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Design Failure in Indoor Shopping Structures: Unconscious Ageism and Inclusive Interior Design in Istanbul

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Abstract

Aging, although not a disability, appears to be stigmatized. People consciously or unconsciously push older adults to the edge of society by not allowing them an active voice and making them feel less important than younger citizens. Older people may experience social and economic stress as well as anxiety, hopelessness, isolation, and depression. Almost all industries are disproportionately focused on developing technological innovations for younger people, not for older adults. Although there is a considerable amount of research on aging populations, research on the indoor design problems that older people encounter every day is scarce. Shopping is a good opportunity for them to get involved in the community, and is an appropriate research area, the aim of which is to prevent architectural barriers to older adults. This study examines indoor shopping design failures that reflect ageism according to older adults' experiences and requirements. A questionnaire was administered to 198 participants about their experiences in supermarkets in the district of Kadıköy, in Istanbul; Kadıköy is the district with the largest proportion of older adults (17,7%). The results showed that as the need for rest areas and toilets increases, the time spent by older adults in supermarkets declines. Additionally, checkout counters and product display shelves show design problems that constitute indoor accessibility issues. This study concludes by looking at issues in the design of indoor shopping area that contribute to ageist attitudes. We call for inclusive shopping environments to address spatial justice and to eliminate ageism.

Keywords: Ageism; older people; supermarkets; inclusive design

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Fallo de diseño en las estructuras comerciales interiores: discriminación inconsciente por edad y diseño interior inclusivo en Estambul

Resumen

Aunque el envejecimiento no es una discapacidad, parece estar estigmatizado. Las personas, consciente o inconscientemente, empujan a los adultos mayores al borde de la sociedad al no permitirles una voz activa y al hacerlos sentir menos importantes que los ciudadanos más jóvenes. Las personas mayores pueden experimentar estrés social y económico, así como ansiedad, desesperanza, aislamiento y depresión. Casi todas las industrias se centran desproporcionadamente en desarrollar innovaciones tecnológicas para los jóvenes, no para los adultos mayores. Aunque hay una cantidad considerable de investigación sobre el envejecimiento de la población, la investigación sobre los problemas de diseño de interiores que las personas mayores encuentran todos los días es escasa. Las compras son una buena oportunidad para que se involucren en la comunidad, y es un área de investigación adecuada, cuyo objetivo es prevenir las barreras arquitectónicas para los adultos mayores. Este estudio examina las fallas en el diseño de compras en interiores que reflejan la discriminación por edad de acuerdo con las experiencias y requisitos de los adultos mayores. Se administró un cuestionario a 198 participantes sobre sus experiencias en los supermercados del distrito de Kadıköy, en Estambul. Los resultados mostraron que a medida que aumenta la necesidad de áreas de descanso y baños, disminuye el tiempo que los adultos mayores pasan en los supermercados. Además, los mostradores de pago y los estantes de exhibición de productos muestran problemas de diseño que constituyen problemas de accesibilidad en interiores. Este estudio concluye analizando los problemas en el diseño del área comercial interior que contribuyen a la discriminación por edad.

Palabras clave: Discriminación por edad; personas mayores; supermercados; diseño inclusivo

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1. Introduction

Aging is inevitable but causes discrimination in daily life. People stigmatize older citizens both consciously and unconsciously. The theoretical and empirical findings of numerous articles (Nelson, 2002; Richeson & Shelton, 2006) describe and provide solutions for age stereotyping, prejudice, and discrimination. Bias due to age is called ageism and leads to casual or systematic stigmatizing behaviors toward older people. The term "ageism" was coined in 1969 by physician and author Robert Neil Butler (Butler, 1969). According to Snellman *et al*., (2012), ageism need not be explicitly articulated (such as when inadequate time is provided at a traffic light for older pedestrians to cross safely or sidewalks with an uneven design), since the majority of individuals do not tend to encounter it in daily life, contrary to the more obvious types of prejudice, such as racism or sexism (e.g., men earning more than women or, regardless of gender, Whites earning more than Blacks, Hispanics, or other racial minority groups). Furthermore, most people do not consider the divergences in attitudes toward older adults and younger people to be discrimination (Snellman, *et al*., 2012; Ward & Bytheway, 2008). Therefore, if we consider ageism a kind of social discrimination, we should understand, describe, and articulate it more clearly to increase its awareness in society.

This paper deals with discrimination through design, specifically the design of built commercial spaces. People's environment can embrace and support them, or it can oppress their attempts to lead independent lives and contribute to their stigmatization. Each individual ages differently, and among older individuals, there are varying degrees of abilities and disabilities. Nevertheless, inclusive designs will ultimately benefit older people and all citizens.

2. Aging and ageist attitudes in daily life

People in many countries are living longer lives, thus increasing the size of the older population. Indeed, soon, the global older people population will be larger than at any other time (Gendron *et al*., 2016; Rosa-Jiménez & Nebot, 2021). Aging and life in old age have improved because of advances in medicine, but older people's quality of life in the built environment remains a considerable social obstacle for them.

Older people comprise a distinct social group like race or gender groups, with the key distinction that almost everyone will be a member of this group someday. Nevertheless, many young people tend to assume that becoming older implies mental and physical impairment (Palmore, 2001). They see growing older as becoming frail, isolated, dependent, having reduced potential, and a greater need for care. In fact, this reflects our attitudes and of misinformation about the aging process. Viewing older citizens as the "other" causes them to suffer from discrimination on a daily basis and even threatens their health and well-being (Mock & Eibach, 2011). The way that young people perceive physical aging is largely dependent on their prejudices; many older adults may remain highly self-sufficient in age-friendly and inclusive environments.

A growing number of studies deal with ageism, which prevents people from leading dignified, equitable, and independent lives (Solem, 2016; Buffel, 2018). This phenomenon "is the third great 'ism'... after racism and sexism" (Palmore, 2001, p. 572) since it is universal in every aspect of society. Buffel (2018) perceives older people as passive victims who, because of societal attitudes, can only respond to changes in their community rather than participate in those changes. We can explain age-based bias using three dimensions developed by Rosenberg and Hovland (1960), and Kaiser and Wilson (2019):

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- Cognitive bias (prejudices, stereotypes about aging);
- Emotional demeanor (positive age-based discrimination, such as providing an extra week of vacation for workers over 60 years old); and,
- Behavioral bias (predisposition to discriminating against older adults in one's actions).

Few other studies explain ageism as people avoiding older people who remind them of death by using terror management theory (Martens *et al*., 2005). On the other hand, the subject of age discrimination because of design failure is quite new.

"People and their environment are not static entities...[somehow] an environment designed to facilitate movement behaves as a dynamic impediment" (Webb *et al*., 2011, p. 43.7) for older adults and people with disabilities. There is extensive literature that centers on improving the design of houses and home-like care centers for older people in different cultures. Although the idea of designing for older people is a well-intentioned approach, it causes them to be stigmatized. Specialized adaptations and accessible design solutions can help older adults, but they tend to be designated for specific locations and users; in addition, they are quite expensive and therefore unsustainable. They "may promote a sense of segregation among end-users...and of stigmatization as being 'seniors' or 'disabled.'" (Carr, Weir, Azar & Azar, 2013, p. 4)

It is important that older adults feel at home in all public settings and not be relegated to cafes or suffer the embarrassment that comes with inappropriately-designed environments (Rowles & Bernard, 2013). To avoid discrimination by design, a built environment with an inclusive approach would be an ideal setting for all; older adults, people with disabilities, and children could live independently like any young, able-bodied person. In this sense, designers should offer users the chance to choose in equal circumstances. Older people should not be considered a specialized group among users.

3. Problems older people encounter when shopping

Loneliness and isolation have negative effects on older adults' physical and mental health. After retirement, people continue to need strong social ties. In many countries in the 21st century, people are healthier and living longer lives compared to 50 years ago. However, they are more isolated and lonelier than the earlier generations. According to Kohijoki (2011), grocery shopping helps to prevent social isolation for older adults. It also helps them to fulfill basic needs such as physical exercise, social interaction, and leisurely activities, especially for those with limited incomes. Aung *et al*., (2020) reported that social participation and physical activities in leisure time had positive effects on active ageing. Conscious physical exercise benefits all aging individuals (Kroemer, 2006). Although shopping is not a planned workout, it can keep older adults from becoming sedentary.

According to Borg (2009) consumers over 60 spend almost the same amount of their household budget on food, drinks, and tobacco as consumers between 45 and 59 years old. Although visits to grocery stores and consumption rates diminish with age (Kohijoki, 2011) older adults spend substantial amounts of their income on food (Moschis *et al*., 2004). Nevertheless, retail companies usually target younger consumers through ads, commercials, and purposefully designed environments. According to Moschis (2003), many companies neglect the importance of meeting the mature market's needs. In other words, companies are not aware of how they discriminate against older adults. Shoppers' perceived age generally leads to such prejudice. Older adults do not wish to buy products that are exclusively marketed toward older people (Moschis, 2003). Moreover, such products may often fail to gain market success since people are stigmatized or labeled as old.

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However, senescent change cannot be prevented; therefore, physical, and sensory needs related to chronological age must be considered when designing retail spaces. As we may expect in this light, some interior design solutions for supermarkets intended for older people have been successful in terms of purchasing turnover (Petermans & Van Cleempoel, 2010).[1]

Noticeable features of aging include deficits in sensory abilities, especially the loss of near focusing ability (presbyopia), and age-related hearing loss (presbycusis) (Kroemer, 2006). According to Barret and Kirk (2000), in addition to these changes, difficulties in perceptual, cognitive, and communication skills can arise, which may also affect physical abilities. Furthermore, depending on one's age, motor skills are affected through reduced movement, balance problems, and fatigue.

According to Arun and Çakıroğlu-Çevik (2013), 56% of older adults in Türkiye have chronic ailments such as high cholesterol, diabetes, hypertension, and arthritis. The Türkiye Health Interview Survey (The Turkish Statistical Institute, 2012-2016) conducted by the Turkish Statistical Institute (TÜİK) in 2016 showed that 18.5% of older adults' sight had worsened and 15% of older adults had experienced hearing loss.[2] The survey also revealed that the rate of walking difficulty among older adults is remarkable in Türkiye. In 2016, the percentage of individuals who were incapable of walking without aid or assistance was 23.4%, while the percentage of individuals who could not walk up and down stairs without aid or assistance was 29.3%. In another study, 15%–30% of older people complained of urinary incontinence (Johnson II & Ouslander, 2009). These problems can discourage older adults from living active social lives, especially when tasks require physical activity. Baltes *et al*., (1999) found that older adults feel anxious outside their own homes. Interior designers are responsible for design solutions that take an aging person's problems into account; these include physiological, sensory, social, and psychological modifications (Table 1).

The quality of life of older adults can be improved by maintaining usable spaces and securing the independence of older adults within a safe environment (Lee & Kim, 2020). In potential alterations to spaces toward this end, the design process should not be related only to internal store environments but also extend to external store settings, such as sidewalks, pedestrian crossings, and parking spots. Some physical features cause inconveniences, such as entrance areas with a threshold, steps, ramps, heavy and rarely used doors; insufficient circulation zones due to width and/or height; and ergonomic milieu elements, such as unsuitable lighting, glare, and noise.

Moreover, older consumers usually have a hard time reading product labels and price tags, it is difficult for them to reach upper and lower shelves, and they may struggle to push heavy carts. At checkout counters, where queues are likely to form, the area needs to be spatially arranged to accommodate older people (Kohijoki, 2011). The area surrounding checkout counters functions like a product shelf to increase sales and attract attention. However, the design of checkout counters can pose problems (e.g., when the height of the checkout counter does not match with the height of the shopping cart, it can be difficult to place products on the counter conveyor belt). Designers also need to consider how to ensure easy access to the checkout area for people with walkers and canes or wheelchair users. These problems are commonly connected to accessibility of spaces and usability of products. However, unconscious ageism is not limited to physical conditions. Unfortunately, age discrimination involving design remains under-researched (Nelson, 2002). According to Moschis (2003), grocery businesses generally target consumers of certain age groups as if they all had homogeneous characteristics. In addition, companies assume that older adults mostly go to the store accompanied by another person or that they receive help from employees or other shoppers.

[1] According to Petermans and Van Cleempoel (2010), product turnover at the Adeg Aktiv Markt 50+ increased by 20% thanks to design alterations.
[2] Data from the Türkiye Health Interview Survey on older adults between the ages of 65 and 74 were taken into consideration.

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In Türkiye, 72% of older people go shopping as part of their daily routine (Urfalıoğlu *et al.*, 2008). Furthermore, older people's general Internet use is very limited, and according to data from the Turkish Statistical Institute (2004-2016), only 12.5% of older men and 5.8% of older women shop online. It is clear that older adults are eager to engage in real social lives instead of virtual ones. In terms of their own needs and wants as consumers, they "shop during morning hours; prefer 'one-stop' shopping; consider shopping to be a social event; [and] are very convenience oriented" (Moschis, 2003, p. 520-521).

In developing retail design solutions, both interior designers and retail company management should consider modifications that take the aging process and older adults' needs and wants into account. A holistic interior design approach is key to helping older adults maintain independence and quality of life.

Table 1. **Probable alterations to accommodate the aging process**

Physiological (altering anthropometry) [a b c]	Sensory [a]	Social [d e]	Psychological [e]	Cognitive [a]
Changes due to chronic diseases (high cholesterol, diabetes, hypertension, and arthritis)	Decline in near vision	Retirement (social isolation, financial loss)	Not accepting being "elderly"	Decline in perceptual and cognitive skills
Auxiliary tools (cane, walker, wheelchair, etc.)	Depth perception deficit	Being a grandparent	Acceptance in society because of their wisdom	Decline in decision-making abilities
Muscular problems	Decline in hearing (due to aging or working conditions)	Being widowed	Not being accepted in society because of being old-fashioned	
Skeletal problems (osteoporosis, osteoarthritis, etc.)	Decline in taste and smell	Loneliness	Anxiety and depression	
Urinary problems (urinary incontinence)	Tactile problems due to neural deficits			
	Balance problems			
	Decline in somatosensory (kinesthetic) senses (touch, pain, vibrations, temperature, and motion)			

Source Elaborated by the authors based on data from Moschis (2003), Kroemer (2006), Kohijoki (2011), Johnson II and Ouslander (2009), and Ceylan *et al.*, (2015).

[a] Kroemer, K. H. E. (2006). *"Extra-Ordinary" Ergonomics: How to Accommodate Small and Big Persons, the Disabled and Elderly, Expectant Mothers, and Children.* CRC Press, Taylor and Francis Group.

[b] Ceylan, H., Kurtkapan, H., & Turan, B. (2015). Literatür: Istanbul'da Yaşlıların Yaşam Durumları. In M. Şentürk & H. Ceylan (Eds.), *Istanbul'da Yaşlanmak-Istanbul'da Yaşlıların Mevcut Durum Araştırması [Aging in Istanbul: Research on older people's current conditions]* (pp. 35–60). Açılımkitap Yayınları.

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[c] Johnson II, T. M., & Ouslander, J. G. (2009). Urinary incontinence. In J. B. Halter, J. G. Ouslander, M. E. Tinetti, S. Studenski, K. P. High, & S. Asthana (Eds.), *Hazzard's Geriatric Medicine and Gerontology* (pp. 717–730). Informa.

[d] Moschis, G. P. (2003). Marketing to older adults: An updated overview and assessment of present knowledge and practice. *Journal of Consumer Marketing*, *20*(6), 516–525.

[e] Kohijoki, A. M. (2011). The effect of aging on consumer disadvantage in grocery retail services among the Finnish elderly. *Journal of Retailing and Consumer Services, 18*(4), 370–377.

4. Universal Design Approach to Include Older Adults

Universal design aims that all designed products including open and closed areas' features, which can be used by everyone in the society, without adaptation (Center for Accessible Housing, 1995). It has been criticized as not being adequately inclusive, especially in implementation (Heylighen, 2014). Universal design has generally not been considered in interior and environmental design; rather, universal design principles tend to be added later in the application process (Afacan & Erbug, 2009; Demirkan, 2007). In addition, difficulties involving the use of knowledge and time pressure may emerge in design practice (Demirkan, 2007).

McIntyre and Harrison (2016) showed that understanding users' requirements when building a professional environment is important for innovation and efficiency. Some researchers (Demirkan, 2007; Duncan, 2007) claim that considering older adults' characteristics in order to manage an inclusive approach to interior design can provide designers with a guide. Older users are different due to their reduced physical and sensory abilities, changing cognitive skills, and social and psychological changes. Moreover, they tend not to accept modifications. In other words, chronological age does not make them necessarily old, and they are unwilling to be labeled as such (Moschis, 2003).

According to Webber (2017), interior design students are more empathetic than students in other disciplines. On the other hand, younger people's conscious or unconscious ageist judgements do not help them to understand older adults' needs and may threaten the universal design approach. Gendron *et al*., (2015, p. 5) summarized this bias among students in the following way: they see "old as negative, young as positive, [and] older people as different (...)" This prejudice could lead them to unconsciously ignore older adults' wants and needs in terms of managing universal design solutions, despite interior designers' empathic skills.

Designers tend to brainstorm physical, sensory, and cognitive alterations that older people might need during the design process. If the alterations are handled in a limited way, solutions could end up being discriminatory. It is critical for designers to remain aware of the social and psychological changes that older people experience in order to improve inclusive design. Turkish law mandates that open spaces, building designs, and services for the public be accessible; these regulations ensure older people's independence both physically and socially.

According to Pettigrew *et al*., (2005), three major issues are vital for older adults as supermarket shoppers: (1) the "demeanor of supermarket employees, (2) the functionality of shopping equipment [i.e., trolleys and baskets], and (3) appropriate placement of products on supermarket shelves" (p. 306). Moschis (2003) emphasized the importance of face-to-face communication for older people as well. Older adults like and need personal relationships in their store experience, and facilitating communication between shoppers and employees is not only related to the managerial organization of the store but also closely linked to interior design. In short, interior design can be integrative thanks to physical solutions.

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The principle of "social cohesion and participation" (Evcil, 2014), a new tenet of universal design, helps us to understand the concept; it is considered to achieve a holistic approach. Designing a retail store as a public space not only is a matter of functionality and offering aesthetic solutions but also includes creative solutions to foster social participation in terms of the communication and cohesion of all.

The other new tenets of universal design are "adding to human delight" and "functional and aesthetic integration" (Evcil, 2014). These principles are significant for strengthening older people's ties with their environment. If universal design ideas are used to help designers and retail managerial teams develop empathy as preliminary work, inclusive solutions could be successfully implemented in subsequent designs.

5. How to Create Designs that Meet Older Adults' Needs in Supermarkets

Many studies (Kohijoki, 2011; Moschis *et al*., 2004; Pettigrew *et al*., 2005; Afacan, 2012) have shown that physical and service accessibility in retail spaces is vital for older adults. Indeed, older adults prefer to shop in accessible stores rather than the one closest to their homes (Kohijoki, 2011).

According to Afacan (2012), five essential design elements based on the work of Danford and Tauke (2001) should be considered when applying universal design principles in shopping malls. These five aspects are "[1] *Circulation systems*–ramps, elevators, escalators, hallways and corridors; [2] *Entering and exiting*–identifying and approaching the entrance and exit and maneuvering through them; [3] *Wayfinding*–paths/circulation, markers, nodes, edges, and zones/districts; and graphical wayfinding: text, pictogram, map, photograph and diagrams; [4] *Obtaining products/services*–service desks, waiting areas and shops; and [5] *Public amenities*–public telephones, restrooms (toilets), and seating units." (Afacan, 2012, p. 87)

In addition to these five obligatory features, the store atmosphere should be considered: noise control, suitable lighting (preventing glare problems), and adequate temperature and humidity. Ambient conditions, particularly noise and glare, affect older people in negative ways (Kohijoki, 2011; Kroemer, 2006).

Supermarket designs require a holistic approach, including seamless indoor and outdoor accessibility, easily reachable and noticeable products, optimum environmental conditions, smooth communication through employees and signage, and easy-to-use shopping carts. Seeing, finding, and reaching products; reading product ingredients and price tags; carrying products; and the payment process are the core operations in a retail store. Older people's physical efforts and sensory problems can be eased by equipping shelves with magnifying glasses; using accessible shelves, storage cabinets, and fridges (in terms of depth and height); using user-friendly shopping carts, including lightweight ones that are easy to hold; and using smart shopping carts that enable the display of price and product information.

The seven primary principles of universal design are (1) equitable use, (2) flexibility in use, (3) simple and intuitive use, (4) perceptible information, (5) tolerance for error, (6) low physical effort, and (7) size and space for approach and use (Table 2).

They are helpful for understanding diversity and for developing projects that serve their intended users and a wide range of users.

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Table 2. Principles of universal design

Principle	Description
Principle one: Equitable use	The design is useful and marketable to people with diverse abilities.
Principle two: Flexibility in use	The design accommodates a wide range of individual preferences and abilities.
Principle three: Simple and intuitive use	Use of the design is easy to understand, regardless of the user' experience, knowledge, language skills or current concentration level.
Principle four: Perceptible information	The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.
Principle five. Tolerance for error	The design minimizes hazards and the adverse consequences of accidental or unintended actions.
Principle six: Low physical effort	The design can be used efficiently and comfortably and with a minimum of fatigue.
Principle seven: Size and space for approach and use	Appropriate size and space are provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.
Principle eight: Adding to human delight [a]	Adaptation to the society by encouraging interpersonal dialogue
Principle nine: Functional & aesthetic integration [b]	Designs should be both functional and aesthetic
Principle ten: Social cohesion & participation [b]	Everyone must enjoy from living environment
Principle eleven: Sustainability related equity [c]	Use of renewable energy resources to protect and sustain natural resources and ensure social equity

Note. The first 7 principles are the core principles created by Ron Mace.
Source: Elaborated by the authors, based on Story, M. F. (2001). Principles of Universal Design. In W.F.E. Preiser & E. Ostroff (Eds.), *Universal Design Handbook* (Chapter 10), McGraw Hill.
[a] Manley, S. (2001). Creating an Accessible Public Realm. In W.F.E. Preiser & E. Ostroff (Eds.), *Universal Design Handbook* (Chapter 58). McGraw Hill.
[b] Degertekin, M. H. (2010), Engelliye Özel Degil Herkese Yönelik Tasarım: Herkes İçin Tasarım (Design not for Disabled: Design for all), 5th International Organization of Foundation for People with Disabilities Congresses & Social Events, Halic, 28-30 May, Istanbul (in Turkish).
[c] Evcil, A. N. (2014). *Herkes İçin Tasarım Evrensel Tasarım (Design for All Universal Design*). Boğazici Press (in Turkish).

6. Empirical Study: Istanbul and Ageism in Supermarket Designs

Istanbul, with its diverse demographic, socioeconomic, and physical features, provides opportunities to explore shopping areas of varying sizes (besides supermarkets, these include shopping centers and open bazaars within walking distance). With a population of 14 million, Istanbul is home to 1.9 million older adults (The Turkish Statistical Institute, 2012). As of 2017, the district of Kadıköy had the highest rate of people aged 65 and over in the city, at 17.7% (The Turkish Statistical Institute, 2017, cited in Tunçer, 2019). In 2016, Kadıköy became a member of the World Health Organization Global Network of Age-Friendly Cities and Communities (World Health Organization, 2016). According to the World Health Organization, eight essential issues govern the creation of age-friendly cities: outdoor space and buildings, transportation, housing, social participation, respect and social inclusion, civic participation and employment, communication and information, and community support and health services (World Health Organization, 2007).

When special arrangements are made to better facilitate these issues -especially in the physical environment- older people are more willing to age in their neighborhoods (Yu & Rosenberg, 2020; Van Hoof *et al* 2018; Kazak *et al*., 2017). In other words, inclusive environments enable ageing in place and help to prevent ageism.

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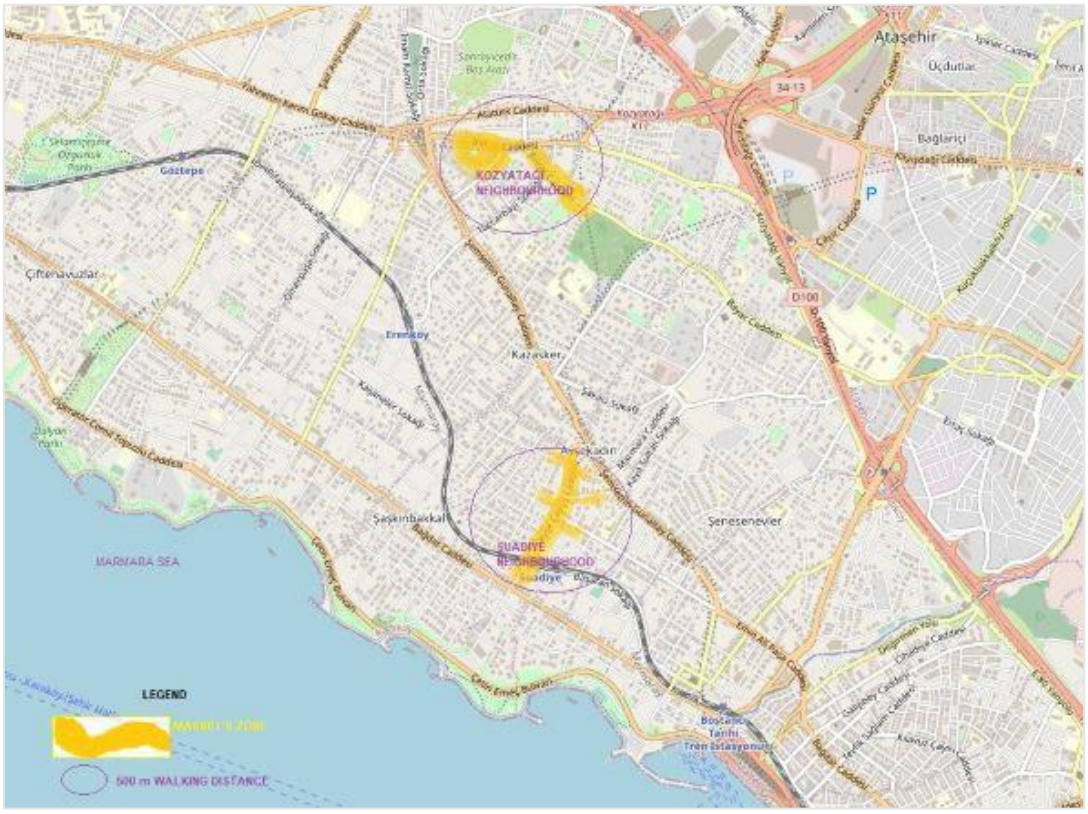
"In order to fully enhance the economic, social, political, and cultural participation of older persons, it is crucial to provide accessible and available products and services, public as well as private" (United Nations Economic Commission for Europe, 2009, p. 5).

Respecting older people is part of Turkish custom, but recent research (Erol *et al*., 2016) shows that 82.5% of older respondents had experienced ageism at least once in Istanbul. The goal of this quantitative study is to increase awareness among designers about their decisions, which may provoke ageism.

A questionnaire was administered to 198 older adults while they were out shopping in the district of Kadıköy, to understand their experiences and the design failures that lead to ageism. The survey was conducted in the neighborhoods of Suadiye and Kozyatağı, each having 9 and 8 small- and medium-sized supermarkets, respectively, within a 500-meter access area for all residents (Figure 1).

Correlation analysis was performed to determine the relationship between the variables tested in the survey.

Figure 1. Map of surveyed areas (Suadiye and Kozyatağı neighborhoods)



Source: Elaborated by the authors based on the Google Maps.

6.1 Goals, Objectives, and Research Questions

The objectives of this quantitative study are to examine the design failures of indoor supermarkets in Istanbul regarding accessibility for older people inside the store, the need for rest areas and toilets, and the design of checkout counters. The study also investigates how older people evaluate the accessibility of shopping. The specific research questions are the following:

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(1) Is there a relationship between the time spent in the supermarket and the need for toilets and rest areas?
(2) Are problems of indoor accessibility related to problems with product display on shelves and the design of checkout counters?
(3) Is there a relationship between older adults' social life perceptions and time spent in the supermarket?

6.2 Methodology

Between December 2016 and April 2017, a questionnaire was administered to 225 older adults aged 65 and above in different supermarkets in Kadıköy, Istanbul. Twenty-seven questionnaires were excluded since the respondents were younger than 65; in total, 198 were analyzed. The questionnaire consists of three sections: the first covers demographic traits such as gender and age; the second covers personal experiences making purchases in supermarkets; and the last consists of items that evaluate indoor design provisions, rated on a 3-point Likert-type scale with a score from 1 (agree) to 3 (disagree). The software IBM SPSS 20 was used to perform statistical analysis. Pearson correlation coefficient (r) was used to determine the statistical correlation between time spent in the supermarket and the need for rest areas-toilets and older adults' social life perception in order to identify which of these items had an impact on the design failure. Additionally, the correlation between problems with indoor accessibility and the problems with product display on shelves and checkout counters was also determined to identify design problems faced by older adults inside the supermarkets.

7. Results

Of the 198 respondents, 54% are female and 46% are male (Table 3). The largest group is 70–79 years old (71.7%). Most of the respondents (52%) said they walk to supermarkets, and 57.1% said they sometimes take a travel companion. Regarding shopping frequency, 40.9% went shopping once a week, while 16.7% went every day. The largest group of respondents (52.5%) preferred small- or medium-sized supermarkets, while 29.8% preferred shopping centers (Table 3).

The reliability of the survey was measured using Cronbach's alpha reliability coefficient, with the help of the SPSS 20 software program. In questionnaire research, a reliability test was used to measure whether a respondent answer consistently in the questionnaire. The obtained value was 0.758, indicating that the level of reliability was acceptable, as a Cronbach's reliability coefficient of 0.60 or higher is considered "acceptable" in social sciences.

Because of the categorical nature of the data received from the questionnaire, correlation analysis was performed to determine the relationships between the variables. Pearson correlation coefficient measures the strength of the statistical relationship between two quantitative variables. However, as the correlation analysis does not represent a causal relationship, it does not indicate which variable is the cause and which is the effect.

In this study, the research questions were examined using Pearson correlation, which can have values in the interval of <-1, 1 >, where -1 represents perfect negative correlation, and a decrease in one variable causes an increase in another variable; 0 represents no relationship, meaning the analyzed variables are independent; 1 represents a perfect positive correlation, and an increase in one variable causes an increase in another variable (Sulastini *et al.*, 2018).

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Table 3. Demographics of the participants (n=198)

Respondents' Characteristics	Frequency	Percentage (%)
Gender		
Males	91	46
Females	107	54
Total	198	100
Age		
65–69	19	9.6
70–79	142	71.7
80 and older	37	18.7
How do you go shopping?		
I walk	103	52
I drive/I use my husband's or wife's car	69	34.8
I take the market shuttle	17	8.6
I take public transport	9	4.5
Do you go with a companion?		
Always	46	23.2
Sometimes	113	57.1
Never	39	19.7
How often do you go shopping?		
Every day	33	16.7
Once a week	81	40.9
Once a month	16	8.1
No specific frequency	68	34.3
Where can you meet your basic needs?		
At small to medium-sized supermarkets	104	52.5
Shopping centers/hypermarkets	59	29.8
Open bazaars/periodic markets	35	17.7

Source: Elaborated by the authors.

This study posed 3 specific research questions (please refer to 6.1.) and examined the relationship between the variables expressed in each question. The first research question was, "Is there a relationship between the time spent in the supermarket and the need for toilets and rest areas?" The Pearson correlation test showed a negative relationship between time spent in the supermarket and the need for rest areas, significant at the 0.01% level (Pearson correlation=−0.301, Sig. (2-tailed) =0.000) (Table 4). In other words, the time spent in the supermarket and the need for rest areas are negatively correlated. Older adults tend to spend less time in supermarkets because they get tired quickly and cannot find rest areas inside.

A negative, significant relationship was also found between the time spent in the supermarket and the need for toilets (Pearson Correlation=−0.273, Sig. (2-tailed) =0.000) (Table 4). As older adults need to go to the toilet more often, the amount of time they spend in the supermarket decreases in cases where there are no toilets inside. Thus, as the need for rest areas and toilets increases, the time spent in the supermarket declines. This could be related to regulations in Türkiye (İşyeri açma ve çalışma ruhsatlarına ilişkin yönetmelik, 2005), which feature no mandatory provisions on supplying toilets and rest areas for customers.

Table 5 demonstrates that problems with indoor accessibility in supermarkets (Indoor access) are positively linked to problems with product display on shelves (Shelves) (Pearson correlation=0.427, Sig. (2-tailed) =0.000) and the design of checkout counters (PCCounterD) (Pearson correlation=0.358, Sig. (2-tailed) =0.000). The relationship was statistically significant, with both variables, Indoor Access-Shelves and Indoor acces-PCCounterD, being positively correlated (Table 5).

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Low and high shelves create indoor accessibility problems for older adults in supermarkets. Likewise, the design of checkout counters is another issue that can pose challenges for indoor accessibility. Checkout counters that are properly designed facilitate greater indoor accessibility.

Table 6 illustrates the results for participating in social life (e.g., opportunities to meet friends and reason to leave their home) and time spent in the supermarket. The Pearson correlation data analysis revealed a negative, significant correlation (Pearson correlation=−0.146, Sig. (2-tailed) =0.040); that is, increases in participating in social life were linked to decreases in time spent in the supermarket (Table 6). This result does not appear in the relevant literature, as shopping is not included as an aspect of older adults' social life. In the case of Türkiye, supermarkets do not have rest areas for taking a short break or toilets. Older adults, however, need these provisions in order to participate in social life.

Table 4. **Correlation between time spent in the supermarket and the need for rest areas and toilets**

		TSiS	NfRA	NfT
Time spent in the supermarket (TSiS)	Pearson Correlation Sig. (2-tailed) N	1 198	-0.301* 0.000 198	-0.273* 0.000 198
Need for rest area (NfRA)	Pearson Correlation Sig. (2-tailed) N	-0.301* 0.000 198	1 198	
Need for toilet (NfT)	Pearson Correlation Sig. (2-tailed) N	-0.273* 0.000 198		1 198

*Correlation is significant at the 0.01% level (2-tailed)
Source: Elaborated by the authors using SPSS 20.

Table 5. **Correlations between problems with indoor accessibility and problems with product display on shelves and checkout counter design**

		Indoor access	Shelves	PCCounterD
Indoor accessibility problems in supermarket (Indoor access)	Pearson Correlation Sig. (2-tailed) N	1 198	0.152[a] 0.033 198	0.363[b] 0,000 198
Problems with product design on shelves (Shelves)	Pearson Correlation Sig. (2-tailed) N	0.152[a] 0.033 198	1 198	
Problems with checkout counter design (PCCounterD)	Pearson Correlation Sig. (2-tailed) N	0.363[b] 0.000 198		1 198

[a] Correlation is significant at the 0.05% level (2-tailed)
[b] Correlation is significant at the 0.01% level (2-tailed)
Source: Elaborated by the authors using SPSS 20.

Table 6. **Correlation between older adult's social life perception and time spent in the supermarket**

		ElSlp	TimeSiSM
Older adult's social life perception (ElSlp)	Pearson Correlation Sig. (2-tailed) N	1 198	-0.146[a] 0.040 198
Time spent in the supermarket (TimeSiSM)	Pearson Correlation Sig. (2-tailed) N	-0.146[a] 0.040 198	1 198

[a]Correlation is significant at the 0.05% level (2-tailed)
Source: Elaborated by the authors using SPSS 20.

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8. Discussion of Findings and Conclusions

Aging and senescence-related changes—which are quite diverse across individuals—offer designers the opportunity to develop inclusive solutions. That is why it is important for designers to consider the physiological, sensory, social, psychological, and cognitive characteristics of older people when planning public spaces, as the solutions they create will make those spaces more inclusive for the rest of society as well (e.g., accessible entrances, sidewalks, seating areas, toilets, etc.).Failure to consider user diversity may result in discriminatory designs, while universal design takes user diversity into account at every step of the design process, giving designers a chance to avoid ageism.

The study is meant to help increase interior designers' awareness of ageism and to prevent unconsciously ageist approaches. The results of the questionnaire survey of older shoppers in Kadıköy can help reveal and then realize older adults' needs in supermarket design (such as providing rest areas and toilets, as well as accessible shelves and checkout counters).

Although many studies have examined older adults' shopping behaviors and the physical features of retail spaces, many supermarkets' interiors provide too few inclusive toilets for customers. In Türkiye, according to regulations (İşyeri açma ve çalışma ruhsatlarına ilişkin yönetmelik, 2005), for supermarket interiors, toilets should be provided for staff. This study has shown that as older adults' need for toilets increases, the time spent in the supermarket declines. Older people tend to choose medium- or small-sized supermarkets within walking distance of their homes, which might be related to this issue. Grimby *et al*., (1993) found that urinary inconvenience causes more social isolation for women compared to older women. Also, many studies (Sinclair & Ramsay, 2011; Lai *et al*., 2016) have demonstrated that urinary problems lead to loss of self-confidence, anxiety, and depression, regardless of gender. Designers should thus be more aware of and consider the urinary needs of older adults. Pettigrew *et al*., (2005) pointed out in their study that proper physical conditions in supermarkets –such as well-maintained and properly-sized shopping carts and baskets and reachable shelves- reduce hazards and have a positive impact on older people's shopping experience, and they further highlighted the importance of having seating and toilet areas in supermarkets, as these have now become a necessary feature of supermarkets, as opposed to simply a matter of comfort, considering the growing population of older adults.

In contrast to other studies (Kohijoki, 2011; Moschis *et al*., 2004; Moschis, 2003; Myers & Lumbers, 2008), the present survey results revealed that older people do not, in general, view shopping as a social activity and that there is a negative relationship between time spent in the supermarket and perceptions of shopping as a social opportunity. Although older people place importance on socializing through communicating with employees in supermarkets (Moschis *et al*., 2004; Moschis, 2003; Pettigrew *et al*., 2005), they do not see supermarket shopping as a social activity like meeting with friends in a café. This might be related to the interior design of supermarkets, where such cafés and socializing areas are not often provided. Usually, a traditional supermarket is a self-service shop on a single level with a wide variety of goods such as produce, deli products, baked goods, and others.

Mostly, it does not offer service facilities such as banks or cafés; however, the search for new marketing strategies such as coffee-shopping or café-inspired retail space will also be beneficial for both society and store managers.

The physiological changes that come with age (Kroemer, 2006; Ceylan *et al*., 2015) require that designers consider the inclusion of rest areas for older people in supermarkets. The findings of this paper show that when older adults' need for rest areas increases, the time they spend in the supermarket declines; older people expect a less tiring shopping experience.

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Even if they prefer to walk to the nearest small- or medium-sized store with a companion, they need rest areas because they get tired easily. The design of new types of shopping carts with seats and the addition of seating areas at the entries, exits, and especially checkout counters, where long queues can occur, will increase accessibility.

Many studies emphasize the importance of accessibility for older people in supermarkets and malls (Kohijoki, 2011; Petermans & Van Cleempoel, 2010; Pettigrew *et al*., 2005; Afacan, 2012). According to our survey, older people struggle to reach shelves, products, and checkout counters due to design problems; such design failures make them unhappy and promote ageism. Older adults feel secure at home (Baltes, *et al*., 1999), but accessible and inclusive design solutions will prevent or decrease their anxiety in public spaces. Some studies point out that inclusive housing and neighborhoods simplify the everyday experiences of older people (Yu & Rosenberg, 2020; Van Hoof *et al*., 2018; Kazak *et al*., 2017). Commercial spaces also fall within this context.

Older adults do not want to be labelled or treated as old (Moschis, 2003). Petermans and Van Cleempoel (2010) investigated the story of a company called Adeg Aktiv Markt 50+ for consumers "age 50+." The turnover rate of the chain's stores increased, and Petermans and Van Cleempoel (2010) determined that the company's success was related to the stores' accessible and inclusive design. On the other hand, classifying different retail stores (e.g., supermarkets and convenience stores) is accepted as a differentiation in retail branding (Maican & Orth, 2013). There is a need to do more research on whether the differentiated characteristics of future stores will be combined by inclusive design principles.

An important limitation of this study is that viewpoints were gathered from only a relatively small number of older people. Hence, the results cannot be generalized. However, despite this, the study may offer an understanding of some design failure resulting in ageism and may serve to increase designers' and other stakeholders' awareness of discriminatory design decisions.

Fundamentally, supermarket designs should appeal to all customers and encourage consumption. This can be achieved with creative and aesthetically pleasing solutions for everyone (Null, 2003; Crews & Zavotka, 2006).

Designing an attractive commercial space for all consumers by means of universal design principles is important not only to ensure social sustainability but also in terms of stores' economic performance and of building stronger customer relationships. The social cohesion and participation principle of inclusive design (Evcil, 2014), should not be ignored, and a holistic approach should be applied. This study calls for future retail design research relying on universal design to prevent unconscious ageism.

Here is it important to note that since October 2020, many countries have recommended older adults to stay at home because of the health risks related to Covid-19. This recommendation, however, has been criticized as betraying an ageist attitude, where older people are assumed to be dispensable. Chrzanowska (2020) recently expressed that universal design in architecture is capable of solving the problem of social isolation and may mitigate various ageist behavior as well.

The findings of this study will contribute to an increased awareness of the importance of older adults' diverse features and needs and the importance of a corresponding diversity of retail design solutions. It will be helpful for future research developing interior design education curricula for improved awareness of diversity and creating design solutions to address the 9th principle of universal design, "social cohesion and participation" for all.

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However, diversity related to aging in society is inextricable from diversity related to generations, culture, and gender, among other factors which were not considered in this study. Understanding the different needs of different generations in their social and cultural diversities may help one to develop empathy. Therefore, future studies could include an interdisciplinary interior design, marketing, and gerontology approach on the basis of the present research findings.

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Author Contributions

Both authors contributed to all parts of the research.

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