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*Field Methods* 2008 20: 226 originally published online 24 April 2008  
DOI: 10.1177/1525822X08316605

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# Shopping Malls: Measuring Interpersonal Distance under Changing Conditions and across Cultures

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*This research measures interpersonal distances between shopping mall users under changing conditions of enclosure and density. It also explores the relationship between culture and interpersonal distance. Four shopping malls in Turkey and the United States are used. The research is carried out through unobtrusive observations with time-lapse digital photography to record naturally occurring interactions between mall users. More than three thousand interpersonal distances are measured. Type of enclosure is defined by the exploratory surveys, and density conditions of each area are measured after manual counts of people present in the digital photographs of open and enclosed mall areas. Overall comparisons and descriptions provide evidence about cross-cultural, age, and gender differences in interpersonal distance. Pairs in Turkish malls interact more closely than those in U.S. malls; adolescents interacting with other adolescents have the largest interpersonal distance; male–female pairs interact more closely than male–male and female–female pairs in all malls.*

**Keywords:** *interpersonal distance; personal space; density; enclosure; shopping malls*

## INTRODUCTION

Design research, focusing on personal space requirements for human comfort (Kahana et al. 2003; Douglas and Douglas 2004), has recently become concerned with changing environmental conditions in contemporary urban environments. New media technologies, such as the cell phone (Oksman and Turtianinen 2004), along with building standards, design guidelines, and living conditions, present new challenges regarding the definition of physical characteristics and the quality of the built environment

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*Field Methods*, Vol. 20, No. 3, August 2008 226–248

DOI: 10.1177/1525822X08316605

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as related to personal space available to individuals and groups. Age and gender may also be important to understanding the relationship between characteristics of the physical environment and interpersonal interaction. Intercultural differences in personal space have become an increasingly crucial element of social interactions in contemporary, globalized cities. As a result of globalization, a better understanding of personal space could lead to improved and more user-friendly built environments in our cities.

Personal space is an essential feature of individuals' social behavior in relation to their physical environment and social interactions (Hall 1966; Sommer 1979; Hayduk 1983). Research focusing on behavioral dimensions of space planning should concern itself with these interactions. Findings would provide usable information to designers, who would then better understand how people interact with others in different environments. Depending on the outcome of such research, design variables of built environments such as shopping malls would be examined specifically with regard to interpersonal interactions between users. Information gained from such studies would improve the design of these environments.

For example, architecturally well-defined settings would support more cooperative behavior, a higher degree of engagement in activities, and more social interaction among people. Understanding the ramifications of the physical environment on user interaction is crucial for designers who configure the space and its elements to support interpersonal contacts and facilitate the desired social interactions.

In this context, digital photography could provide insight into how users interact with others in relation to the changing spatial conditions of built environments, such as shopping malls. This article is the result of a study that explored spatial features of shopping malls and interpersonal distance patterns of mall users in U.S. and Turkish cities. The results aim to draw conclusions to establish a basis for methodological implications as well as for future research needs.

## BACKGROUND

Interpersonal distance is a very salient cue to both young and old (Strayer and Roberts 1997; Feeney 1999). People give cues to others about how they want to interact in whatever environment they are in, and one of these cues is interpersonal distance. On the social front, the physical distance between interactive partners plays a significant role in shaping the quality and tone of their encounter and helps establish and maintain a level of intimacy that is comfortable, appropriate, and safe (Gurevitch 1990; Shamasundar 1999;

Thomson and Johnson 2006). Additionally, a person's choice of interpersonal distance and his or her response to proximity seeking or distancing by a social partner transmits important cues as to the individual's comfort with emotional closeness and the willingness to express it (Burgeon and Le Poire 1999). Interpersonal distance informs both participants and observers about the nature of the participants' relationship to others (Gifford 2002; Hall, Coats, and LeBeau 2005). In this respect, we may relate interpersonal distance to the concept of personal space, which is defined as a protective mechanism founded on the ability of the individual to perceive signals from the physical environment (Sommer 1979, 2002; Webb and Weber 2003). The preservation of personal space might be used as a control criterion by the subjects to plan and predict future behaviors in accordance with the changing environmental contexts (Hall 1966; Gerin-Lajoie, Richards, and McFadyen 2005).

Many components of the built environment have been studied for their relationship to interpersonal interaction. Past research has found that situational variables such as artificial lighting (Miwa and Hanyu 2006), color and ceiling height (Read, Sugawara, and Brandt 1999), type of enclosure (Pedersen and Topham 1990), and high density (Sinha and Nayyar 2000; Sakuma, Mukai, and Kuriyama 2005) affect social interaction between individuals. Type of enclosure is an important environmental feature related to people's perception of the environment; the proportion of closed to open surfaces influences the way people experience enclosure and the way they interact with others (Al-Homoud and Abu-Obeid 2003).

Cultural differences in spatial distancing were found to influence the use of space and the style of social interaction (e.g., touching [Dibiase and Gunnoe 2004]). With all the definitions of personal space, it is important to remember that it is very particular to each individual and culture (Hall 1966; Hayduk 1983). There are many variations and interpretations of personal space. In a cross-cultural study, Evans, Lepore, and Allen (2000) discovered that Latin Americans and Asians have a smaller personal space than North Americans or Northern Europeans. Even within the United States, people perceive personal space differently. Mexican Americans and Vietnamese Americans have a different understanding of personal space than do Anglo Americans and African Americans. These findings can be explained by two theoretical accounts based on differences between contact and noncontact cultures (Beaulieu 2004) and differences between collectivistic and individualistic cultures (Triandis 1994; McSweeney 2002).

Beaulieu's (2004) case study focusing on cross-cultural differences of personal space aimed to measure interpersonal distance in a cross-cultural environment. Results showed that noncontact cultures used the largest zone of personal space; as expected, contact cultures (Mediterraneans and Latinos)

used the shortest distance. According to the proxemic account, contact cultures prefer closer interpersonal distances and more interactions than non-contact ones (Remland, Jones, and Brinkman 1995; Li 2001; Barry 2003; Horenstein and Downey 2003; Beaulieu 2004). Alternatively, the collectivism–individualism perspective views individuals from a collectivistic culture as more eager to create connections with their peers and more likely to seize opportunities that allow for proximate social interactions than do individuals from individualistic cultures (Lustig and Koester 1996; Evans et al. 2000; Mesquita 2001). It is, therefore, reasonable to expect differences in reaction to density between North American (noncontact/individualistic) and Turkish (contact/collectivist) cultures (Rustemli 1992).

Previous research has found variation in interpersonal distances among gender groups (Akande 1997; Berry and Hansen 2000; Amole 2005; Uzzell and Horne 2006) and generally concluded that female pairs maintain closer distances than male pairs (Aiello 1987; Gifford 2002; Horenstein and Downey 2003). It has been argued that basic gender differences are due to either a female predisposition to be more affiliative than males and/or a stronger female socialization to be affiliative. Past research has also examined the role of age in personal space behavior (Vranic 2003) and found that older adults increased their personal space more than younger adults (Rapp and Gutzmann 2000; Webb and Weber 2003; Gerin-Lajoie, Richards, and McFadyen 2005).

Previous researchers (Harrell, Hutt, and Anderson 1980; Eroglu and Harrell 1986; Eroglu and Machleit 1990; Machleit, Kellaris, and Eroglu 1994; Machleit, Eroglu, and Mantel 2000; Pons, Laroche, and Mourali 2006) have acknowledged the considerable interest in studying crowding issues in a retailing environment. The influence of culture in crowd-related issues has also been investigated (Evans, Lepore, and Allen 2000; Amole 2005; Pons, Laroche, and Mourali 2006). In much of this research, dense environments are usually associated with limited personal space (Sinha and Sinha 1991; Kaya and Erkip 1999; Sinha and Nayyar 2000; Pons, Laroche, and Mourali 2006). An increase in the number of people or a decrease in the amount of available space leads to high-density situations in which individuals may feel uncomfortable (Kaya and Erkip 2001).

The relationship between the changing character of public space and face-to-face interaction in Turkish culture is another issue to be addressed. Erkip (2003) focused on the nature of shopping mall visits and suggested that the shopping mall, as a new public space, is an ideal environment that provides myriad opportunities for the consumption and leisure needs of Turkish urbanites. The shopping mall introduces a new postmodern architectural element to the older mix of architectural styles in the Turkish urban landscape. In this

context, the shopping mall was defined as an alternative to the traditional public space and the traditional marketplace (Uzzell 1995; Aybars 2001; Salcedo 2003; Birol 2005; Southworth 2005). This new development is a type of property that is neither public nor private (Voyce 2006); it is a place created to encourage consumer activities in an enclosed area rather than a face-to-face interaction, as seen in the old bazaar in the form of negotiation and hassling. Although the bazaar and the traditional marketplace are still an essential part of Turkish city life for economic and social exchange, the traditional marketplace is no longer a focal point for social interaction (Ozdemir 2007).

## MEASUREMENT TECHNIQUES

Three principal methods have been used to examine variation in interpersonal distances: projective, laboratory, and observation. In projective methods, participants are asked to hypothetically imagine a situation and indicate, either with pencil and paper or using dolls or figures, how they believe they or another individual would respond spatially in that scenario. Some of the techniques include the Comfortable Interpersonal Distance technique (Sinha and Nayyar 2000; Nechamkin et al. 2003), simulation techniques (Bailenson et al. 2003; Rehm, Andre, and Nischt 2005; Miwa and Hanyu 2006; Randell and Rowe 2006; Was, Gudowski, and Matuszyk 2006), and techniques using models and figures (Webb and Weber 2003). Projective techniques are simply not credible. They have several obvious flaws, such as requiring complex cognitive skills like reconstruction, imagination, empathy, memory demands, and most difficult of all, rescaling from life size to the perceived scale of the figures (Uzzell and Horne 2006).

Laboratory methods include the stop-distance technique that was used to assess tolerance for interpersonal proximity (Vranic 2003; Kaitz et al. 2004). Although this procedure is not conducted in a naturalistic context, it is one of the most frequently used techniques for assessing preferred or tolerated interpersonal distance under varied conditions. One important reason for this is the researcher's ability to control and manipulate conditions shown in pictures and drawings, such as height and size of space, details in drawings, and elimination of other environmental features. However, perception is a complex process that results from the combination of many factors related to people's reactions to what they see, hear, smell, and touch.

In an exploratory study of interpersonal distances in changing environmental conditions, the factors that are already present in the settings cannot be neglected. In this context, personal space would be better studied in real settings where users are exposed to real environmental factors. Laboratory

studies are easily administered, and by contriving the setting to resemble, for example, an office, the experiment can have some degree of ecological validity. However, accurate measurements are difficult, as participants are asked to use their own bodies to position themselves according to hypothetical situations. These procedures are not done in naturalistic contexts; they are done in laboratory experiments. Generally, selected subjects are observed while they are interacting with others under different environmental conditions in controlled environments. Subjects are usually aware that they are being watched, and this might cause them to behave differently.

The third method, observation, has the most ecological validity, as it involves direct observation of people interacting with each other in real situations, preferably by unobtrusive means; it also gives rise to the most practical difficulty, principally in the accurate measurement of interpersonal distances (Uzzell and Horne 2006). Each of these techniques has two crucial shortcomings—ecological validity and accuracy of measurement, with some resulting trade-off between the two. Although observation studies and even laboratory studies can have ecological validity, to date, they have not permitted accurate measurements of interpersonal distance. If gender differences are to be explored and explained with any degree of confidence, then studies will require the employment of a highly accurate interpersonal distance recording method that can be used within an ecologically valid setting. This type of controlled and structured recording technique can also be used in real settings, such as shopping malls.

Digital photography has made it possible for researchers to capture naturally occurring behaviors and interactions unobtrusively. Many researchers (Remland, Jones, and Brinkman 1995; Read, Sugawara, and Brandt 1999; Berry and Hansen 2000; Hall et al. 2001; Uzzell and Horne 2006) have used digital photography extensively. According to Velastin et al. (1994), time-lapse photography is used extensively in determining pedestrian densities in urban spaces. This technique also shows that individuals attempt to maintain buffer zones around them to prevent collisions with others and that behavior in various countries may differ according to body structure and cultural conventions.

## PURPOSE AND HYPOTHESES

Past studies have incorporated age, gender, and culture to help expand knowledge of personal space. This study tested the differences of interpersonal distance under changing conditions of the physical environment.

The primary purpose of this study was to investigate the relationship between selected characteristics of the physical environment and interpersonal

distance among mall users. The characteristics of the physical environment included type of enclosure and density. The study assessed whether, in a similar retail setting, consumers from different cultures would have different reactions to environmental stimuli. It was expected that users would interact in different distances in environments with differentiated physical characteristics such as more enclosure and higher density. Furthermore, it was assumed that female dyads would interact more closely than male dyads and that older adults would stand further apart than young adults in mall settings, regardless of the type of enclosure and density.

Culture has been shown to modify personal space such that Northern Europeans and North Americans will use greater space than will Mediterraneans and Latin Americans (Remland, Jones, and Brinkman 1995; Evans, Lepore, and Allen 2000; Sommer 2002; Beaulieu 2004). The objective of this present study is to compare interpersonal distances in which the distance between interactants from different cultures were measured in a natural environment. Therefore, one of the hypotheses predicts results convergent with previous studies; that is, North Americans will use greater distance than Turks during their interactions with others.

## METHODOLOGY

Research was conducted in two phases. The first phase gathered data about the physical conditions of the settings and mapped the spatial characteristics of the shopping malls. The second phase adopted a field study to observe and measure interpersonal distances between subjects. To provide credible results and hypotheses in a cross-cultural case study, it was vital to follow the same methodological considerations throughout the study. Therefore, the same methods were used in all cases after the pilot tests had been carried out.

### Settings

My familiarity with the settings and the availability of the locations were important considerations in the case selection. Turkey is my home country, and the United States is where I did my graduate studies. For the study, I selected four shopping malls in two nations: Armada and Migros in Ankara, Turkey, and the Streets at Southpoint in Durham, North Carolina, and Triangle Town Center in Raleigh, North Carolina, in the United States. This was not a laboratory experiment in which I could manipulate variables, so it was vital to select similar cases in both Turkey and the United States.



Shopping malls have been considered as ideal settings in which to study the relationships between the environmental features of the setting and their effect on various aspects of human behavior in various cultures. A shopping mall is unique with its streetlike character. On a design basis, the mall is spatially differentiated into separate functional zones that lend themselves well to the observation of interpersonal interactions. With approximately the same variety of features in each of the malls studied, the question arises as to how the environmental features affect user interaction with others in different cultures. The shopping mall is particularly suited to the study of user behavior because most shopping malls have two or more levels; multiple floors allow for unobtrusive digital photography.

### Exploratory Survey

The objective of the exploratory survey was to identify the type of enclosure of mall areas according to user definitions. After preliminary observations and architectural surveys, locations for exploratory surveys were chosen. Features such as location of entrances and intersections, lighting conditions (artificial or natural), and functions of the spaces helped me choose these locations. My main purpose in choosing these locations was to ensure that I could easily observe potential respondents in the crowd and then approach them to ask for their participation in the study. For the Migros shopping mall, the first right entrance area on the first floor, which most people use to enter the mall, was selected. In the Armada shopping mall, the Streets at Southpoint, and Triangle Town Center, the main entrances of the malls were selected as locations for this part of the study.

It was known that more people visit malls during weekends than during weekdays. The number of people in the malls would affect user responses to the questions; therefore, one weekend day and one weekday were selected. Users were asked to select the areas on a scaled mall plan that they define as open or closed inside the malls. It was vital to select subjects who had already visited the malls and experienced the settings. Therefore, exit surveys were conducted; I stood next to the entrances of the malls and asked people who were leaving the malls to participate in the study. Respondents who had not visited and not experienced all areas of that particular mall were eliminated. Fifty-two people in malls (thirteen in each) were interviewed in this part of the study. Participants were asked to select and show the most open and closed areas on the floor plans. After organizing and counting the responses, two areas in each of the four malls (the most enclosed and the most open) were selected as the sites of observations.

## Observational Study

I used observational research to analyze interpersonal distances between mall users. Photographs were found to be the most effective and simple method for analyzing interpersonal distances. In this context, pairs of users, either walking or standing, were photographed in open and closed mall areas for two weeks (four weekdays and two weekend days). Time and days of observations were selected randomly. A digital camera that could capture still pictures of the scenes was used. I chose the same stationary spot in the mall at all times and took pictures every 10 seconds for half an hour. I then transferred these images to a personal computer.

Observations were intended to be unobtrusive because it was assumed that users might change their actions if they were aware that they were being observed and photographed. When capturing subjects at an unobtrusive distance, the camera was simply pointed in the direction of the subjects. When the subjects were in close proximity to me, such as in the Turkish malls, I held the camera below eye level and continued capturing the scenes so that I did not attract any attention. To the subjects, I appeared to merely be waiting for someone.

## Sampling

All pictures were classified based on day, time, and location. During review of the photographs, mall visitors who seemed aware of being photographed (e.g., smiling at the camera) and mall visitors whose characteristics of age and gender could not be ascertained were excluded from data analysis. All individuals in groups whose age and gender could be defined and who appeared to be with at least one person were selected. Groups with two or more individuals were selected for the measurements. Their ages and genders were then noted. To ensure reliability of age estimates, thirty university undergraduate students predicted the average age of individuals in randomly selected mall pictures. In most cases, the students and I arrived at the same conclusion regarding the age of the individuals. Age and gender compositions of samples were defined and listed in a table for reference (Table 1). Age groups and gender compositions were treated separately. Individuals who seemed to be under the age of 18 were not selected for measurement.

Two measurements were made between three interacting individuals in which the person in the middle of the group was selected twice for the measurement. Time-lapse photography allowed me to decide whether the individuals in continuing photographs knew each other or not. Photographic reviews ascertained the reliability of the selection of interacting individuals.

TABLE I  
Categories of Gender Compositions and Age Groups

<i>Gender Composition</i>	<i>Age Group<sup>a</sup></i>
	1-1
	1-2
Male-male	1-3
Female-female	1-4
Male-female	2-2
	2-3
	2-4
	3-3
	3-4
	4-4

*a.* 1 (<18), 2 (18-29), 3 (30-54), and 4 (>54).

### Defining Density

Based on preliminary observation in malls, weekend days were assumed to be high-density conditions and weekdays were assumed to be low-density conditions, with both high- and low-density times in weekends and weekdays. Presumptions would falsify the definition of density conditions. Therefore, a different strategy was used to measure the density in each case. Each day, the number of people in digital pictures taken on-site was counted, and density condition was decided.

Using photographs, manual counts were made on a number of still pictures to provide a measure of the average density in a given area. In this study, it was assumed that users in the scene were moving normally and that stationary people did not remain completely stationary for any significant period of time.

Density was defined after I had carried out reliability tests. Randomly selected mall pictures were shown to a group of people (thirty university undergraduate students) who were not aware that the setting was a typical shopping mall. Subjects rated the pictures according to the density definition and condition of those settings displayed in the pictures. The previously counted number of people in each picture was compared with the average density definition of the settings. The students and I arrived at the same conclusion regarding the density condition of each scene.

Based on the people counts and reliability tests, three ranges of density—low, medium, and high—were defined with the use of upper and lower thresholds. The definition of density implies that as the area increases,

density decreases. Open areas of U.S. malls are twice as large as other areas in all malls. Floor sizes of these two areas were defined as two units, and other areas' floor sizes were defined as one unit (Table 2).

Values between minimum and lower thresholds were defined as low density, those between lower and upper thresholds as medium, and those between upper thresholds and maximum as high. It was assumed that people do not feel crowded up to a threshold value of density. This study aims to define low- and high-density conditions; therefore, medium densities were eliminated.

### Measurement Technique

During review of the pictures, a rectangle was drawn around each subject, and the middle point of the bottom side of the rectangle was selected as the reference point that was used to locate those points on the scaled area plan. The scale of mall floor plans was kept constant for each case. Floor tiles, which were of identical size, were used to find the standing points of subjects on the floor plans. Once the points were located, distances between these points were measured. These values were then converted into the actual distances by using the scale of mall floor plans.

Pilot tests were conducted for interpersonal distance measurements, and this also helped ensure reliability. For these tests, two of my colleagues participated by measuring the distance between two points in a mall area. I took pictures of my colleagues from a distance while they stood on those two points; then, I measured the distances between them on the area plan. The measured distance was compared with the distance measured by the colleagues. Twelve measurements were made in two malls. The measured distance was compared with the distance measured by the colleagues. Cronbach's coefficient alpha was used to calculate the reliability of each of the measurements. Alphas were calculated separately for the measurements in one Turkish and one U.S. mall ( $r = .86$ ) and ( $r = .88$ ), respectively. In both measurements, high coefficients were found, which indicated that the measurements were reliable.

## RESULTS

### Spatial Characteristics of Cases

All malls selected were classified as superregionals, with a total area of 1.3 million square feet or more. Turkish malls are located on proportionally much smaller parcels of land than U.S. malls. Although the latter were

TABLE 2  
 Ranges of People Counts in Each Mall Area

	Open						Closed					
	Floor Size	Min	Lower Threshold	Mean	Upper Threshold	Max	Floor Size	Min	Lower Threshold	Mean	Upper Threshold	Max
Migros	1 unit	5	12	15.5	19	26	1 unit	4	7	9.5	11	15
Armada	1 unit	3	9	12.5	16	22	1 unit	5	8	8.5	11	14
Southpoint	2 units	3	13	18.5	24	34	1 unit	2	5	7	9	12
Triangle	2 units	2	11	15.5	20	29	1 unit	2	5	6.5	8	11

sprawled out over two levels of shopping with outdoor parking lots surrounding the mall, Turkish malls expand vertically over three floors of shopping and require enclosed, multilevel parking structures. The shape or layout of these malls is different too: the U.S. malls are V shaped; the Turkish malls, straight or rectangular. In terms of the placement or situation of these malls within larger urban environments, Turkish malls are adjacent to a planned urban core, whereas U.S. malls are located next to open areas and established commercial settings.

The most significant functional and architectural difference between Turkish and U.S. malls is the presence of an outside street. Triangle Town Center and the Streets at Southpoint were designed with a combination of indoor and outdoor shopping areas. Some of the stores and restaurants are located on the outside, where visitors enjoy an artificial streetlike environment. The Migros and Armada shopping malls, however, consist of only enclosed shopping areas.

The two U.S. malls have curvilinear shapes that are formed by two linear corridors aligned at different angles. At the intersection of corridors, large courts form the focal point in the malls, with large windows on the upper sides that provide natural light throughout the day. Each U.S. mall is considered the town center of the surrounding neighborhood and is intended to connect the surrounding neighborhood with the mall. However, there is limited physical and pedestrian connection to this surrounding area.

### Results of the Exploratory Survey

The frequency tests were conducted to select the most open and closed areas preferred by the mall users. The results showed that 54% of respondents selected the rear entrance area of the Armada shopping mall as the most open, and 69% of respondents selected the linear corridor on the second floor as the most enclosed area; 48% of respondents selected the food court area of the Migros shopping mall as the most open, and 39% of respondents selected the main entrance as the most enclosed area; 61% of respondents selected the center court area of the Triangle Town Center as the most open, and 46% of respondents selected the corridor to the Belk entrance as the most enclosed area; 46% of respondents ranked the center court of the Streets at Southpoint as the most open, and 69% of respondents ranked the Sears entrance as the most closed area.

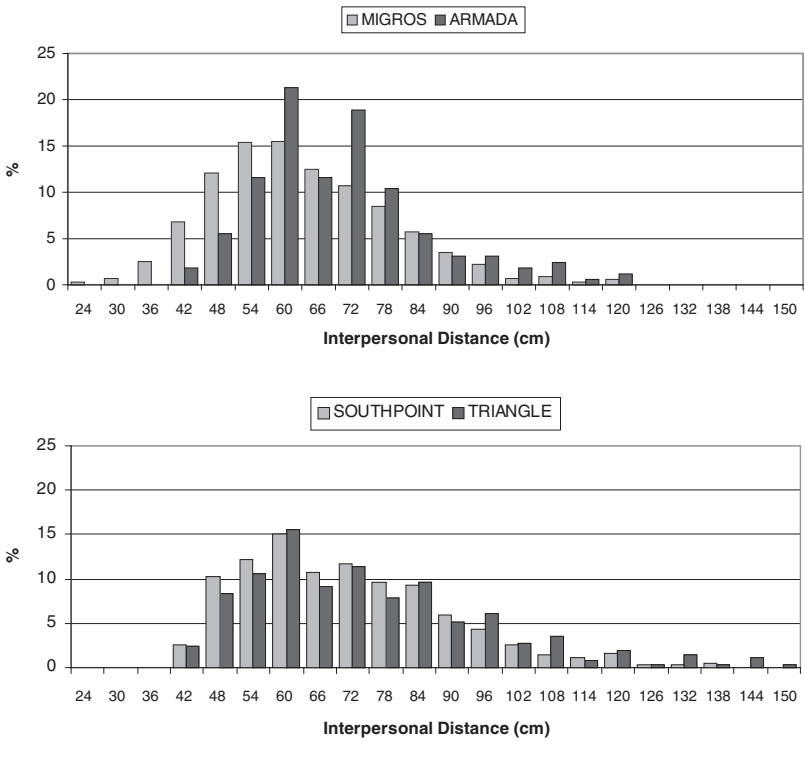
The general assessment of the functions and the physical characteristics of these areas, such as width, ceiling height, number of enclosures, type of lighting (either natural or artificial), connections to areas with other functions (cinema or department stores), type of use (entrance space or central court),

location in the mall (next to the main entrance, location in the center, or being the entrance space of a department store), and frequency of use, revealed conclusions similar to those defined by the respondents in terms of the conceptual definitions identified by the previous research.

Differences among Measured Interpersonal Distances

The distribution and mean scores of interpersonal distances showed variation across culture, age, and gender in open and enclosed mall areas. In the open areas of all malls, the distance varies from 24 to 120 cm. The distance between subjects ranges between 36 and 102 cm in the closed area (Figure 1).

FIGURE 1  
Measured Interpersonal Distances in Four Shopping Malls



In each area, the most common interaction distances ranged between 54 and 60 cm. As shown in Table 3, most of the users in the open area interacted at larger distances than users in closed areas.

TABLE 3  
Mean Interpersonal Distances in Open and Closed Areas across Cultures

	<i>Open</i>	<i>Closed</i>	<i>All</i>
	<i>cm (inches)</i>		
Turkey	65 (25.6)	61 (24)	63 (24.8)
USA	73 (28.7)	71 (28)	72 (28.3)

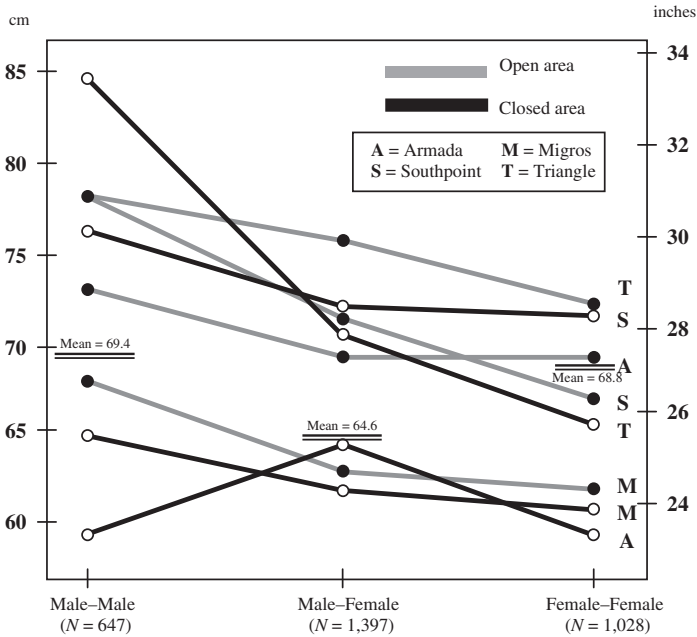
Interpersonal distances between age groups and gender compositions were evaluated based on ANOVA tests. In both open and closed areas, male–male pairs ( $N = 647$ , mean = 69.4 cm) interacted at larger distances than male–female ( $N = 1,397$ , mean = 64.6 cm) and female–female ( $N = 1,028$ , mean = 68.8 cm) pairs ( $F = 20.772$ ,  $df = 2$  at  $<.0001$ ). Statistical tests revealed that the mean for male–male interactions was significantly different from the mean for male–female interactions ( $t = 4.99$ ,  $df = 1087$  at  $<.0001$ ). Male–female pairs interacted at the shorter distances in all areas. Mean interpersonal distances between all gender compositions in closed areas were smaller than the interpersonal distances in open areas. Pairs of male individuals had larger interpersonal distance than male–female pairs and pairs of female subjects (Figure 2).

In all areas, young adults interacted at the largest distances with seniors ( $n = 12$ , mean = 81.5 cm). ANOVA tests revealed that adolescents interacting with other adolescents had the largest interpersonal distance in all areas ( $n = 53$ , mean = 63.6 cm). Generally, young adults interacting with other young adults were observed in all of the settings and interacted with one another at shorter distances than did pairs of older adults ( $N = 1,886$ , mean = 65.3 cm;  $F = 6.816$ ,  $df = 9$  at  $<.0001$ ).

According to the measurements, Turkish subjects ( $N = 1,840$ , mean = 63 cm) interacted more closely than U.S. subjects ( $N = 1,232$ , mean = 72.9 cm) in both the open and closed areas of the malls ( $F = 208.8$ ,  $df = 1$  at  $<.0001$ ); see Figure 2.



FIGURE 2  
 Mean Interpersonal Distances Across Gender Groups in Four Malls



Exploring the Relationships between Variables

Table 4 shows the results of correlation analysis to explore the relationships between physical variables and interpersonal distance.

TABLE 4  
 Correlations between Interpersonal Distance and Listed Variables

Variables	Migros		Armada		Southpoint		Triangle	
	Open	Closed	Open	Closed	Open	Closed	Open	Closed
Enclosure	0	0	0	0	0	0	0	0
Density	0.04	0	0	0	0.16*	0	0.06*	0
Age	0.04	0.13*	0.16*	0.22*	0.12*	0.05	0.22*	-0.26*
Gender	-0.12*	-0.11*	-0.09*	-0.08	-0.20*	-0.06*	-0.08*	-0.19*

\*significant relationship at the level < .05.

All the significant relationships between potential variables and interpersonal distance are weak. Among these relationships, the strongest is between age and interpersonal distance in the closed area of Triangle Town Center ( $r_s = .26$ ). All correlation coefficients calculated for the relationship between age and interpersonal distance have positive values in all areas. The results show that age groups have statistically significant positive relationships with interpersonal distance in six of eight areas. On the other hand, gender groups and interpersonal distance are negatively correlated in all areas. These results indicate that groups with young users interact more closely than groups with older adults, and male–female dyads interact more closely than male–male and female–female dyads.

## DISCUSSION AND IMPLICATIONS

Most of the literature has suggested that people in contact cultures interact more closely than people in noncontact cultures. Similar results were obtained in this study. According to the findings, Turkish subjects interacted more closely than U.S. subjects, both in open and closed areas of the malls. This is especially consistent with the findings of Rustemli's (1992) study, which suggested that Turks stand closer to each other than North Americans in residence hall settings.

The process of designing similar types of settings in different cultures deserves special attention. Space organization and layout; arrangement of areas that facilitate certain behaviors such as sitting, eating, and socializing; and deciding on the scale and size of the fixed and semifixed elements for those particular activities would benefit from the recommendations developed by these kinds of studies.

People may change their distance from one zone to another in changing spatial conditions and in different types of social relationships. The distance, then, will likely be greatly influenced by the environmental conditions, and the observer may be able to ascertain these conditions by examining the type of distance between individuals. From a theoretical perspective, as space gets more open, interpersonal distance increases. Most of the respondents interacted more closely in closed areas. Based on this perspective, another assumption was the presence of a relationship between type of enclosure and interpersonal distance. In this study, differences in interpersonal distances were observed between mall users in open and closed areas. This shows that the space enclosure has effects on interpersonal interactions in selected malls.

Individuals naturally create behavioral patterns to change their interaction distances with others; the distance varies according to the nature of the

particular social interaction and situational variables such as enclosure and density in this study. Hall (1966) classifies four types of distances: intimate, personal, social, and public. Each of the types reflects a different relationship between given individuals (Gifford 2002), and these varied preferences for personal space and relationships are greatly influenced by environmental, personal, and cultural factors. Most of the mall users interacted with others in the personal space distance zone (45–120 cm), which is used in social interactions between close friends and acquaintances and generally occurs in public spaces such as shopping malls.

Gender differences also have been reported in interpersonal distances. In all shopping mall cases, males interacted with other males at the greatest distances, and males with females interacted at the closest distances. Understanding these gender differences can help designers to design spaces more appropriate for the needs of both males and females.

Most of the studies measuring interpersonal distance between individuals were conducted either in outdoor public areas, such as parks and plazas, or in laboratory settings. The present study contributes to research literature that has investigated interpersonal distance in an environment that has not been studied in this context. Marketing and consumer researchers may benefit from the results of this study. In shopping environments, the goal is to attract more users and manipulate them to stay longer so that they will spend more money. What is best for the users is, therefore, a plain, clear, and open place where they can read the signs, process information, and perceive the spatial characteristics easily for better organization of behavior and response to the environment. In conclusion, design features of built environments, such as larger interiors with open courts and wide corridors, along with the seating areas, which are defined as positive spatial attributes of mall design, will promote more social behavior and interaction among users.

Understanding the optimum levels of interpersonal distance for comfort might result in basic design guidelines for the benefit of landscape designers, interior designers, and architects. These guidelines can be used during the planning, design, and implementation of user-friendly environments in different cultures. Although this study does not reach conclusions regarding levels of discomfort based on changing interpersonal distances, common patterns of distances would likely be observed in similar cases. The findings of this study suggest that interpersonal distances between individuals vary across cultures, which implies that Turks stand closer to each other than North Americans.

The environment can be understood in terms of shared social and cultural meanings among users of a physical setting. The process of designing similar types of settings in different cultures deserves special attention. Space

organization and layout; arrangement of areas that facilitate certain behaviors such as sitting, eating, and socializing; and deciding on the scale and size of the fixed and semifixed elements for those particular activities would benefit from the recommendations developed by these kinds of studies.

## LIMITATIONS AND FUTURE DIRECTIONS

This study focused only on the relationships between a limited number of variables in four malls located in two countries. Results cannot be generalized to all malls and all cultures. The choice of settings was another limitation of the study. U.S. cities differ in significant ways from Turkish cities. Cities with more comparable features need to be selected in future research to overcome this limitation.

The cases chosen for this study were superregional shopping malls. Future research should investigate users' responses to environmental conditions of shopping malls in different scales. Interaction distances measured in the urban open space, such as city parks and urban plazas, and in enclosed spaces could be compared in future research. More research needs to be conducted on the effects of natural landscape elements, such as plants, on interpersonal distance.

Another limiting factor of this study is the effects of social setting, which could lead to bias. Previous studies have shown that interpersonal distance varies according to the type of interaction between individuals. However, this study did not intend to define the characteristics of interpersonal interaction and their relation to the distancing. It was assumed that the individuals have relative intimacy with each other.

Pictures of naturally occurring behaviors, which were used here, might not provide adequate information about degree of and reasons for interaction between people. Future research could include more qualitative methods of assessing users' opinions regarding the preferences for interpersonal distances in environments with changing conditions. Behavior mapping, participant observations along with personal journals, and in-depth interviews would be useful major data collection techniques that would help one better understand the effects of built environment on interpersonal interaction.

Although this study was conducted in commercial settings, it did not address marketing issues such as purchasing behavior. More research is needed in the environment-behavior field in terms of its marketing relationship. Lessons learned from these studies might be used by businesses to increase sales by incorporating certain design principles.

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