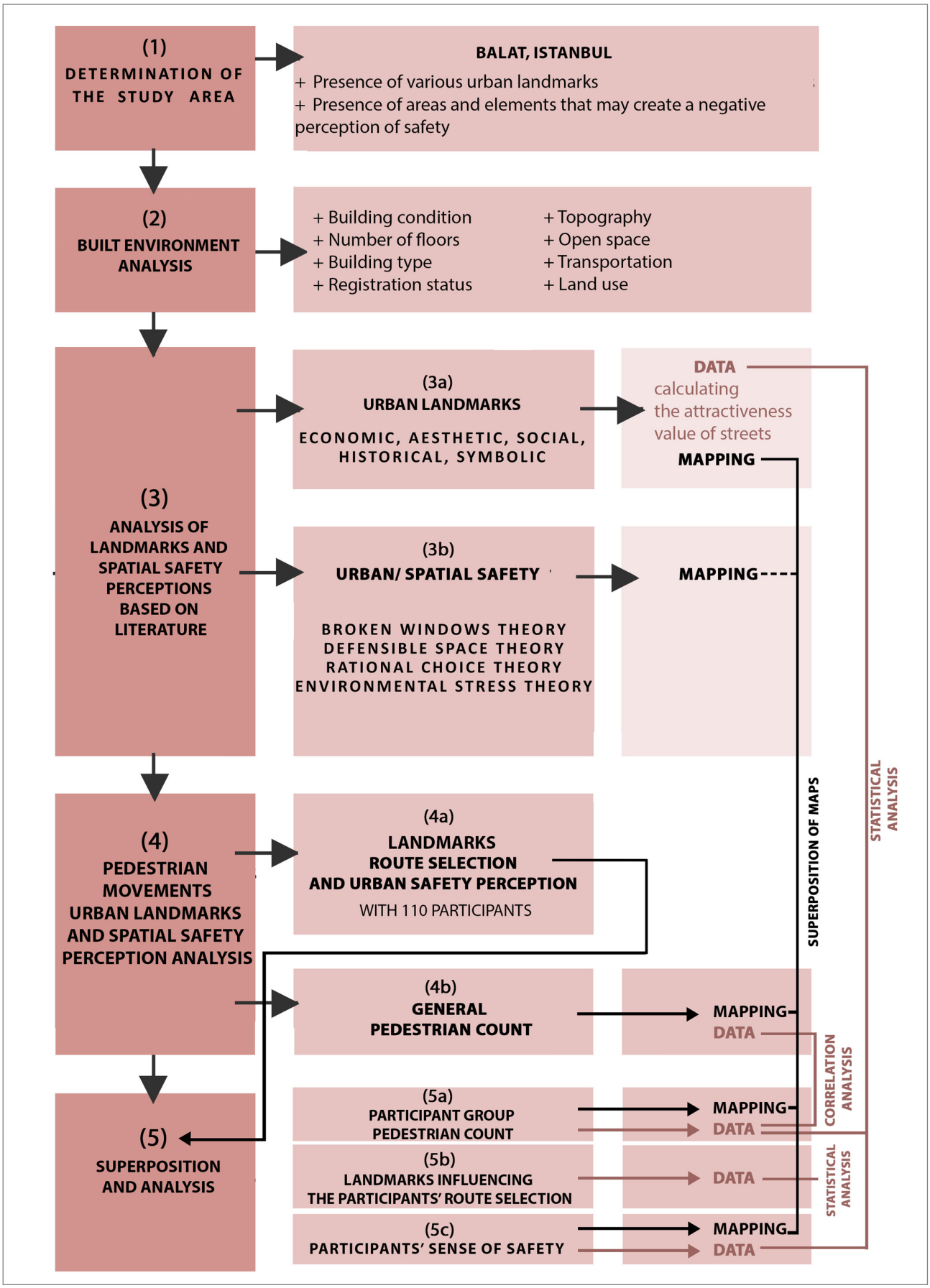

Figure 1: Method of the study (illustration: authors).

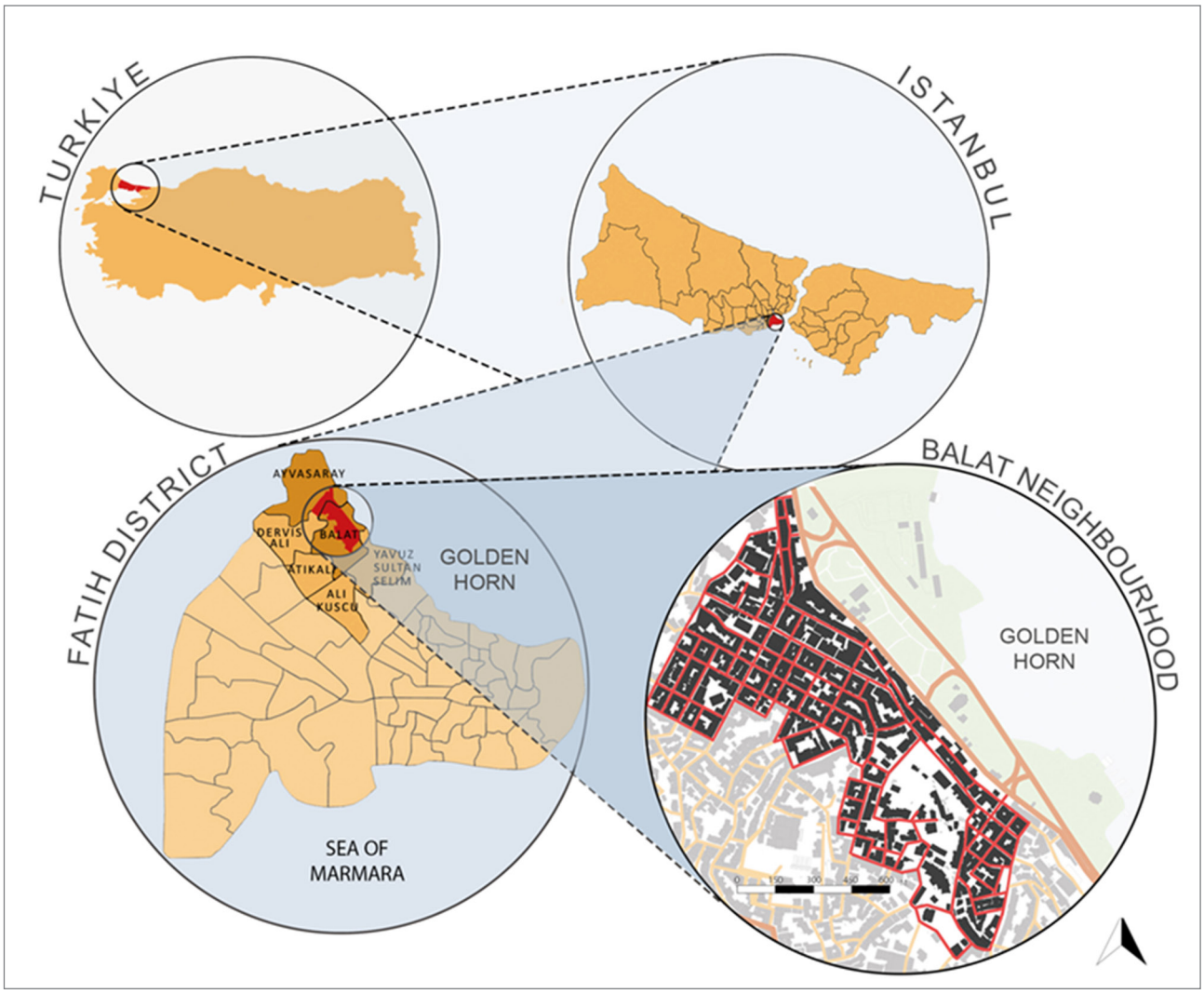

Figure 2: Location and boundaries of the study area (illustration: authors; base map: courtesy of the Istanbul Metropolitan Municipality Department of Zoning).

two high schools, one police station, one research centre, and six accommodation facilities were recognized as social landmarks. The Fener Greek School, some residential architecture structures, and Naftalin Café were categorized as symbolic landmarks. Buildings with aesthetic value, such as those with distinctive architectural and landscaping features – stone walls, plane trees, vines, lighting, colourful lights from cafés and restaurants spilling onto the street, furniture, coloured stairs, a variety of artificial landscape elements, and fountains – were considered aesthetic landmarks.

A structure or element can embody multiple values. For example, the Fener Greek School stands out as the strongest landmark due to its historical, social, symbolic, and aesthetic values. Religious buildings with historical, social, and aesthetic value follow the Fener Greek School in terms of attraction. There are numerous registered buildings with aesthetic value scattered throughout the study area, some of which also serve commercial purposes and thus possess commercial value as well, contributing to their higher attraction power. Streets with attraction power values greater than average (plus standard deviation) were classified as high-attraction streets and mapped. The streets and avenues with high attraction value are generally the commercially dense (economically valuable) axes parallel to the Golden Horn at the entrance to the study area, and, at certain points, the lines that cut across these axes perpendicularly and extend inward, highlighting historical, aesthetic, or social values (Figure 4).

4.1.2 Urban safety analysis

The spaces and structures that contribute to a sense of insecurity are concentrated in the western, southern, southwestern, and southeastern parts of the study area (Figure 5). In the southwestern part, there is a noticeable concentration of poor-quality buildings and poor-quality environments, which are the key criteria under the environmental stress theory.

Table 1: Analysis of buildings and ground floor use in the study area.

Category	Unit count	Percentage
Condition of buildings		
Good	35	2.2
Average	1,328	85.2
Poor	181	11.2
Ruined	23	1.4
Number of stories		
One	92	6.0
Two	215	14.0
Three	462	30.2
Four	481	31.4
Five	225	14.7
Six	51	3.3
Seven	4	0.3
Eight	2	0.1
Type of construction		
Masonry	1,375	84.8
Wooden	17	1.0
Reinforced concrete	191	11.8
Other	38	2.3
Registration status		
Registered official building	2	0.2
Registered monument	33	2.0
Registered residential building	459	28.3
Unregistered building	1,127	69.5
Ground floor use		
Housing	1,288	79.3
Café or restaurant	241	80.6
Vintage or antique shop	8	2.7
Workshop	4	1.3
Post office or bank	4	1.3
Boutique store	4	1.3
Gym or yoga studio	2	0.7
Museum	4	10.9
Church	5	13.5
Mosque	9	24.3
Synagogue	3	8.1
Baths	2	5.4
Primary school	2	5.4
Middle school	2	5.4
High school	2	5.4
Police station	1	2.7
Research centre	1	2.7
Accommodation	6	16.2

Source: authors, data courtesy of the Istanbul Metropolitan Municipality Department of Zoning.

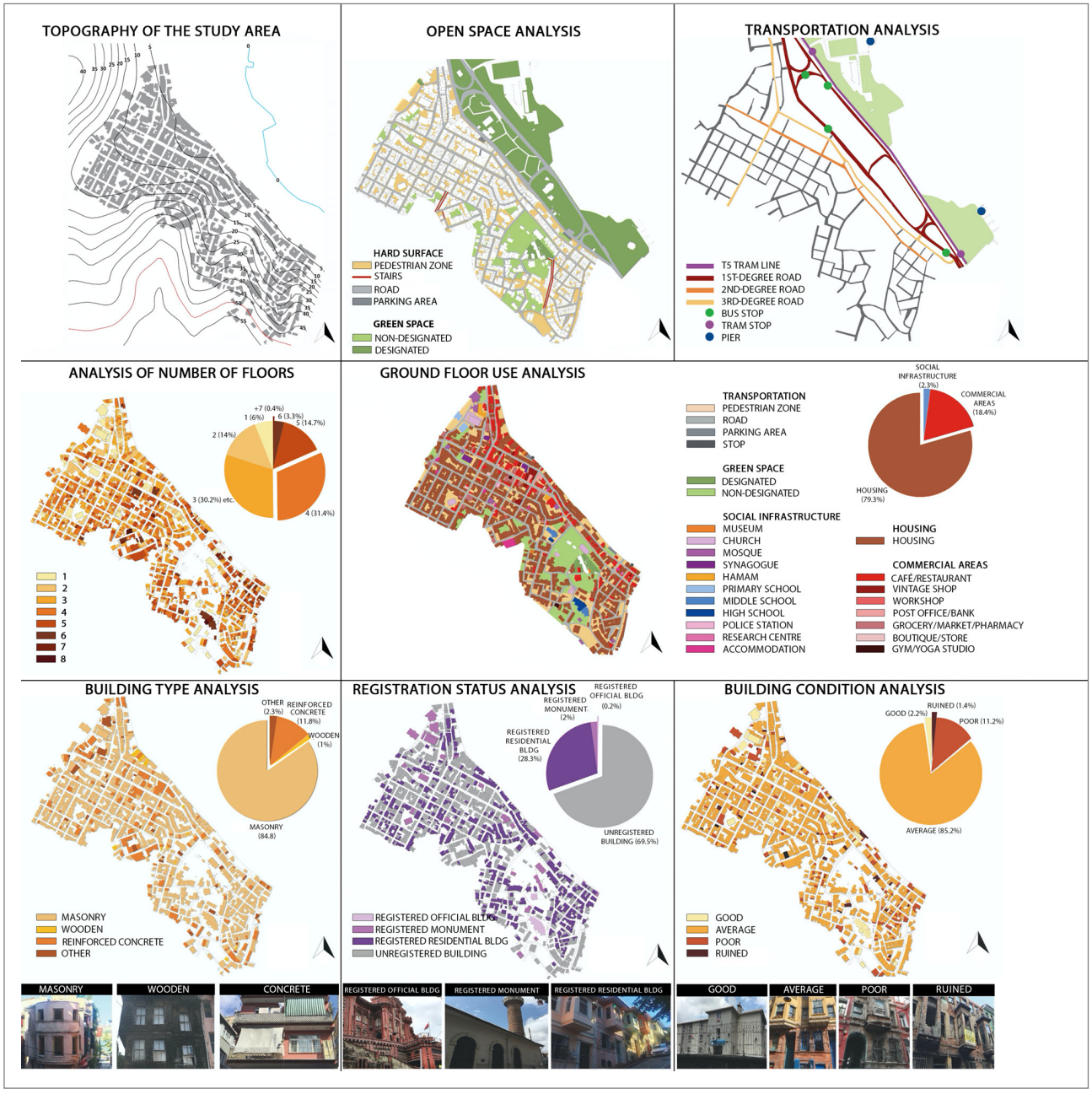

Figure 3: Physical structure analysis of the study area (illustration: authors; base map: courtesy of the Istanbul Metropolitan Municipality Department of Zoning).

4.2 Analysis of pedestrian movements, urban landmarks, and safety perception

Table 2 provides information on the participants' sex, age, and education. They entered the study area through one of three entrances accessible from the shoreline. These entrances are the gates of the historical walls that largely disappeared over time (Özbilge, 2018). Participants selected the gate (G1, G2, or G3; Figure 6) based entirely on their preferences. Participants were then given a base map of the study area, on which they could mark their path. The base map displayed all roads, stairs, and connection elements in a partially abstract and linear format, with intersection points marked as circles. Participants stopped at each intersection and selected the street they wished to proceed on, thus forming their routes. Along the route, participants identified the landmarks influencing their preferences at each intersection and rated their sense of urban safety on a Likert scale. The study lasted one hour for each participant.

Figure 4: Superposition of landmarks and streets with high attraction value (illustration; authors; base map: courtesy of the Istanbul Metropolitan Municipality Department of Zoning).

Table 2: Participants' demographic characteristics.

Characteristic	*n*	Percentage
Sex		
Women	52	47.0
Men	58	53.0
Education level		
Primary school	17	15.5
High school	35	31.8
Bachelor's	46	41.8
Master's or doctorate	12	10.9
Age (years)		
20–29	35	31.8
30–39	22	20.0
40–49	30	27.3
50–59	23	20.9

Source: authors.

4.2.1 General pedestrian and participant counts

The base maps provided by the participants were superimposed, and the number of participants passing through each street was calculated. Bidirectional crossings were counted separately. A maximum of forty-nine participants passed through a single street, and some streets were not passed through by any participant. Vodina Street, which runs parallel to the Golden Horn and serves as the main street of both the study area and Balat, was the most crowded street. In addition to calculating the number of participants, general pedestrian counts were also conducted in the study area. They were conducted concurrently with the participants' field studies between August and October 2020, on Saturdays between 2 pm and 5 pm to ensure comparability. Pedestrian flows in both directions were manually recorded by observers stationed at key points throughout the study area. Each street segment was continuously observed for one hour. During the general pedestrian counts, pedestrian flows of between 1,000 and 1,200 individuals were recorded on certain street segments. Based on the counts, it can be concluded that the number of pedestrians is high on the bazaar (Vodina Street) and Fener sides (east-southeast), and that it

Figure 5: Spaces inducing a feeling of insecurity according to spatial safety theories (illustration: authors; base map: courtesy of the Istanbul Metropolitan Municipality Department of Zoning).

is significantly lower in the western and southern parts. Both counts showed that the number of pedestrians was high on streets with a high concentration of commercial units and places of worship. Furthermore, Pearson's correlation coefficient between the general pedestrian count and the participant count was 0.92 (Figure 6).

4.2.2 Urban landmarks and orientation preferences

According to the data obtained from the field study, the factors most influencing participants' orientation preferences were primarily architectural landmarks. These were followed by commercial landmarks, the physical environment, landscape and topography, and, finally, social and cultural landmarks.

When evaluating landmarks based on architectural features, the historical buildings were the most influential architectural elements affecting orientation preferences. Building colour and form were also important factors, whereas building height and fountains were among the architectural elements least affecting orientation preferences in the study area. When evaluating landmarks related to the physical environment, landscape, and

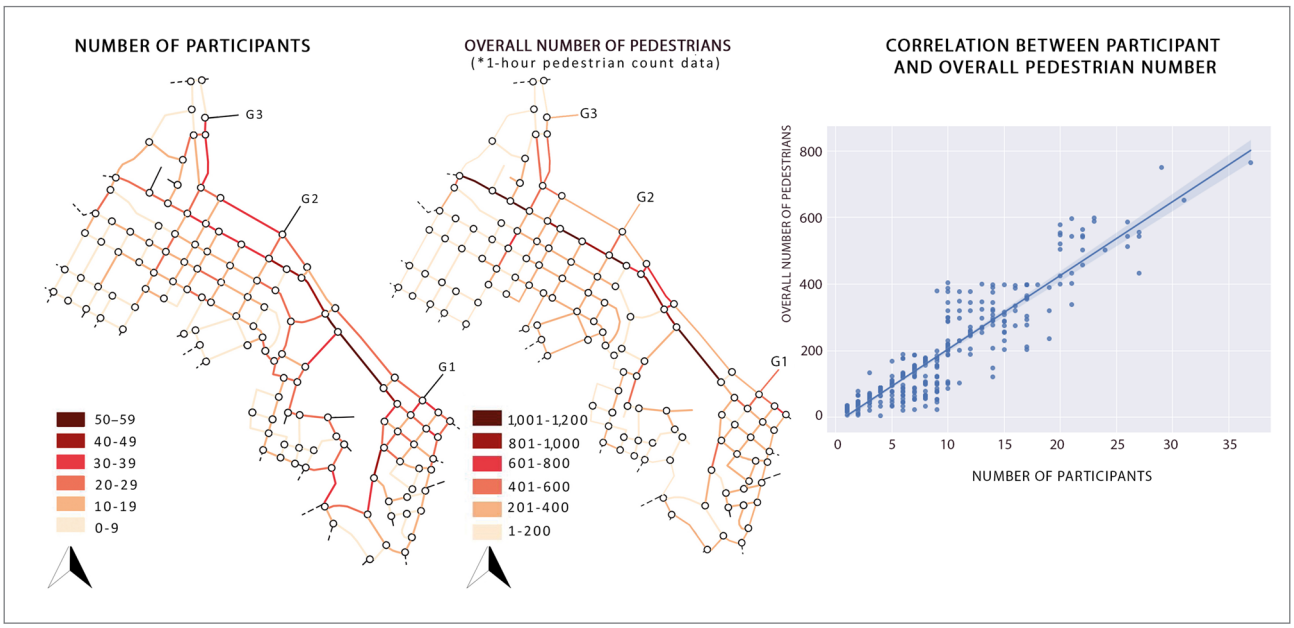

Figure 6: Participant count, general pedestrian count, and their Pearson's correlation coefficient (illustration: authors; base map: courtesy of the Istanbul Metropolitan Municipality Department of Zoning).

topography, the most influential factor was natural landscape. Artificial landscapes and topography were also significant factors within this category that notably affected orientation preferences. Street width and scenery had a lesser impact on determining orientation preferences, and factors such as curvilinearity, openness, shadow, and light had minimal influence.

In terms of landmarks related to social and cultural elements, the Fener Greek School, which stands out as one of the most magnificent and prominent structures of the Golden Horn due to its colour, size, and architectural style, had the greatest impact on orientation preferences. This was followed by graffiti, mosques, and churches within the study area. The school, police station, research centre, and sports club had a minimal effect on orientation preferences. Although there is no large hospital in the study area, outpatient clinics and dental offices were also included in this category. However, these did not significantly influence the participants' orientation preferences.

In terms of landmarks related to commercial activities, cafés and restaurants were preferred by participants, with a significant difference compared to other commercial activities. This can be attributed to the number of cafés and restaurants in the study area, their locations (density and cohesion), concepts, colourful tables and chairs, awnings, lighting, stairs, and graffiti. In addition, the participants' orientation preferences were also influenced by grocery stores, markets, pharmacies, vintage or antique shops, workshops, and boutiques in the area. However, the small-scale market in the Ayvansaray area in the west, where food and clothing are sold, had no effect on orientation preferences at all (Figure 7).

4.2.3 Perception of safety

After calculating and mapping the mean and median of the safety perception scores obtained from participants, both were overlapped, and streets with a score of 2 or more in both were identified and mapped. To prevent exceptional situations that might arise during the study, both the mean and median were used together to eliminate outliers in the dataset, and streets with a low number of participants were excluded from the evaluation. The streets with high urban safety perception scores (marked green in Figure 8) according to participants were compared with areas in which negative safety perceptions may arise according to urban safety theories due to the concentration of certain structures and elements (red circles). This comparison is important for evaluating the accuracy of subjective safety perception (Figure 8).

The streets with a high perception of safety according to participants were largely located outside the red circles in Figure 8. Most of the streets within the circles have a mean and median value below 2. In this regard, the analysis of the study area based on the urban safety theories aligns with the participants' safety perceptions, with participants feeling insecure in areas that could lead to a negative safety perception. Even though most streets with a high safety perception score are located outside the circles, some streets remain inside. This situation can be explained by the influence of individual factors and certain landmarks (Figure 8).

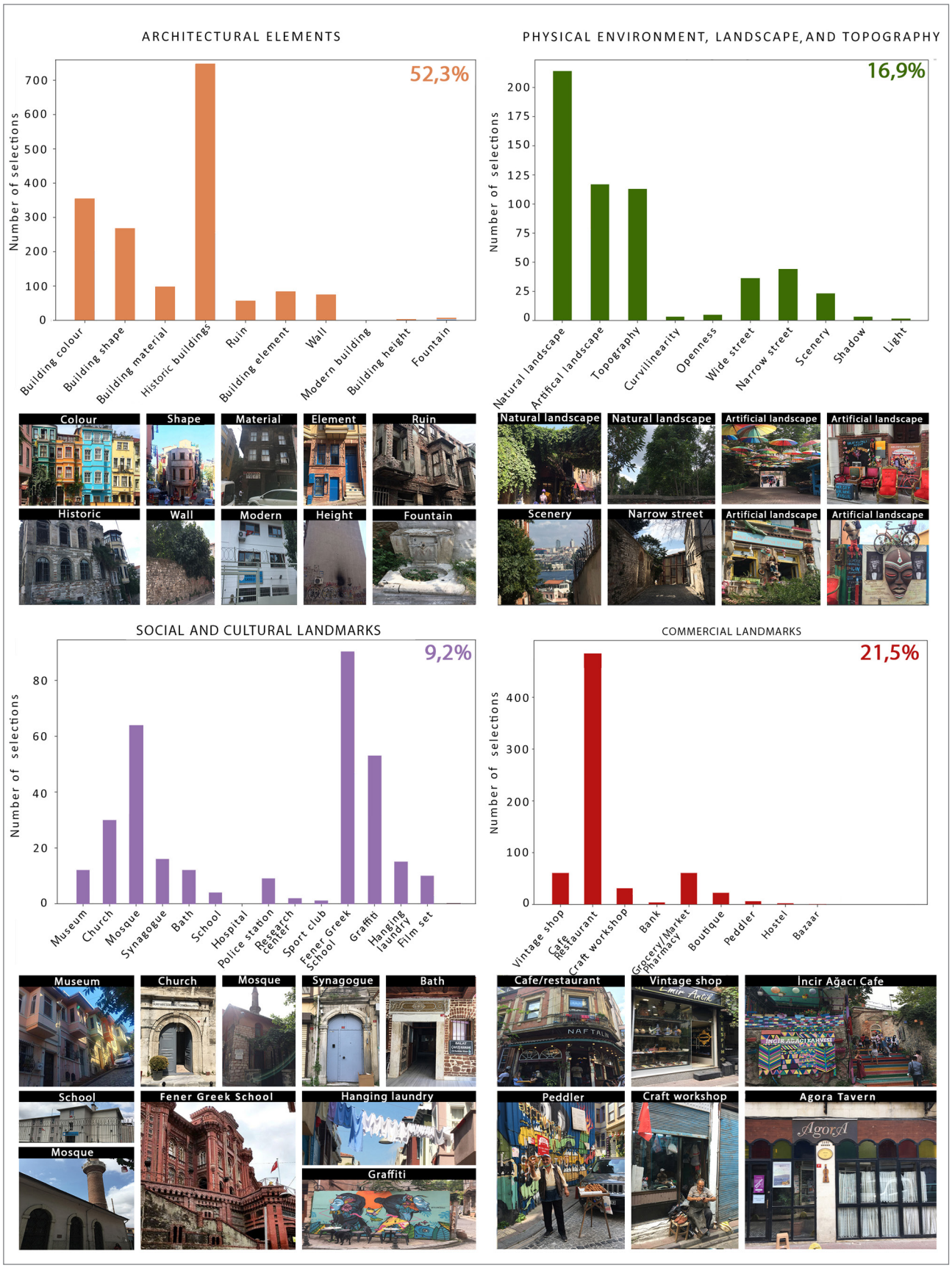

Figure 7: Number of landmarks selected (illustration and photo: authors).

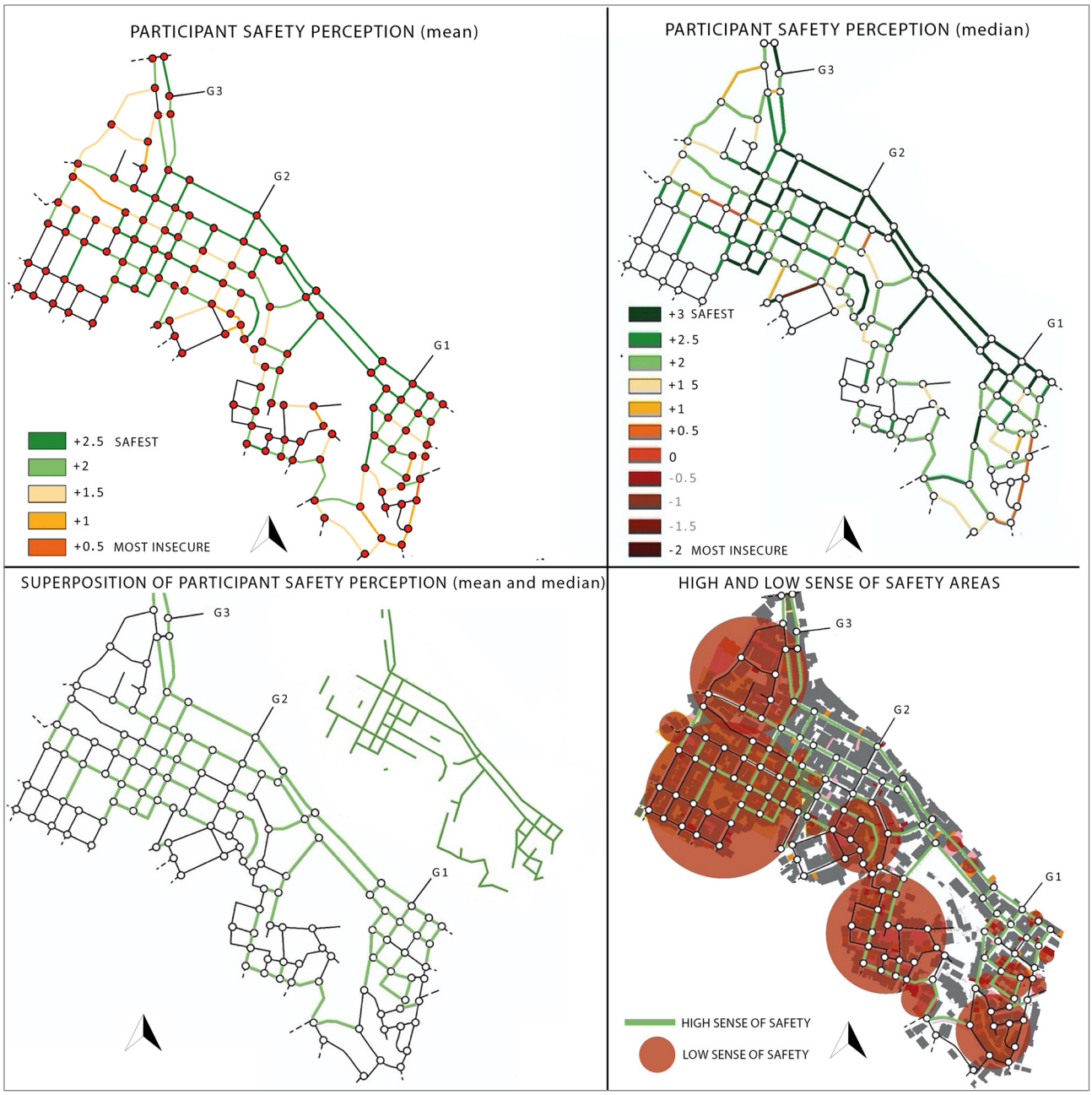

Figure 8: Areas with a high and low perception of safety (illustration: authors; base map: courtesy of the Istanbul Metropolitan Municipality Department of Zoning).

4.2.4 Evaluation of participant numbers, perceived safety, and landmarks

Streets with a high concentration of participants, high number of pedestrians, high perceptions of safety, and a strong attraction power largely overlap. These include Vodina Street, Yıldırım Street, Ayan Street, Leblebiciler Street, Lavanta Street, Kürkçü Çeşmesi Street, Hızır Çavuş Köprübaşı Street, Akgül Street, Çimen Street, Sancaktar Hill, and Mesnevihane Street. Therefore, pedestrian numbers and movement preferences are correlated with the presence, strength, and density of urban landmarks that determine the street's attraction power and contribute to a strong sense of safety (Figure 9).

The findings of the study were analysed statistically. When examining the relationship between the attraction power and the number of participants passing through a street, the average attraction power across all streets was 8.22, with a standard deviation of 6.39. The distribution of attraction power approximately follows a symmetric normal distribution. Streets with attraction power values ranging from 0 to average minus standard deviation were classified as low-attraction streets.

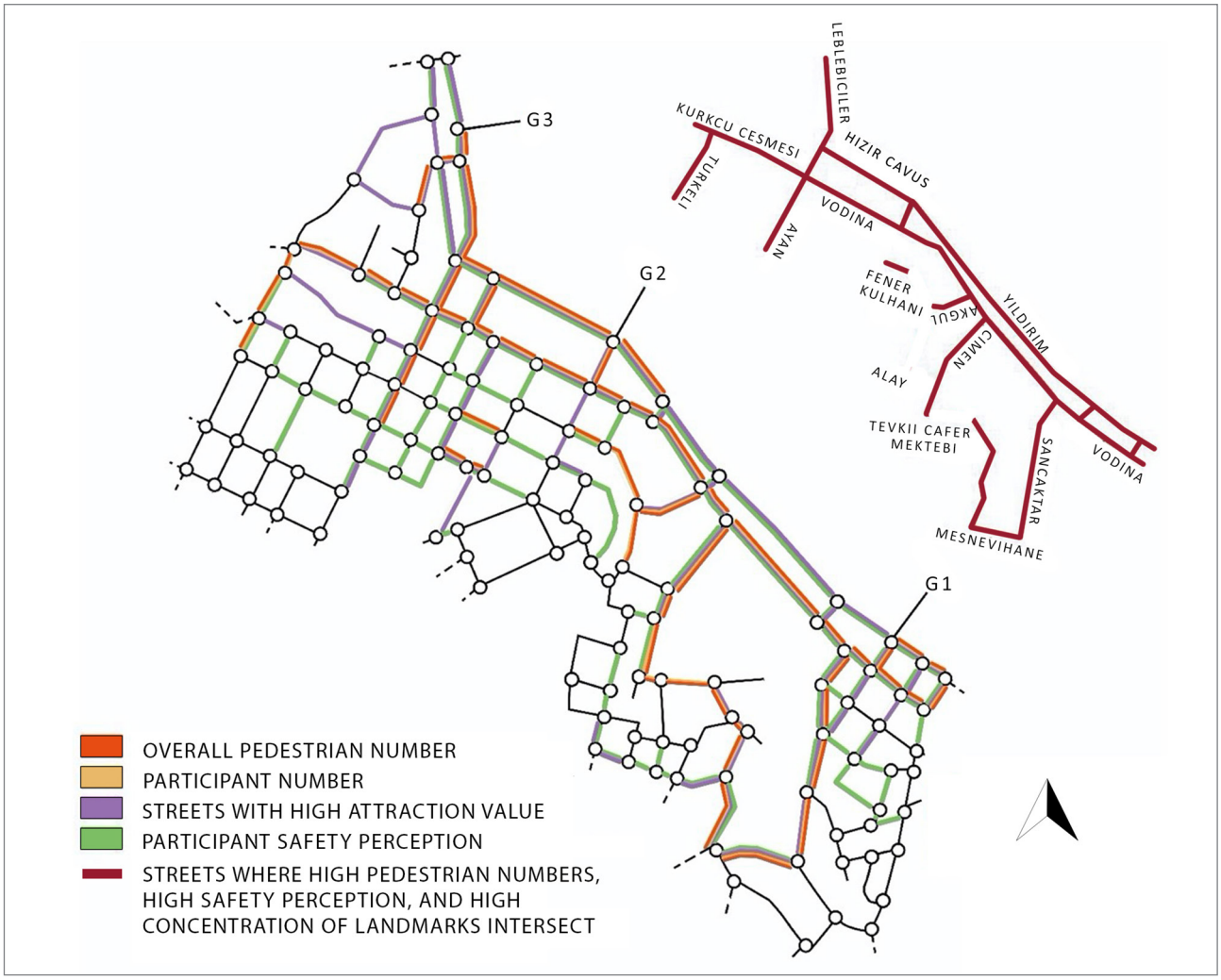

Figure 9: Superposition of streets with a high pedestrian number, high safety perceptions, and a high concentration of landmarks (illustration: authors, base map: courtesy of the Istanbul Metropolitan Municipality Department of Zoning).

Table 3: Classification of streets based on their attraction power and the corresponding average number of participants passing through them.

Attraction power range	Street attraction	Percentage	Average participants
0 to mean minus SD	Low	16	7
Mean minus SD to mean	Low to moderate	34	8
Mean to mean plus SD	Moderate to high	34	11
> Mean plus SD	High	16	13

Source: authors.

These streets constituted approximately 16% of all streets. Streets with values ranging from average minus standard deviation to average were classified as low-to-moderate–attraction streets. These streets constituted approximately 34% of all streets. Streets with attraction power values ranging from average to average plus standard deviation were classified as moderate-to-high–attraction streets. These streets accounted for approximately 34% of all streets. Streets with attraction power values greater than average plus standard deviation were classified as high-attraction streets. There were approximately 16% of such streets. The average number of participants in each class is displayed in a bar chart in Figure 10a. The average number of participants is approximately seven for low-attraction streets, eight for low-to-moderate–attraction streets, eleven for moderate-to-high–attraction streets, and thirteen for high-attraction streets. Therefore, as the street's attraction power increases, the average number of participants on it also increases (Figure 10a and Table 3).

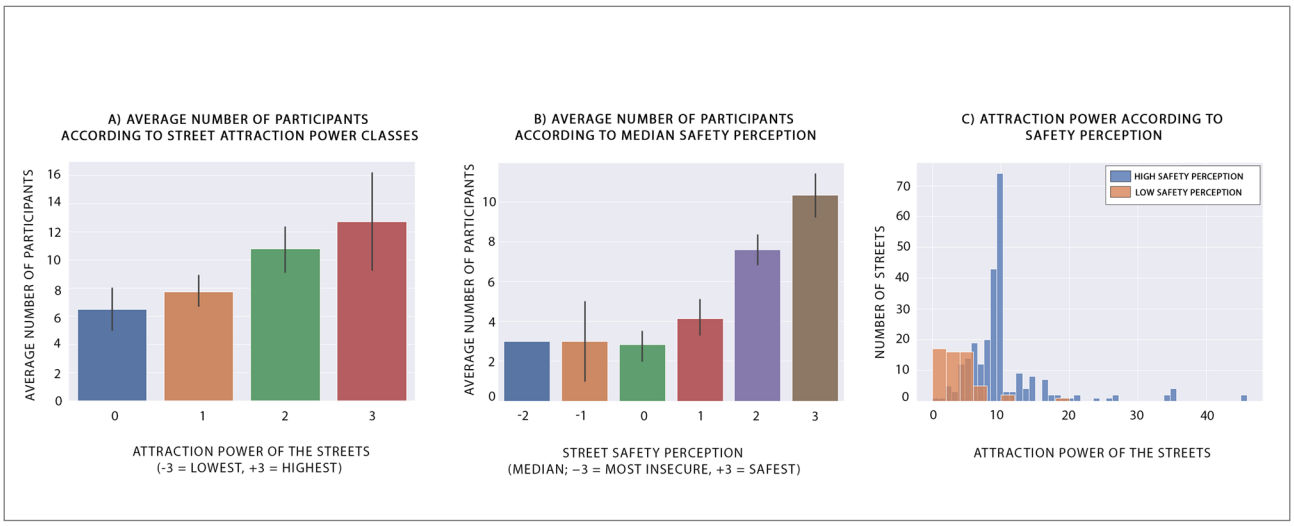

Figure 10: Relationships between street attraction power, perceived safety, and participant number: a) participant number according to attraction power classification; b) participant number according to perceived safety levels; c) attraction power according to perceived safety levels (source: authors).

When examining the relationship between perceived safety and the number of participants passing through a street, the median value of safety perception, scored between −3 and +3, was calculated for all streets, with decimal values rounded up. The average number of participants on streets in relation to their safety perception is displayed in a bar chart in Figure 10b, which shows that, as the street's safety perception value increases, the average number of participants also increases. When examining the relationship between perceived safety and attraction power, the average attraction power of streets with a high sense of safety was 10.28, and the average attraction power of streets with a low sense of safety was 3.33. This indicates that streets with high attraction power, on which urban landmarks are dense and strong, tend to have a higher sense of safety (Figure 10c).

5 Discussion

In relation to the first research question, the findings of the field study conducted indicate that streets with higher levels of attraction power tend to exhibit higher pedestrian density. Streets with high pedestrian density largely overlap with streets that have high attraction power (Figure 9). Moreover, statistical analyses revealed a meaningful increase in the average number of pedestrians as the attraction power of the street increases. For instance, whereas streets with low attraction power hosted an average of seven pedestrians, this number rose to thirteen on streets with high attraction power. These results confirm the influence of spatial attraction power on pedestrian movement and demonstrate that user behaviour is shaped by spatial variability (Figure 10a).

These findings are consistent with the theory of urban image proposed by Lynch (1960), who argued that individuals develop orientation based on the relationship they form with environmental elements. Similarly, Zacharias (2001) emphasized that pedestrian behaviour in urban areas is shaped by interactions with the physical environment and that certain spatial focal points play a determining role in directional choices. In addition, the pedestrian behaviour model developed by Kitazawa and Batty (2004) highlights a strong correlation between environmental stimuli and user preferences. In this context, the strong correlation values and orientation data obtained in this study show significant alignment with both theoretical and empirical findings in the literature. Overall, these results confirm the critical importance of high-attraction urban areas in influencing user mobility, reinforcing their relevance in urban planning and design practices.

With regard to the second research question, the study showed that architectural features are the most influential landmarks affecting users' spatial perception and orientation preferences. These are followed by commercial landmarks and those related to the physical environment, landscape, and topography. Social and cultural landmarks, on the other hand, appear to have the least impact on users' spatial perception and orientation preferences. Key elements influencing participants' orientation decisions included historic buildings, cafés and restaurants, building colours and forms, natural and artificial landscape elements, topographical features, and religious buildings.

These findings support Lynch's (1960) theory of urban image, which emphasizes that visually distinctive and functionally meaningful urban elements guide users in their wayfinding

processes. The Fener Greek School, due to its historical, symbolic, aesthetic, and social qualities, emerges as a particularly significant focal point and spatial reference. Similarly, the classification of landmarks developed by Santos-Delgado (2005) also emphasizes the role of aesthetic, economic, social, historical, and symbolic values in shaping spatial perception. Norberg-Schulz (1966) argued that spatial identity, shaped by symbolic and aesthetic environmental elements, enhances the legibility of urban spaces – an approach that directly aligns with our study, in which the Fener Greek School emerges as a prominent orientation reference. Furthermore, Bratina Jurkovič (2014) demonstrated that aesthetically rich public spaces enhance user interaction and positively influence orientation tendencies. This finding agrees with our study, in which building colour, form, and landscaping characteristics were found to have a strong impact on users' spatial orientation. In this regard, its findings are consistent with earlier findings in the literature (Köseoğlu & Önder, 2011; Zacharias, 2001). In conclusion, landmarks with high aesthetic and economic value play a critical role in directing users' spatial decision-making processes. This effect is closely related to orientation behaviours based on perception and environmental cues (Figure 7).

In reference to the third research question, the study revealed a significant and statistically strong correlation between urban landmarks and the perception of urban safety. Streets with high attraction values largely coincide with those that received high safety perception scores from participants. The maps produced by combining the mean and median values of the safety ratings assigned by participants clearly show that streets perceived as safer overlap considerably with those with a high attraction value (Figure 9). Statistical data further support this correlation. The average attraction score for streets perceived as safe by participants was 10.28, whereas it was only 3.33 for those perceived as unsafe. This difference – over threefold – demonstrates that, as the intensity and quality of landmarks increase, the perception of safety significantly rises as well (Figure 10c). Accordingly, it can be concluded that landmarks not only influence orientation and pedestrian movement but also have a direct effect on the perception of safety within the urban environment.

These findings are also highly consistent with theoretical approaches. Lynch (1960) stated that distinct and functional urban elements help users with orientation while simultaneously enhancing their sense of safety. Similarly, Santos-Delgado (2005) argued that landmarks carry social, symbolic, and aesthetic values, which help reduce spatial ambiguity and thereby foster a greater sense of safety among users. In the same vein, theories such as the broken windows theory (Wilson & Kelling, 1982), defensible space theory (Newman, 1972), and environmental stress theory (Steg et al., 2015) emphasize that environmental qualities such as aesthetic appearance, legibility, clarity, and order directly influence the perception of safety. Within this framework, landmarks contribute to a stronger sense of safety by creating an environment that is aesthetically appealing, orderly, well defined, and of high quality. In conclusion, the findings of the study confirm a strong and direct relationship between the presence and quality of urban landmarks and individuals' perception of safety in urban spaces. This underlines the importance of landmarks not only for visual appeal or wayfinding but also for fostering a psychological sense of safety in the context of urban design and planning processes.

Based on all the above, the hypothesis of the study can be confirmed. This means there is an interconnected and directly proportional relationship between landmarks within the urban space, pedestrian movements/orientations, and the sense of urban safety.

An important methodological limitation of this study is that the participant group consisted solely of individuals that had never visited the study area before. Although this approach helped eliminate prior knowledge bias and allowed a clearer focus on the impact of visual and spatial cues, it also limits the interpretation of the findings to first-time users. Individuals that are familiar with the area may perceive, navigate, and evaluate landmarks and safety differently based on prior experiences, cognitive maps, or habitual routes. Therefore, the results should be interpreted with caution, particularly in terms of their generalizability to frequent users or residents of the area. Furthermore, it should be acknowledged that participants' map-reading and marking skills, as well as their perceptions of landmarks and safety, are shaped by individual characteristics such as spatial cognition, attention levels, and environmental sensitivity. Therefore, a different group of participants may yield different outcomes. In addition, temporal and environmental conditions during data collection can influence pedestrian density and spatial perception. Variations such as weekdays versus weekends, morning versus evening hours, seasonal differences (e.g., winter months), or weather conditions (e.g., rainy or foggy days) may significantly affect how landmarks and safety are perceived. Although the study was conducted during a relatively relaxed phase of COVID-19 restrictions, residual social distancing behaviour may have influenced participants' movement patterns and route preferences. Consequently, the findings of this study should be interpreted within the context of these limitations, and future research is encouraged to include a wider range of participant profiles and environmental conditions to further validate and expand upon the current results.

6 Conclusion

This study contributes significantly to the interdisciplinary dialogue between urban planning, urban design, and environmental psychology by emphasizing the pivotal role of urban landmarks in shaping users' spatial behaviour and perception of safety. One of the primary objectives of urban planning and design is to create inclusive, high-quality public spaces, in which users can feel safe, oriented, and engaged. According to the data obtained, landmarks serve not only as visual and functional cues that guide spatial behaviour but also as elements that reinforce the psychological perception of safety. Therefore, the presence, intensity, and quality of urban landmarks should be considered a critical design parameter in planning safer, more legible, and user-oriented urban environments. Given the growing complexity of urban spaces and the rising importance of human-centred design, the integration of safety-enhancing attraction elements is a suitable direction for future spatial interventions and policy-making processes.

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Acknowledgments

This article is based on the master's thesis *The Effect of Physical and Functional Landmarks on Urban Safety Perception: The Case of Balat, Istanbul*, written by the principal author under the supervision of the coauthor and defended in January 2022.

References

Abu-Obeid, N. (1998) Abstract and scenographic imagery: The effect of environmental form on wayfinding. *Journal of Environmental Psychology*, 18, 159–173. doi:10.1006/jevp.1998.0082

Akers, R. L. (2000) *Criminological theories: Introduction, evaluation, and application*. Los Angeles, Roxbury Publishing Company.

Aksoy, E. (2007) Suç ve güvenli kent yaklaşımı. *Dosya 06 – Kent ve Suç*, 55, 11–15.

Anselin, L., Cohen, J., Cook, D., Gorr, W. & Tita, G. (2000) Spatial analysis of crime. *Criminal Justice*, 4, 213–262.

Banerjee, T. & Southworth, M. (1990) *City sense and city design*. Cambridge, MA, The MIT Press.

Barker, R. G. (1968) *Ecological psychology: Concepts and methods for studying the environment of human behavior*. Stanford, CA, Stanford University Press.

Bilen, Ö. & Büyüklü, A. H. (2018) Kırık pencereler teorisi'nin İstanbul metropoliten alanı'nda geçerliliğinin testi. *İdealkent*, 23(9), 160–188. doi:10.31198/idealkent.416791

Bradshaw, C. (1993) *Creating and using a rating system for neighborhood walkability: Towards an agenda for local heroes*. Paper presented at the 14th International Pedestrian Conference, 1 October, Boulder, CO. Typescript.

Bratina Jurkovič, N. (2014) Perception, experience and the use of public urban spaces by residents of urban neighbourhoods. *Urbani izziv*, 25(1), 107–125. doi:10.5379/urbani-izziv-en-2014-25-01-003

Broadbent, D. E. (1958) *Perception and communication*. London, Pergamon Press. doi:10.1037/10037-000

Carmona, M., Heath, T., Oc, T. & Tiesdell, S. (2003) *Public places, urban spaces*. Oxford, Elsevier.

Clarke, R. V. (1997) *Situational crime prevention: Successful case studies*. New York, Harrow and Heston.

Correa, C. (1983) Quest for identity, architecture and identity. In: Powell, R. (ed.) *Exploring architecture in Islamic culture, 10. Singapore,* Concept Media Pte Ltd.

Çubuk, M., Yüksel, G. & Karabey, H. (1978) Yapılanmamış kentsel-kamusal dış mekanlar. *Yapı*, 30, 25–54.

Cüceloğlu, D. (2019) *İnsan ve davranışı*. Istanbul, Remzi Kitabevi.

Cullen, F. T. & Agnew, R. (1999) *Criminological theory: Past to present*. Los Angeles, Roxbury Publishing Company.

Deleon, J. (1991) *Balat ve çevresi*. Istanbul, Can Yayınları.

Diker, M. & Erkan, N. Ç. (2017) Kent kimliğinde ibadet yapıları: Antakya örneği. *Planlama*, 27(2), 180–192. doi.org/10.14744/planlama.2017.74755

Doğan, H. İ. & Sevinç, B. (2011) Suç teorileri ve şehir güvenliği: Bitlis ili'yle ilgili genel bir değerlendirme. *Polis Bilimleri Dergisi*, 13(4), 27–53.

Dülger-Türkoğlu, H. (2002) Kentsel imge: İstanbul'dan bulgular. *İTÜ Dergisi A, Mimarlık, Planlama, Tasarım*, 1(1), 57–64.

Elliott, M. A. (1952) *Crime in modern society*. New York, Harper and Brothers Publishers.

Erbey, D. & Erbaş, A. E. (2017) The challenges on spatial continuity of urban regeneration projects: The case of Fener Balat historical district in Istanbul. *International Journal of Sustainable Development and Planning*, 12(3), 498–507. doi:10.2495/SDP-V12-N3-498-507

Erkan-Biçer, N. Ç. (2002) Kastamonu örneğinde Anadolu kenti imaj öğeleri ve değişim süreci. Doctoral thesis. Istanbul, Yıldız Technical University, Faculty of Architecture.

Farrington, D. P. (2004) Criminological psychology in the twenty-first century. *Criminal Behavior and Mental Health*, 14, 152–166. doi:10.1002/cbm.583

Gibson, J. J. (1950) *The perception of the visual world*. Cambridge, The Riverside Press. doi:10.2307/1418003

Gifford, R. (2002) *Environmental psychology: Principles and practice*. London, Allyn & Bacon Ltd.

Göregenli, M. (2018) *Çevre psikolojisi: İnsan mekân ilişkileri*. Istanbul, İstanbul Bilgi Üniversitesi Yayınları.

Kaplan, S. (1973) Cognitive maps in perception and thought. In: Downs, R. M. & Stea, D. (eds.) *Image and environment*, 8–26. Chicago, Adline Press.

Kitazawa, K. & Batty, M. (2004) Pedestrian behaviour modelling. In: Leeuwen, J. P. & Timmermans, H. J. P. (eds.) *Developments in design & decision support systems in architecture and urban planning*, 111–126. Eindhoven, Eindhoven University of Technology.

Koca, T. & Erkan, N. Ç. (2019) Yaşam kalitesinin artırılmasında bir etmen: Mekânsal güvenlik ölçütleri. *Megaron*, 14(1), 167–176.

Köseoğlu, E. & Erinsel-Önder, D. (2011) Defining salient elements of human memory and city: Subjective and objective landmarks in Ayvalık. *Arkitekt*, 524, 40–51.

Kürkçüoğlu, E. & Ocakçı, M. (2015) Kentsel dokuda mekânsal yönelme üzerine bir algı-davranış çalışması: Kadıköy çarşı bölgesi. *Megaron*, 10(3), 365–388.

Lang, J. (1987) *Creating architectural theory: The role of behavioral sciences in environmental design*. New York, Van Nostrand Reinhold Company.

Lim, W. S. W. (2000) Memories and urban places. *City*, 4(2), 270–277. doi:10.1080/13604810050147875

Lynch, K. (1960) *The image of the city*. Cambridge, MA, The MIT Press.

Marshall, S. (2005) *Streets and patterns*. New York, Spon Press. doi:10.4324/9780203589397

Massey, D. (1994) *Space, place and gender*. Minneapolis, University of Minnesota Press.

Moughtin, C. & Mertens, M. (2003) *Street and square* (3rd ed.). Oxford, Elsevier.

Mumford, L. (1937) *What is a city?* Available at: https://deensharp.files.wordpress.com/2014/08/mumford-what-is-a-city_.pdf (accessed 1 May 2025).

Norberg-Schulz, C. (1966) *Intentions in architecture*. London, Allen and Unwin Ltd.

Önem, B. & Kılınçaslan, İ. (2005) Haliç Bölgesi'nde çevre algılama ve kentsel kimlik. *İTÜ Dergisi A, Mimarlık, Planlama ve Tasarım*, 4(1), 115–125.

Özbilge, A. F. (2018) *Fener Balat Ayvansaray*. Istanbul, E Yayınları.

Özer, Ö. (2006) Yaya hareketleri ve mekân ilişkisi – İstanbul Galata bölgesi örneği. Master's thesis. Istanbul, Istanbul Technical University, Faculty of Architecture.

Rapoport, A. (1977) *Human aspects of urban form: Towards a man–environment approach to urban form and design*. Oxford, Pergamon Press.

Raubal, M. & Winter, S. (2002) Enriching wayfinding instructions with local landmarks. In: Egenhofer, M. J. & Mark, D. M. (eds.) *Geographic information science*, 2478, 243–259. Berlin, Springer. doi:10.1007/3-540-45799-2_17

Relph, E. (1976) *Place and placelessness*. London, Pion Limited.

Ritts, Z. (2024) Designing justice in the city. *City*, 28(1–2), 297–303. doi:10.1080/13604813.2024.2315873

Rykwert, J. (1982) Learning from the street. In: *The necessity of artifice*, 102–113. New York, Rizzoli.

Sampson, R. J. & Raudenbush, S. W. (2004) Seeing disorder: Neighborhood stigma and the social construction of "broken windows". *Social Psychology Quarterly*, 67(4), 319–342. doi:10.1177/019027250406700401

Santos-Delgado, R. (2005) Architectural landmarks in Davao City: Value-based approach to the history of architecture. *Banwa*, 2(1), 38–62.

Sayar-Avcıoğlu, S. & Akın, O. (2017) Kolektif bellek ve kentsel mekân algısı bağlamında İstanbul Tuzla Köyiçi Koruma Bölgesi'nin mekânsal değişiminin irdelenmesi. *İdealkent*, 8(22), 423–450.

Şenyapılı, Ö. (2009) *İsim isim İstanbul*. Istanbul, Boyut Yayıncılık.

Steck, S. D. & Mallot, H. A. (2000) The role of global and local landmarks in virtual environment navigation. *Presence*, 9(1), 69–83. doi:10.1162/105474600566628

Steg, L., Van Den Berg, A. E. & De Groot, J. I. M. (2015) *Environmental psychology*. Ankara, Nobel.

Topçu, K. D. (2011) Kent kimliği üzerine bir araştırma: Konya örneği. *Uluslararası İnsan Bilimleri Dergisi*, 8(2), 1048–1072.

Trancik, R. (1986) *Finding lost space: Theories of urban design*. New York, Van Nostrand Reinhold Company.

Ülke, R. (1957) *İstanbul anıtları: Ayvansaray, Balat ve Fener semtlerinde anıtlar*. Istanbul, Yeni Matbaa.

Welsh, B. C., Braga, A. A. & Bruinsma, G. J. N. (2015) Reimagining broken windows: From theory to policy. *Journal of Research in Crime and Delinquency*, 52(4), 447–463. doi:10.1177/0022427815581399

Zacharias, J. (2001) Pedestrian behavior and perception in urban walking environments. *Journal of Planning Literature*, 16(3), 3–18. doi:10.1177/08854120122093249