

**EVALUATING THE ENVIRONMENTAL CUES FOR ORIENTATION:
WAYFINDING IN A DISTRICT BAZAAR**

**YÖNLENDİRME İÇİN ÇEVRESEL İŞARETLERİN DEĞERLENDİRİLMESİ:
BİR SEMT PAZARINDA YÖN BULMA**

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ABSTRACT

Finding one's way through the built environment is an everyday task. Especially in unfamiliar and complex environments that are difficult to comprehend and navigate through may be discouraging and frustrating for first time users. Shopping, which is an essential activity to acquire goods for daily use and a form of leisure, can trigger irritation and disorientation when the shopping environment is unfamiliar and complex. People have to rely either on their previous experience with similar environments or on environmental cues they encounter while navigating. This study focuses on navigation and orientation in an outdoor shopping environment and aims to examine the internal and external information that affect wayfinding and spatial orientation. A questionnaire was administered to one hundred participants based on quota sampling in a district bazaar. The results verified that female participants focused on object properties (landmark information) and male participants focused on spatial properties such as location and spatial relations. Participants who were familiar with the bazaar were able to find their way and give verbal information. Furthermore, this study highlights the importance of verbal cues for orientation especially when other environmental (architectural, graphic and spatial) cues are lacking.

Keywords: District Bazaar, Environmental Cues, Spatial Orientation, Navigation, Wayfinding

ÖZET

Yapılı çevrede kişinin yolunu bulması günlük bir işidir. Özellikle anlaşılması ve gezinmesi zor olan bilinmeyen ve karmaşık ortamlarda, ilk kez kullananlar için cesaret kırıcı ve sinir bozucu olabilir. Günlük kullanım için ürün satın almak ve bir tür boş zaman geçirmek için temel bir aktivite olan alışveriş, alışveriş ortamı yabancı ve karmaşık olduğunda huzursuzluk ve yönelim bozukluğunu tetikleyebilir. İnsanlar, ya benzer çevrelerle ilgili önceki deneyimlerine ya da gezinirken karşılaştıkları çevresel ipuçlarına güvenmek zorundadır. Bu çalışma, bir açık hava alışveriş ortamında navigasyon ve oryantasyona odaklanmakta, yön bulmayı ve mekansal yönelimi etkileyen iç ve dış bilgileri incelemeyi amaçlamaktadır. Semt pazarında kota örneklemesine dayalı olarak yüz katılımcıya anket uygulanmıştır. Sonuçlar, kadın katılımcıların nesne özelliklerine (röper noktası bilgileri) ve erkek katılımcıların konum ve mekansal ilişkiler gibi uzamsal özelliklere odaklandığını doğrulamaktadır. Pazara aşına olan katılımcılar yollarını bularak sözlü bilgi verebilmiştir. Ayrıca, bu çalışma, özellikle diğer çevresel (mimari, grafik ve mekansal) işaretler eksik olduğunda, yönlendirme için sözlü işaretlerin önemini vurgulamaktadır.

Anahtar Kelimeler: Semt Pazarı, Çevresel İşaretler, Mekansal Yönlendirme, Navigasyon, Yön Bulma

1. INTRODUCTION

Navigation and orientation are everyday spatial activities that are performed in various built environments. It can take place in familiar environments or in unfamiliar environments in which an individual has little or no prior experience; it can also occur in large environments that are difficult to perceive from a single point. People navigate through complex built environments where they can experience difficulties in finding their way to a desired destination. These environments, such as transportation centers, governmental buildings, universities, offices, museums, hospitals and shopping malls can be challenging and frustrating for first-time users. People can become disoriented and feel lost when they have little or no prior knowledge about the environment. Wayfinding is a spatial problem solving activity that enables people to navigate and orient in the built environment (Arthur-Passini, 1992; Passini, 1984). In order to reach the desired destination, individuals need to identify their current locations and orientations, and to determine a path or route between their current and target locations (Golledge, 1999). Shopping, which is an essential activity to acquire goods for daily use and a form of leisure, can trigger irritation (Passini, 1996). Previous studies conducted in shopping malls indicated that wayfinding can be a problem for shoppers (Chebat et al., 2005, 2008; Doğu-Erkip, 2000; Li et al., 2019; Ng, 2003; Passini, 1996). Wayfinding in these environments causes frustration and disorientation when various internal and external information affect the wayfinding behavior. Finding the way within these complex environments spares the individual from stress, anxiety and confusion.

2. NAVIGATION

Navigation is a coordinated and goal directed movement through an environment that consists of two parts, travel (locomotion) and wayfinding (Montello-Freundschuh, 2005). Travel emphasizes the physical processes to execute navigation plans while wayfinding emphasizes the mental processes of navigation (Zhang, 2008). Wayfinding is defined as a spatial problem solving activity in which people encounter everyday (Arthur-Passini, 1992). It is a purposive, directed and motivated activity to efficiently find one's way from the origin to a desired destination (Allen, 1999; Golledge, 1999). According to Arthur and Passini (1992) wayfinding consists of three interrelated processes: decision-making (and the development of a plan of action), decision execution (transforming the plan into appropriate behavior at the right time and place) and information processing (comprising environmental perception and cognition that are responsible for the information basis of the two decision-related processes). When people navigate in environments they tend to update their orientation as they progress. Updating one's location and spatial orientation with respect to the environment are crucial processes during wayfinding (Avraamides et al., 2004). Spatial orientation is the ability to know one's location within the environment and the relative location of other objects, and to continually update this knowledge. Orientation ability is often a pre-requisite for successful navigation (Parush-Berman, 2004; Passini, 1996).

People unconsciously construct a mental map of the environment while navigating in an environment that is referred to as a cognitive map. The cognitive map is a mental representation of the spatial layout of the environment that enables the individuals to find their way in unfamiliar environments and it is continually refined and updated as the environment is re-explored (Montello-Freundschuh, 2005). The cognitive map is composed of three levels of

knowledge that are landmark, route and survey knowledge (Parush-Berman, 2004). Landmark knowledge is derived from the knowledge of salient objects in an environment (Schlender et al., 2000). Information about the shape, size, color and contextual information about landmarks, or memorable and distinctive objects in an environment are presented in landmark knowledge (Montello, 1998; Sadeghian et al., 2006). Landmarks do not contain spatial information, but they are believed to play critical roles in route knowledge by indicating the decision points along a path and helping the traveler to remember the procedures needed to reach a destination, and in survey knowledge by providing regional anchors that help them to determine the distances and directions (Sadeghian et al., 2006). Route knowledge is the knowledge of routes that connect landmarks into a travel sequence (Montello, 1998; Montello-Freundschuh, 2005). Survey knowledge is gained when routes and landmarks are combined into a cognitive map. It can be considered as the ultimate stage of navigational knowledge acquisition because it is based on a world-centered frame of reference; the user has the ability to take shortcuts, create efficient routes, point directly between landmarks and utilize increasingly abstract terms of reference, such as cardinal directions (Kallai et al., 2005; Montello, 1998; Ruddle-Peruch, 2004). Landmark, route and survey knowledge are three approaches to wayfinding that people can use for spatial knowledge acquisition. For successful navigation, people need to plan their movements by using spatial knowledge that is acquired about the environment and is stored as cognitive maps (Ruddle-Peruch, 2004).

3. FACTORS AFFECTING NAVIGATION

While navigating in unfamiliar built environments people can fail to orient themselves, find the appropriate path or become lost, they can experience frustration, stress, and feel anxious, lost and angry (Arthur-Passini, 1992). Navigation is a dynamic process where the task and the environment in which it takes place, affects the way a person moves. Consequently, successful navigation is an interplay between internal information that consist of gender and spatial familiarity, and legible environmental cues as external information that exist in the environment.

3.1. Internal Information

Previous studies have shown that there are gender differences in the ability to acquire spatial information and navigate through complex environments (Sandstrom et al., 1998; Saucier et al., 2003; Tlauka et al., 2005). Males employed an Euclidean approach in navigating to a target, using cardinal directions and absolute distance (allocentric strategy), whereas females used a topographic strategy that relied more on visual landmarks and egocentric directions (i.e. left/right) (egocentric strategy) (Barkley and Gabriel, 2007; Chai-Jacobs, 2009; Chen et al., 2009; Coluccia-Louse, 2004; Dabbs et al., 1998; Picucci et al., 2011; Sandstrom et al., 1998; Saucier et al., 2003; Tlauka et al., 2005). Males formed a more accurate representation of the Euclidean or geometric properties, whereas females formed a more accurate representation of the landmarks in the 2D environment (Sandstrom et al., 1998). Furthermore, Chen and colleagues (2009) indicated that males have a better movement performance when compared to females.

When people give navigational directions to others, females refer more to cues and other visual objects along a route. They also show greater accuracy in recalling cues and in estimating

distances to cues, and report using a route-based navigation strategy. They provide more landmark information than do men. On the other hand, it is reported that males use more cardinal directions, often provide more cardinal descriptions and use an orientation strategy (Cherney et al., 2008; Dabbs et al., 1998; Hund et al., 2008; Hund-Minarik, 2006; Iachini et al., 2005; Sandstrom et al., 1998; Saucier et al., 2003). Kozhevnikov and colleagues (2005:725) asserted that “females tend to be object visualizers and males tend to be spatial visualizers”. In other words, females use object properties such as shape and color, whereas males use spatial properties such as location and spatial relations (Chebat et al., 2008).

Lavenex and Lavenex (2010) indicated that although females and males exhibit different strategies when solving a real world spatial relational memory task in which females considered the local cues and males considered the local and spatial cues, they did not differ in their overall ability and accuracy to solve the task. In addition, males and females differ in the amount of attention that is given to the objects in the environment. Females have better object memory than males in remembering the location and identity of previously viewed objects (Barkley-Gabriel, 2007; Levy et al., 2005; Voyer et al., 2007). Barkley and Gabriel (2007) claimed that the female superiority in object memory may be the result of females using positional, landmark-based strategies for navigation.

While shopping is stereotypically an activity conducted by females (Buttle, 1992), females and males search shopping information similarly (Avery, 1996). Titus and Everett (1995) theorized that wayfinding could be affected by shopping values. According to Titus and Everett (1995) shoppers can be classified as utilitarian and hedonist. Utilitarian shoppers focus on completing a task of finding items in a rational and efficient way, and their wayfinding strategies are based on the use of landmarks and/or other people. They move rapidly without changing their way or stopping and limit their contact with the environment to persons and things important to their problem solving. On the other hand, hedonist shoppers enjoy the process of shopping, they move more slowly by stopping frequently and changing their routes (Titus-Everett, 1995). Doğu and Erkip (2000) showed that females and males are equally efficient in wayfinding in a shopping mall, even if females are more familiar with the shopping mall. Likewise, Chebat and colleagues (2008) found that women, as hedonist shoppers, are more efficient in a shopping mall and use more people as information sources.

During navigation the level of familiarity of people to the built environment is another factor that can affect wayfinding. Familiarity means being closely acquainted with or knowing something or being well known from a long or close association (Najafpour et al., 2017). Familiarity with an environment is gained by experiencing it, either consciously or unconsciously. People familiar with the built environment are more efficient in finding their goal and tend to use information stored in memory, whereas people who are unfamiliar use external sources of information (Abu-Ghazze, 1996). An increase in familiarity with the environment results in better performance on wayfinding and spatial orientation performance tasks and the degree of complexity of the layout of the environment becomes less important (O’Neill, 1991; Prestopnik-Roskos-Ewoldsen, 2000). Likewise, Hunt and Waller (1999) indicated that as people become familiar with the environment, they first acquire landmarks, paths and finally develop configuration knowledge of the key locations. In addition, unfamiliar people are more likely to make mistakes and walk more in particular on their way back and use environmental information whereas familiar people use information stored in memory (Chebat

et al., 2005, 2008). However, Doğu and Erkip (2000) showed no significant relation between the frequency of visits to the shopping mall and spatial orientation.

3.2. External Information

When people navigate in unfamiliar environments, the design of the environment should promote rapid information that is necessary for successful navigation and orientation. The legibility of the built environment is an important design issue that influences the ease of wayfinding for many people since the features of the environment aid people in creating effective cognitive map of spatial relationships within an environment (O'Neill, 1991). Legibility is the ease, with which a displayed message can be seen or discerned within an environment helps us to understand the spatial organization (Arthur-Passini, 1992). Legibility of the built environment indicates how characteristics of an environment differently contribute to the development of spatial knowledge acquisition. Lynch (1960) highlighted five elements of the environment that enhance legibility: paths, edges, landmarks, districts and nodes. Paths are linear separators that define channels of movement, such as streets or walkways. Edges are barriers or boundaries; such as walls or fences. Landmarks are described as visible reference points that may be large objects, which are in sharp contrast to their immediate surroundings or on a local scale. Districts consist of large sections that have recognizable, common perceived identity, homogeneity or character, which differentiates them from other areas and in which observers mentally experience 'inside of'. Nodes are focal points that consist of intensive activity to and from people may travel or with similar characteristics (Lynch, 1960; Nasar, 1998). These elements help to form a cognitive map of the environment.

Various environmental design elements can influence legibility and contribute to wayfinding ease such as architectural differentiation, visual access, the use of signs and room numbers to provide identification or directional information and spatial layout (Weisman, 1981). The degree of differentiation refers to the parts of an environment that look different or to objects in an environment that make the environment more or less recognizable. The differentiation of environments can be the result of varying size and shape of environment, architectural style and salient landmarks in the environment. Visual access refers to which different parts of the environment can be seen from a vantage point. The complexity of layout is determined by the environmental size, the number of possible choices of routes in the environment, and whether the routes intersect at right angles or not. The complexity of spatial layouts can be associated with the visual access since an environment of lower layout complexity is associated with higher visual access (Li-Klippel, 2010). A simple plan plays an important orientation role by allowing the visitor to concentrate on the purpose of the visit (Bourdeau-Chebat, 2003).

According to Başkaya and colleagues (2004) the uniformity of architectural composition and the lack of reference points increased wayfinding difficulties, whereas visual access to the main destinations made wayfinding easier. They found that remembering a regular but asymmetrical floor plan was easier than a regular but symmetrical layout and a simple corridor system allowed for easy orientation. Çubukcu and Nasar (2005) found that environments with simple layout and higher physical differentiation provided better spatial knowledge than environments with complex layout and lower physical differentiation. The simple layouts also had significantly lower selection, sketching and navigation errors than the complex ones.

Overall, understanding the influences of different aspects of environments is important in how they influence the legibility of environment and the wayfinding behaviors (Li-Klippel, 2010).

Legible environments in which people can effectively maintain their orientation and find their way are not simplistic, dull or boring. Navigation and orientation in the built environment can be enhanced by environmental cues that people use while navigating. These cues are comprised of all kinds of information that is available in the environment, such as ‘architectural’ (with emphasis on the features of the architectural elements locally perceivable), ‘verbal’ (from information desk, people, staffs), ‘graphic’ (signage, map) and ‘spatial’ (how things relate to each other, with the emphasis on the layout of these elements) cues (Arthur-Passini, 1992; Sun-de Vries, 2009).

4. THE CASE STUDY

Architectural design, which is a problem solving activity, requires experiencing the spatial layout of the built environment, discovering environmental cues and maintaining spatial orientation during navigation. Navigation and orientation can be problematic when the environment is complex or unfamiliar. People have to rely either on their previous experience with similar environments or on environmental cues they encounter while navigating. Wayfinding research is mainly conducted in large, complex built environments, such as hospitals (Başkaya et al., 2004; Devlin, 2014), shopping malls (Chebat et al., 2005, 2008; Doğu-Erkip, 2000; Güneş, 2018; Li et al., 2019; Ng, 2003), libraries (Mandel, 2013, 2018), museums (Cosley et al., 2009), educational environments (Kanakri et al., 2016) and airports (Churchill et al., 2009); however, wayfinding in an outdoor shopping environment has not been studied. This study aims to examine the internal and external information during navigation and spatial orientation in a district bazaar.

The hypotheses of the study are as follows:

1. Familiarity with the bazaar improves wayfinding.
2. Gender differences affect wayfinding in the bazaar.
3. The environmental elements like node, edge, district, path and landmark influence wayfinding and orientation in the bazaar.
4. Verbal cue within the bazaar is more important than architectural, graphic and spatial cues.

4.1. Description of the Site

A bazaar is a market consisting of rows of shops or stalls where a variety of goods are sold by many small and private vendors (Merriam-Webster Dictionary, 2020; Ng, 2003). A bazaar is designed to encourage social interaction among shoppers and between shoppers and vendors. However, this social interaction becomes a determinant for wayfinding when the layout of the bazaar is complex, not legible and visually accessible. Stall owners are able to give directional help where other environmental cues are lacking, such as legible architectural, spatial and graphical cues consisting of legible spatial layout and circulation routes, landmarks, directional and informative signs at decision points (Ng, 2003).

The bazaar is situated in the Maltepe district of Ankara and on one of the major roads that lead to the outer skirts of the central business district. The bazaar is semi-closed and is lined with stalls on both sides. There are nine different ways to enter the bazaar and the

intersecting narrow alleys allow one to circulate in between the other sections of the bazaar. The stalls in the bazaar are numbered; however, they are not visible, the stall owners help to show the right stall.

4.2. Participants

The sample group consisted of eighty shoppers (forty females and forty males) who were chosen by quota sampling based on gender differences. The age range was from 21 to 50 years and the mean age was 34.81. A stationary point in the bazaar was determined (marked as X in Figure 1) and every participant from each gender was asked if they would complete the questionnaire. Participation to the questionnaire was voluntary; if they refused the next person was asked. In addition, every respondent was informed on the purpose of the study.

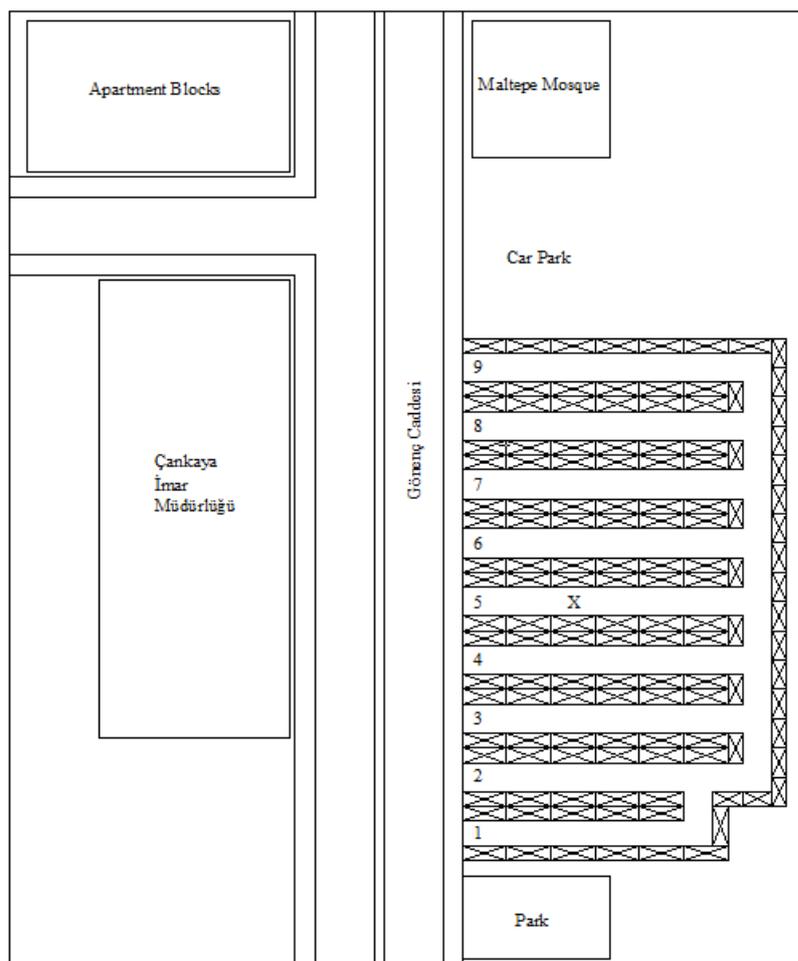


Figure 1. Spatial layout of the district bazaar (not to scale)

4.3. Procedure

The study was conducted in two phases. In the first phase, the spatial layout of the bazaar was analyzed and the environmental elements within and around the bazaar were identified and classified according to path, node and landmark. The environmental elements around the bazaar, which were identified by Lynch (1960), can be stated as a mosque (landmark), street (path), a park (node), directorate building of Çankaya municipality (node) and car parking area (node) (see Figure1). The types of stalls at the beginning of each alley were identified. The

'dried fruits' stall located on the eighth alley was identified as a landmark by the researcher. The availability of environmental cues in the bazaar was searched.

In the second phase, a questionnaire was administered to the shoppers during a weekend. The questionnaire consisted of questions on demographics, familiarity, frequency and reason for using the bazaar, point of enter and exit, existence and relevancy of environmental cues and spatial layout of the bazaar.

4.4. Results

Statistical Package for the Social Sciences (SPSS) 12.0 was used to analyze the data. In the analysis of the data, chi-square tests and frequencies were used.

The first hypothesis, which was familiarity with the bazaar improves wayfinding and orientation, was analyzed by identifying its relationships between verbal cue and environmental elements. The frequency of visits to the bazaar was a determining factor for familiarity. Fifty-seven percent of the participants visited the bazaar more than once in a month and the main reason for visiting the bazaar was to buy products or goods (90%). There was a significant relationship between the frequency of visits to the bazaar and not being lost ($\chi^2 = 8.10$, $df = 2$, $p \leq 0.018$). Likewise, there was a significant relationship between the frequency of visits to the bazaar and the ability to give directions within the bazaar ($\chi^2 = 7.08$, $df = 2$, $p \leq 0.029$). A significant relationship was seen between the frequency of visits and identifying the correct alley of the dried fruits stall ($\chi^2 = 6.42$, $df = 2$, $p \leq 0.033$).

According to the results related to the gender differences, there was no significant relationship between gender and wayfinding in the bazaar. However, there was a significant relationship between gender and the identification of environmental elements around the bazaar ($\chi^2 = 7.48$, $df = 2$, $p \leq 0.024$). Female shoppers identified the landmark (mosque) as the key element for finding the bazaar, whereas the male shoppers identified the landmark and the nodes around the bazaar, which were the car parking area, directorate building of Çankaya municipality, park and apartment blocks.

There was not a significant relationship between the environmental elements and wayfinding in the bazaar, since the majority of the participants (82%) indicated that the environmental elements in the bazaar for wayfinding and orientation were lacking. Likewise, there was not a significant relationship between the frequency of visits and the identification of environmental elements in the bazaar. Even though some respondents who visited the bazaar frequently were able to identify certain sections in the bazaar, this was not significant for wayfinding and orientation in the bazaar. A significant relationship was seen between the frequency of visits and noticing the environmental elements around the bazaar ($\chi^2 = 6.03$, $df = 2$, $p \leq 0.049$). Respondents were able to identify the environmental elements, such as landmark (mosque), node (car parking area, directorate building of Çankaya municipality, park and apartment blocks), edge and path around the bazaar. Sixty-four percent of the participants indicated that they remembered their point of entry and did not feel lost.

According to the results related to the verbal cue, a significant relationship was found between the feeling of being lost and asking for help ($\chi^2 = 5.56$, $df = 1$, $p \leq 0.021$). Participants who felt lost mainly asked the stall owners for help since they were more familiar with the bazaar. In addition, there was a significant relationship between giving directions within the bazaar and the availability of environmental cues within the bazaar ($\chi^2 = 9.54$, $df = 1$, $p \leq$

0.002). Since the relevant environmental cues were not available within the bazaar, the shoppers relied on the verbal cues from the stall owners.

5. DISCUSSION AND CONCLUSION

Wayfinding as a spatial problem solving activity enables people to navigate and orient in the built environment (Arthur-Passini, 1992; Passini, 1984). The ease of wayfinding in a built environment can be understood by the users of the environment. People can become disoriented and feel lost when they have little or no prior knowledge about the environment. As a result, they have to rely either on their previous experience with similar environments or on environmental cues they encounter while navigating. During shopping wayfinding can be a problem that causes frustration and disorientation for the shoppers when various internal and external information are lacking. The legibility of the environmental cues (architectural, verbal, graphic and spatial cues) is important. Previous studies have focused on wayfinding in a shopping mall (Chebat et al., 2005, 2008; Doğu-Erkip, 2000; Güneş, 2018; Li et al., 2019; Ng, 2003); however, this study focused on navigation and orientation in an outdoor shopping environment. The aim of the study was examining the internal and external information that affect wayfinding and orientation in a district bazaar.

Familiarity is one of the essential factors that influence wayfinding and spatial orientation in an environment. People who are familiar with the environment use internal sources of information, whereas people who are unfamiliar use external sources of information. An increase in the frequency of visits to an environment develops familiarity and becoming familiar with the environment improves the ability to identify environmental elements and find the way around. In agreement with the previous studies (Güneş, 2018; O'Neill, 199; Prestopnik-Roskos-Ewoldsen, 2000), as the frequency of visits to the bazaar increased, the participants became familiar with the bazaar, did not feel lost, were able to identify a specific stall and were able to give directions.

Although shopping is stereotypically a female activity (Buttle, 1992), no gender differences in wayfinding were found in the bazaar similar to Doğu and Erkip's study (2000). However, gender differences were seen in the identification of the environmental elements around the bazaar. Female participants only identified the landmark; whereas male participants identified the landmark and the nodes, in other words, male participants considered more environmental elements. This is line with previous studies (Cherney et al., 2008; Dabbs et al., 1998; Hund et al., 2008; Hund-Minarik, 2006; Iachini et al., 2005; Lavenex-Lavenex, 2010; Kozhevnikov et al., 2005; Sandstrom et al., 1998; Saucier et al., 2003) in which female participants recall and rely more on landmarks, and are object visualizers, whereas male participants focus on spatial cues, use an orientation strategy and are spatial visualizers. In addition, female participants used verbal cue more than male participants.

The legibility of the environment is an important design issue that influences the ease of wayfinding and can be enhanced by environmental elements, such as paths, edges, landmarks, districts and nodes (Başkaya et al., 2004; Doğu and Erkip, 2000; Lynch, 1960; O'Neill, 1991). In the bazaar, the participants were unable to identify environmental elements that would contribute to the development of spatial knowledge acquisition and cognitive map. However, they identified environmental elements around the bazaar that helped them to find the bazaar.

The environment consists of verbal, graphic, architectural and spatial cues that are available for people to use during navigation (Sun-de Vries, 2009). Various studies have focused on the graphic, architectural and spatial cues of the environment (Doğu-Erkip, 2000; Güneş, 2018; Memikoğlu-Demirkan, 2020; Sun-de Vries, 2009); however, this study highlights the importance and use of verbal cues in a bazaar when the other environmental cues are not perceivable by the participants. According to the results, the verbal cue from the stall owners gained importance in the bazaar; in other words, when the participants got lost verbal communication was the only source of information to find their way. The verbal cue aided the participants within the bazaar.

This study emphasizes the importance of verbal cue as an environmental cue during navigation and orientation in a district bazaar when visual access to the exterior is limited and environmental cues are not available or legible in a semi-closed outdoor environment. In order to increase accessibility and safety, and minimize stress and anxiety, designers and interior architects need to consider human wayfinding abilities when designing complex built environments to minimize wayfinding challenges, allow people to find their way intuitively. In addition to verbal cue, successful wayfinding and orientation relies on providing sufficient, legible and effective environmental cues to solve wayfinding problems.

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