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The Effect of Flat-Type and L-Type Checkout Counters on Customer's Perceptual and Functional Evaluations

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Abstract

This study aims to determine the effects of physical environmental factors in markets, which are an integral part of daily life, on perceptual and functional evaluations of participants. In this study, it is thought that physical environmental factors in supermarkets where flat-type and L-type checkout counters are used may positively or negatively affect customers' perceptual and functional evaluations. The research hypotheses focus on the correlations with the independent variables of checkout counter type, gender, and age. The Çağdaş Grocery Stores were selected as the research environment and an evaluation questionnaire on the environmental factors of the stores was applied to 200 customers who shopped at these stores. The questionnaire results show that the L-type checkout counter is found to be more aesthetic, inviting, organized, functional, and useful by customers compared to the flat-type counter. These results show that the design of the checkout counter plays a critical role in customer satisfaction and user experience. Therefore, it was concluded that the checkout counter type can be an important design criterion for improving the shopping experience in markets. This study undertaken emphasizes the critical role played for customer satisfaction and service quality in the retail sector area of operations and checkout counters and stresses the importance of design characteristics in this field. Enterprises can take steps to improve the shopping experience by revising their checkout counter preferences in accordance with the expectations and needs of customers.

Keywords: *Cash register, Checkout counter, Perception, Shopping decisions, Supermarket*

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INTRODUCTION

Retailers, salespeople, and managers focus on a search for customer satisfaction due to the intensive competition experienced recently in the supermarket retail sector. This innovative approach started to question what the effects on the shopping decisions and behaviours of customers for the typical characteristics of the physical environmental elements would be, such as the product displays used in supermarkets and storage units, and checkout counters.

In this context, in a market where supermarket physical environmental factors are gradually becoming more competitive, the shopping decisions and behaviours of the consumers can be affected positively or negatively. These types of influences could be a significant guide for developing the new solution proposals for both supermarket retailers and for designers.

The shopping concept, especially together with the industrial revolution, experienced a transformation from open areas towards closed spaces (Grewal & Levy, 2007; Goić et al., 2021). Technological developments and the event of globalization changed in a radical manner the shopping experience and consumer expectations (Verhoef et al., 2021). The needs and demands of consumers shape the modern shopping process (Zahra & Anoraga, 2021). Store organizations and placement of products are important design elements that directly affect the shopping experiences of customers (Grewal & Roggeveen, 2020). Organizations within the store affect to a significant extent the motivations and behaviours of customers to shopping (Liu-Thompkins et al., 2022).

The customer concept is in the forefront as an important component of retail strategies. Internal customer satisfaction indirectly improves external customer service quality by increasing the effectiveness of processes within the enterprise (Smith, 2011; Bowen & Schneider, 2022). The internal satisfaction and motivation of customers directly influence the external customer experience (Smith, 2011; Gustafsson et al., 2024). To develop strategies for strengthening both the interior and exterior customer relations provides the opportunity for increases in the operational efficiencies of enterprises and improvements in customer experiences. Whereas external customer satisfaction can strengthen the market location of the enterprise and can provide a competitive advantage (Gustafsson et al., 2024). Consequently, retail enterprises should adopt an integral approach for optimizing both the internal and external customer relations.

The supermarkets located within large-scale shopping centres, which have become prevalent in recent years, have an area between 400-2500 m2 and the hypermarkets have an area of 2500 m2 and above. These retail shopping centres provide for the presentation of various needs under one roof that can meet broad consumer demands (Jones, 2021). Since modern consumers seek more choices and ease, large retail shopping centres present an ideal environment for meeting this demand (Grewal & Levy, 2007; Grewal & Roggeveen, 2020). The size and the

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diversity of shopping centres directly affect the increase in pleasure of consumers and the ability of retailers to be in the forefront in the competitive market (Verhoef et al., 2021). Understanding this process of transformation presents important data both theoretically and practically and directs the strategic decisions of retailers.

In this context, to know the effects on the perceptual and functional evaluations of customers by the in-store organizations and product placements and to optimize them is of critical importance. Research studies show that the organizations of the physical store have a characteristic effect on consumer satisfaction and loyalty (Yıldırım et al., 2014, 2015; Ameen et al., 2020; Flacandji et al., 2020; Gilboa et al., 2020; Krey et al., 2022). Planning in-store organizations and product placements in a detailed manner and optimizing them is of great importance for retail enterprises to provide for customer satisfaction and competitive advantage.

Theoretical Background and Hypothesis Development

Many research studies conducted in the retail sales field set forth that the physical environmental factors of stores have an important effect on the shopping decisions and behaviours of customers (Turley & Milliman, 2000; Kuuru et al., 2020; Hermes & Riedl, 2021; Mustikasari et al., 2021; Basu et al., 2022; Grewal & Roggeveen, 2020). Physical environmental factors primarily shape the shopping experience, and this directly affects the general perception of customers for the store. Baker (1986) separated the physical environmental factors into three main categories: surroundings, design, and social factors. In the study, the surroundings factors express the general atmosphere within the store; design factors state the organization and aesthetic characteristics of the store, whereas social factors express the interactions among the customers and employees. Especially in large retail enterprises, surroundings factors, such as illumination, warmth, odour, and music, and design factors, such as colour, placement order, and equipment element characteristics play a critical role in determining customer satisfaction (Yıldırım et al., 2014; Elmashhara & Soares, 2019; Pizam &Tasci, 2019; Krey et al., 2022; Breugelmans et al., 2023). These environmental factors can positively or negatively affect the shopping experience of customers. Consequently, the physical environmental elements of stores can be evaluated as an important tool in determining customer perceptions and behaviours (Turley & Milliman, 2000; Yıldırım et al., 2014, 2015; Elmashhara & Soares, 2019; Gilboa et al., 2020; Grewal & Roggeveen, 2020). The studies conducted show that the detailed analysis of physical environmental factors could be an important strategy in increasing customer pleasure and loyalty (Yıldırım et al., 2014; Grewal & Roggeveen, 2020). The internal space environmental components, such as cabinets with shelves, racks, counters, tables, and checkout counters in large stores form the general atmosphere of the store and play an important role in directly affecting customer experience (Turley & Milliman, 2000; Pizam & Tasci,

2019; Ameen et al., 2020). Of these, it can be thought that the checkout counter, by defining the functional plan of the supermarket, is one of the most important design components contributing to the interior design atmosphere. These checkout counters, due to their orienting the physical behaviour of the customer, can also have a significant effect on consumer behaviour. When checkout counters are treated from this aspect, they can define the relationship between customer and personnel. Furthermore, they can influence positively or negatively the environmental perceptions of customers. Additionally, the checkout counter represents and emphasizes the institutional identity of the company (Yıldırım et al., 2014). The literature shows that the design and functionality of checkout counters have a critical importance for customer pleasure.

Checkout counters in the retail sector can be designed and produced in different operational areas in suitable dimensions and shapes. The basic aim of these counters is for the cashier to undertake the procedures in a productive manner and to provide for easy and rapid service to customers. The checkout counter should have sufficient space during payment procedures for both money and credit card procedures and for realizing easily additional procedures, such as packaging, putting in plastic bags, returns, and exchanges (Yıldırım et al., 2014). The ergonomic solution in these areas could positively influence customer satisfaction. Thus, the final stage of the shopping experience of customers could be without problems. It is necessary to take into consideration ergonomic principles, such as the importance in the design of counters, frequency of use and turn, storage, and dimensions of the working plane for increasing customer pleasure and for obtaining competitive advantage (Zhang et al., 2023). Similarly, Grewal and Roggeveen (2020) reported that it is necessary to organize in the optimal manner the management of customer transportation to the store to meet the customer expectations and to provide for competitive advantage. These organizations do not only remain limited to increasing the speed and productivity of the payment process, at the same time, they can also improve the general shopping experience. Thus, the retail enterprises can increase customer loyalty and can obtain a stronger position in the competitive market conditions.

Checkout counters can be in various shapes. Usually, they are in flat, L, or U shapes. Different checkout counter shapes can be perceived differently by customers (Yıldırım et al., 2014). It was stated in some studies conducted that checkout counters that have a broad storage area and that provide for the placement in an organized and easy manner of products after shopping would be able to complete the payment process of customers at a more problem-free and pleasing level (Zhang et al., 2023; Yıldırım et al., 2014). In the study by Yıldırım et al. (2014) it was reported that customers evaluated flat cash registers as more positive compared to L- and U-shaped cash registers. These limited findings show that the shape of checkout counters could be effective on the cognitive and functional evaluations of customers.

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The literature treated above shows that the design characteristics of checkout counters could affect to a significant degree customer perception and ease of use. However, when the existing literature is considered, it is understood that this subject has remained at a limited level and that a need is felt for new design proposals supported by current information. Accordingly, this study focuses on determining the effects on the perceptual and functional evaluations of customers for two different checkout counters used in supermarkets and aims to present significant contributions to the literature and in conclusion, to reach new information for which a need is felt related to the checkout counters in the retail sector with the data obtained. The H1 and H2 research hypotheses constituted according to this aim have been given below:

H1: There are differences between the perceptual evaluations of customers for the flat and L-shaped checkout counters used in supermarkets.

H2: There are differences between the functional evaluations of customers for the flat and L-shaped checkout counters used in supermarkets.

The strategies for increasing customer satisfaction in the retail sector are directly related to the design and functionality of the store. In this context, to understand the effects on the ergonomic and functionality characteristics of checkout counters in supermarkets for the gender and age factors is of critical importance. This comprehension provides for the development of strategies for increasing customer satisfaction and provides the opportunity for personalization of the store organization according to customer segments. The research conducted on this subject has started to study in deeper detail the effects on customer satisfaction of the design and functionality of checkout counters. Especially, information is gradually increasing about how improvement of checkout counters ergonomically and functionally affects customer experience (Turley & Milliman, 2000; Yıldırım et al., 2014; Ayalp et al., 2016; Algarni et al., 2021).

In this context, engaging in more research, which contains perceptual and functional evaluations according to the customer characteristics for checkout counters in supermarkets, would provide significant contributions, both theoretically and practically. It is observed in the literature that studies are limited about the effects on design of checkout counters especially used in supermarkets and customer experience of the gender and age factors (Grohmann, 2009; Kolyesnikova et al., 2009; Yıldırım et al., 2014; Basu et al., 2022; Lee et al., 2023; Shamsi et al., 2023). However, current studies undertaken in recent years present important findings on this subject.

Gąsiorowska (2008) observed that females feel a greater interest in shopping compared to males, that they move slowly in stores, that they examine carefully the racks and shelves, that they evaluate the products, that they compare the prices, that they interact with personnel and others shopping, that they ask questions, that they test the products and finally

purchase the products. Furthermore, studies show that they also display differences according to gender in the perceptions of the benefits of symbolic brands. For example, males display a difference compared to females in the dimensions of brand individuality (Grohmann, 2009; Ghorbani et al., 2022). Lee et al. (2023) treated in a comprehensive manner the effects on in-store experience of these factors by studying in detail customer preferences based on gender and age. Furthermore, Shamsi et al. (2023) developed strategies for increasing customer satisfaction in supermarkets by researching how the store organizations and design components changed according to age groups. However, a few studies (Kolyesnikova et al., 2009; Basu et al., 2022; Wu et al., 2021; Yıldırım et al., 2014) treated how the physical environmental factors of a store change according to different customer sectors, but they did not study sufficiently how the perceptual and functional evaluations of checkout counters used in supermarkets could change according to customer characteristics, such as gender and age.

Research on the differences based on gender and age could improve customer experience by presenting customized solutions in the design of checkout counters in supermarkets. In this context, this study aims to present valuable information about optimizing the store design and improving customer experience. The findings obtained will assist in our understanding better the effects on customer satisfaction of the store organizations and design strategies in the retail sector. According to this aim, the H3 and H4 research hypotheses constituted have been given below:

H3: There are differences between the functional evaluations of female and male customers for checkout counters.

H4: There are differences between the functional evaluations of 18-35, 36-45, and 46-60 years of age group customers for checkout counters.

METHOD

Participants

All the participants in the research were university graduates, 51.5% of these were females and 48.5% were males; 46% were people between 18-35 years of age, 27% were between 36-45 years of age, and 27% were people between 46-60 years of age.

Questionnaire Design and Application

A total of 200 people residing in Ankara Province participated in this research. The questionnaire form designed to assess the research hypotheses was composed of two sections. The first section included the demographic information of the participants. Whereas the second section included questions for measuring the effects on perceptual and functional evaluations of customers for checkout counters used in supermarkets. Previous studies were utilized in the development of this questionnaire form (Yıldırım et al., 2014, 2015, 2019; Ayalp et al., 2016, 2017; Müezzinoğlu et al., 2020, 2021). The questionnaires, which were

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prepared for measuring the effects on the perceptual and functional evaluations of customers for checkout counters, were applied at the Çağdaş Grocery Stores during a period of one week in April 2023. It was applied face-to-face, and every questionnaire was completed in a period of approximately 15 minutes. The required ethical permissions for the questionnaires applied was first obtained from the Chairmanship of the Board of Directors of the Çağdaş Grocery Stores dated 02 December 2022 and subsequently from the Gazi University, Ethics Commission, No. 05 and dated 21 March 2023. The research data was analysed by using the IBM SPSS Statistics (version 22.0) programmed.

Research Environment

It was aimed in this research to determine the effects on the perceptual and functional evaluations of customers for checkout counters, which are a component of the design factors included within the physical environmental factors of commercial spaces. The visuals of two different checkout counters used with the objective of determining the effects on the perceptual and functional evaluations of customers of the physical environmental factors of the Çağdaş Grocery Stores, which were taken into the scope of the research, have been given in Figure 1. The opinions and evaluations of participants were gathered throughout the research to evaluate how checkout counters contributed to the customer experience. In this context, the determination of the effects on the perceptual and functional evaluations of customers for checkout counters will assist in making strategic decisions in the retail sector.

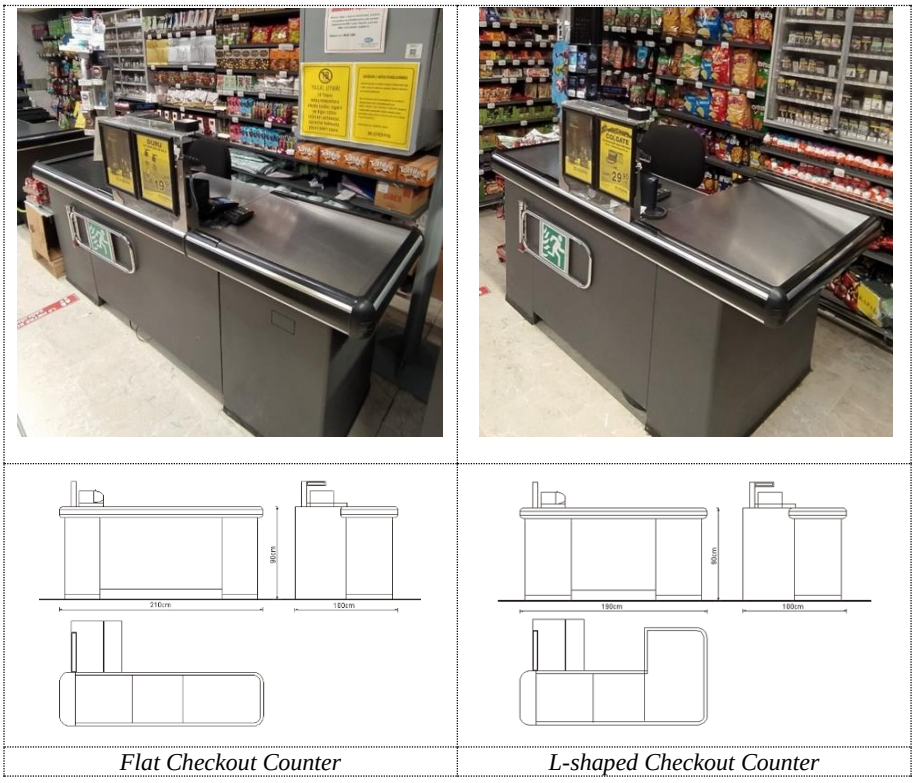

Figure 1. Checkout counters used in the research

Statistical Evaluation

The perceptual and functional evaluations for the shape of checkout counters by customers participating in the research were defined as dependent variables, whereas shape of checkout counter, gender, and age were defined as independent variables. The Cronbach's alpha test of reliability was performed on the data obtained from the questionnaires applied with the objective of assessing the hypotheses of the study. Subsequently, the percentage, average, and standard deviation values of the reliable data were analysed. The One-Way Analysis of Variance (ANOVA) was conducted for evaluation of whether the differences among the independent variables was statistically significant at the level of $p<0.05$. The data has been given graphically to compare with each other the average values found to be significant in ANOVA.

FINDINGS

Perceptual Evaluation Findings

In the research, the components used for measuring the effects on the perceptual evaluations of customers for the type of checkout counters used in supermarkets and the reliability of the scale were assessed with Cronbach's alpha. Accordingly, the reliability coefficient of the scale was calculated to be 0.834. In previous studies, it was stated that when the alpha reliability coefficient for the components constituting the dependent variable was over 70, it could be accepted as reliable (Amirrudin et al., 2021). This result shows that the data is reliable. The components used in the research and the reliability values of the scale have been given in detail in Table 1.

Table 1. The level of Cronbach's alpha reliability for the perceptual evaluation components.

Dependent Variables		Component Reliability	Scale Reliability
P1	The checkout counter looks better.	0.803	0.834
P2	The checkout counter looks more inviting.	0.792	
P3	The checkout counter looks more organised.	0.799	
P4	The checkout counter looks plainer.	0.854	
P5	The checkout counter looks more functional.	0.794	
P6	The checkout counter looks more useful.	0.792	

The questionnaire data related to the effects on the perceptual evaluations of customers for the flat and L-shaped checkout counters used in supermarkets in the research conducted were analysed with statistical methods and the average and standard deviation values and the ANOVA test result findings obtained have been given in Table 2.

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Table 2. The effect on the perceptual evaluations of customers of the type of checkout counter.

Dependent Variables	Types of Checkout Counters						ANOVA Results		
	Flat		L-Shaped		Total				
	M[a]	SD	M	SD	M	SD	F	df	Sig.
P1	3.07	1.43	1.94	1.38	2.51	1.51	64.963	1	0.000*
P2	3.10	1.29	1.85	1.23	2.47	1.41	97.873	1	0.000*
P3	2.98	1.45	1.92	1.27	2.45	1.46	59.895	1	0.000*
P4	2.49	1.46	2.46	1.50	2.47	1.48	0.028	1	0.866[is]
P5	3.10	1.38	1.77	1.13	2.43	1.43	110.496	1	0.000*
P6	3.16	1.37	1.74	1.10	2.45	1.43	131.314	1	0.000*

*Note: *It is significant at the level of p<0.001. is: It is insignificant at the level of p<0.05.*
M: Average value, SD: Standard deviation, F: F value, df: Degree of freedom.
a: Variable averages have been listed from 1 to 5. 1: I definitely agree, 5: I definitely disagree.

The findings in Table 2 show that the flat and L-shaped checkout counters used in supermarkets have important effects on the perceptual evaluations of customers. According to the ANOVA test results, statistically significant differences were found for the others, excluding one component, at the level of p<0.05 among the perceptual evaluations of customers for both checkout counters.

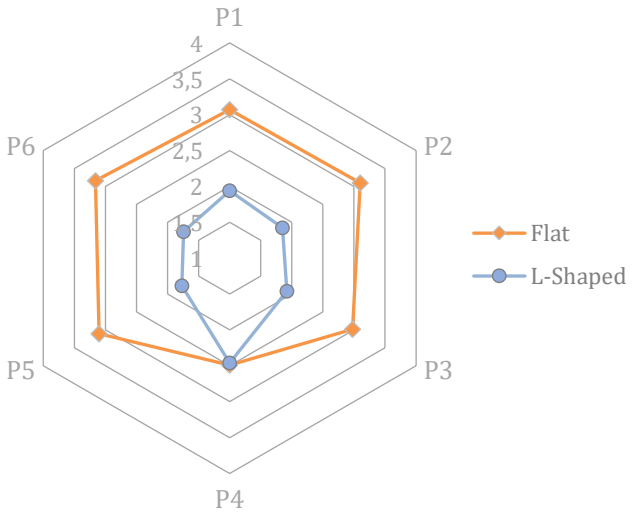

Figure 2. The effect on the perceptual evaluations of customers for the type of checkout counter

**Variable averages have been listed from 1 to 5. (1: I definitely agree, 5: I definitely disagree).*

In the graph given in Figure 2, it is observed that different values were received for the five components of both checkout counters: P1 (The checkout counter looks better.), P2 (The checkout counter looks more inviting.), P3 (The checkout counter looks more organized.), P5 (The checkout counter looks more functional.) and P6 (The checkout counter looks more useful.). However, it is observed that the P4 (The checkout counter looks plainer) component received values very close to each other. These results show that the L-shaped checkout counter was found to be more aesthetic, inviting, organized, functional, and useful compared to the flat-shaped checkout counter. The graph given shows that there are evident differences among the perceptual evaluations of customers for both checkout counters. These results support the H1 hypothesis set forth: There are differences between the perceptual evaluations of

customers for the flat-shaped and L-shaped checkout counters used in supermarkets.

Functional Evaluation Findings

The components used and the reliability of the scale were tested in the research with Cronbach's alpha to measure the effects on the functional evaluations of the customers for the shape of the checkout counters used in the supermarkets. Accordingly, the alpha reliability coefficient of the scale was calculated to be 0.849. In previous studies, it was stated that when the alpha reliability coefficient for the components constituting the dependent variable was over 70, it could be accepted as reliable (Amirrudin et al., 2021). This result shows that the data is reliable. The components used in the research and the reliability values of the scale have been given in detail in Table 3.

Table 3. The level of Cronbach's alpha reliability for the functional evaluation components.

Dependent Variables		Component Reliability	Scale Reliability
F1	The checkout counter is suitable for establishing communication with the cashier.	0.823	0.849
F2	The checkout counter is suitable for putting the products purchased in the shopping cart.	0.826	
F3	The dimensions and shape of the checkout counter are suitable for making rapid payment.	0.835	
F4	The checkout counter is suitable for passing and using shopping carts.	0.838	
F5	The checkout counter is suitable for placing what I have purchased in plastic bags.	0.825	
F6	The checkout counter is suitable for the display of sales promotion products.	0.824	
F7	The surface size of the checkout counter where products are placed is suitable.	0.824	

The questionnaire data related to the effects on the functional evaluations of customers for the flat and L-shaped checkout counters used in supermarkets in the research conducted were analysed with statistical methods and the average and standard deviation values and the ANOVA test result findings obtained have been given in Table 4.

Table 4. The effect on the functional evaluations of customers for the type of checkout counters.

Dependent Variable	Types of Checkout Counters						ANOVA Results		
	Flat		L-Shaped		Total				
	M[a]	SD	M	SD	M	SD	F	df	Sig.
F1	3.30	1.36	1.76	1.18	2.53	1.49	146.386	1	0.000*
F2	2.94	1.25	1.72	1.04	2.33	1.30	112.279	1	0.000*
F3	2.89	1.38	1.89	1.23	2.39	1.40	58.259	1	0.000*
F4	2.76	1.30	1.94	1.10	2.35	1.27	46.480	1	0.000*
F5	3.51	1.18	1.53	1.04	2.52	1.49	317.545	1	0.000*
F6	3.25	1.24	1.77	1.21	2.51	1.43	144.699	1	0.000*
F7	3.06	1.23	1.79	1.11	2.42	1.33	117.970	1	0.000*

*Note: *It is significant at the level of p<0.001.*
M: Average value, SD: Standard deviation, F: F value, df: Degree of freedom.
a: Variable averages have been listed from 1 to 5. 1: I definitely agree, 5: I definitely disagree.

The findings in Table 4 show that there are significant effects on the functional evaluations of customers for the flat and L-shaped checkout counters used in supermarkets. According to the ANOVA test results,

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significant differences were found statistically for all components at the level of $p<0.05$ between the functional evaluations of customers for both checkout counters. These results set forth a significant effect on functional characteristics, which were evaluated by customers for the type of checkout counter. The graphic statement of these results has been given in Figure 3.

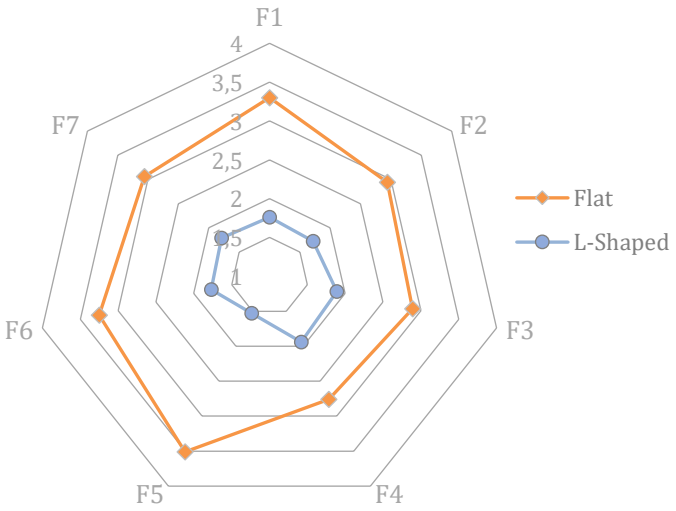

Figure 3. The effect on the functional evaluations of customers for the type of checkout counter

**Variable averages have been listed from 1 to 5. (1: I definitely agree, 5: I definitely disagree).*

In the graph given in Figure 3, it is observed that there are different values received for all the components for both checkout counters: F1 (The checkout counter is suitable for establishing communication with the cashier.), F2 (The checkout counter is suitable for putting the products purchased in the shopping cart.), F3 (The dimensions and shape of the checkout counter are suitable for making rapid payment.), F4 (The checkout counter is suitable for passing and using shopping carts.), F5 (The checkout counter is suitable for placing what I have purchased in plastic bags.), F6 (The checkout counter is suitable for the display of sales promotion products.), and F7 (The surface size of the checkout counter where products are placed is suitable.). These results set forth that the L-shaped checkout counter was evaluated more positively compared to the flat checkout counter from the aspect of functional characteristics, such as establishing communication with the cashier, placing the products purchased, making rapid payment, ease of passing and use, putting products in plastic bags and displaying sales promotion products. The graph given shows the evident differences between the functional evaluations of the customers for both checkout counters. These findings support the H2 hypothesis that sets forth There are differences between the functional evaluations of customers for the flat and L-shaped checkout counters used in supermarkets.

The average and standard deviation values and ANOVA test results including the functional evaluations for the checkout counters according to genders (female, male) of the customers has been given in Table 5.

Table 5. The effect of gender on the functional evaluations for checkout counters.

Dependent Variables	Gender						ANOVA Results		
	Female		Male		Total				
	M[a]	SD	M	SD	M	SD	F	df	Sig.
F1	3.29	1.36	3.31	1.37	3.30	1.36	0.013	1	0.909[is]
F2	2.96	1.22	2.92	1.28	2.94	1.25	0.042	1	0.837[is]
F3	2.99	1.39	2.80	1.38	2.89	1.38	0.976	1	0.324[is]
F4	2.68	1.33	2.83	1.26	2.76	1.30	0.709	1	0.401[is]
F5	3.52	1.30	3.50	1.07	3.51	1.18	0.004	1	0.950[is]
F6	3.04	1.36	3.44	1.09	3.25	1.24	5.176	1	0.024*
F7	2.81	1.30	3.28	1.12	3.06	1.23	7.455	1	0.007*

*Note: *It is significant at the level of p<0.05. is: It is insignificant at the level of p<0.05.*
M: Average value, SD: Standard deviation, F: F value, df: Degree of freedom.
a: Variable averages have been listed from 1 to 5. 1: I definitely agree, 5: I definitely disagree.

According to the findings in Table 5, statistically significant differences were found at the level of p<0.05 for the F6 and F7 components among the functional evaluations for checkout counters by female and male customers. These results have been given in a graph in Figure 4.

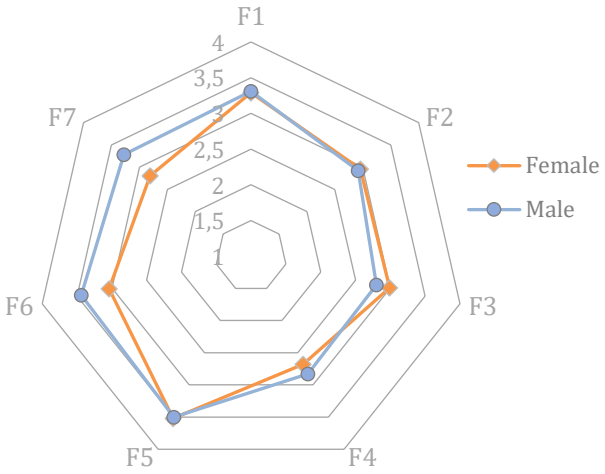

Figure 4. The effect of gender on the functional evaluations for checkout counters

**Variable averages have been listed from 1 to 5. (1: I definitely agree, 5: I definitely disagree).*

It is observed in the graph in Figure 4 that there are similarities in the functional evaluations for the checkout counters by female and male customers excluding the F6 and F7 components. Accordingly, in connection with 'displaying the sales promotion products' and 'the surface size where products are placed' at the checkout counters, males displayed a more negative approach compared to females. These results generally do not support the H3 hypothesis set forth, there are differences between the functional evaluations of female and male customers for checkout counters. However, it can be stated that there were significant differences for two components among the functional evaluations of customers with different genders.

The average, standard deviation, and the ANOVA test results of the data including the functional evaluations of the checkout counters according to the age (18-35, 36-45, 46-60) of the customers have been given in Table 6.

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Table 6. The effect of customers' age on the functional evaluations of checkout counters.

Dependent Variables	Age						ANOVA Results		
	18-35		36-45		46-60				
	M[a]	SD	M	SD	M	SD	F	df	Sig.
F1	3.14	1.42	3.44	1.34	3.43	1.28	1.158	2	0.316[is]
F2	2.76	1.29	2.80	1.23	3.39	1.11	4.969	2	0.008*
F3	2.65	1.34	2.96	1.48	3.22	1.31	3.047	2	0.050*
F4	2.39	1.22	2.83	1.36	3.31	1.16	9.499	2	0.000*
F5	3.55	1.26	3.50	1.26	3.44	0.96	0.148	2	0.862[is]
F6	3.05	1.24	3.30	1.34	3.52	1.09	2.475	2	0.087**
F7	2.93	1.22	3.00	1.32	3.31	1.13	1.714	2	0.183[is]

*Note: * It is significant at the levels of p<0.05 and ** p<0.10. is: It is insignificant at the level of p<0.05*
M: Average value, SD: Standard deviation, F: F value, df: Degree of freedom.
a: Variable averages have been listed from 1 to 5. 1: I definitely agree, 5: I definitely disagree.

According to the findings in Table 6, statistically significant differences were found at the levels of p<0.05 and p<0.10 for the F2, F3, F4, and F6 components among the functional evaluations for the checkout counters by customers in the 18-35, 36-45, and 46-60 years of age groups. However, a significant difference was not found for the F5 and F7 components. These results have been given as a graph in Figure 5.

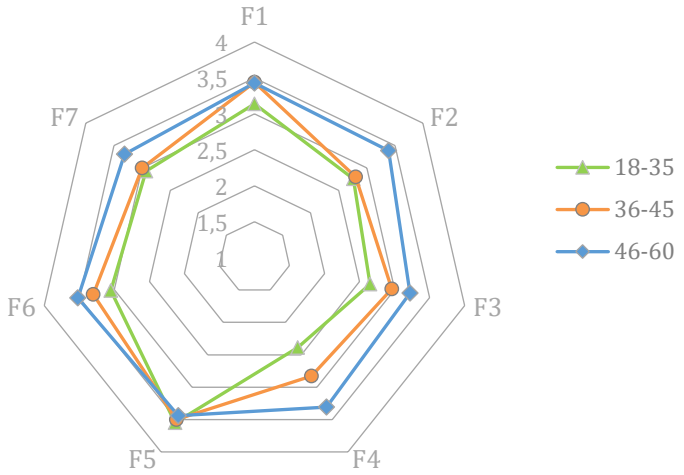

Figure 5. The effect of age on the functional evaluations for checkout counters

**Variable averages have been listed from 1 to 5. (1: I definitely agree, 5: I definitely disagree).*

It is observed in the graph given in Figure 5 that there are similarities in the evaluations excluding the F2, F3, F4, and F6 components in the functional evaluations for checkout counters by customers in the 18-35, 36-45, and 46-60 years of age groups. Accordingly, on the matters of 'putting the products purchased', 'making rapid payment', 'passing of shopping cart', and 'displaying sales promotion products' at the checkout counters, the customers in the 18-35 years of age group displayed a more negative approach compared to the customers in the 45-60 years of age group. These results support in general the H4 hypothesis set forth, there are differences between the functional evaluations of 18-35, 36-45, and 46-60 years of age group customers for checkout counters. This situation shows that age has an evident effect on the functional evaluations of checkout counters excluding the F5 component (putting the products purchased in plastic bags).

CONCLUSION AND DISCUSSION

In this research, the effects on the perceptual and functional evaluations of customers for the flat and L-shaped checkout counters used in supermarkets were investigated and the results obtained, and proposals have been listed in order below:

The first result shows that there are significant effects on the perceptual evaluations and it was determined that there were statistically significant differences among the perceptual evaluations of customers for both checkout counters for the P1 (The checkout counter looks better), P2 (The checkout counter looks more inviting), P3 (The checkout counter looks more organized), P5 (The checkout counter looks more looks more useful), and P6 (The checkout counter looks more useful) components (at the level of $p<0.001$). However, a significant difference was not determined for the P4 (The checkout counter looks plainer) component. These results show that the L-shaped checkout counter was found to be better, more inviting, more organized, more functional, and more useful compared to the flat checkout counter. Accordingly, the L-shaped checkout counter that would be preferred for supermarkets would be more suitable for being able to positively influence the perceptual evaluations of customers. This result did not support the findings of Yıldırım et al. (2014). This situation could stem from the differences in design characteristics of the wooden and lacquered cash desks used in the study by Yıldırım et al. (2014).

Another result shows that the flat and L-shaped checkout counters used in supermarkets had significant effects on the functional evaluations of customers. Accordingly, it was determined that there were statistically significant differences among the functional evaluations of the customers for both checkout counters for the F1 (The checkout counter is suitable for establishing communication with the cashier.), F2 (The checkout counter is suitable for putting the products purchased in the shopping cart.), F3 (The dimensions and shape of the checkout counter are suitable for making rapid payment.), F4 (The checkout counter is suitable for passing and using shopping carts.), F5 (The checkout counter is suitable for placing what I have purchased in plastic bags.), F6 (The checkout counter is suitable for the display of sales promotion products.), and F7 (The surface size of the checkout counter where products are placed is suitable.) components (at the level of $p<0.001$). These results set forth that the L-shaped checkout counter was evaluated more positively compared to the flat checkout counters from the aspect of functional characteristics, such as establishing communication with the cashier, putting the products purchased, making rapid payment, ease of passing and use, putting products in plastic bags, and displaying sales promotion products. Accordingly, the L-shaped checkout counter that would be preferred for supermarkets would be more suitable for being able to positively affect the functional evaluations of customers. This result did not support the findings of Yıldırım et al. (2014). This situation could

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stem from the differences in design characteristics of the wooden and lacquered cash desks used in the study by Yıldırım et al. (2014).

Another result is the statistically significant differences found by female and male customers at the level of $p<0.05$ for the F6 and F7 components among the functional evaluations for the checkout counters. It is observed that for the other five components, there were similarities in the evaluations of female and male customers. Accordingly, for the matters of 'displaying sales promotion products' and 'surface size where products are placed,' males displayed a more negative approach compared to females. It can be stated in this situation that there were significant differences for these two components between the functional evaluations of females and males. This result, excluding the two components, did not support the results found by Yıldırım et al. (2014), 'women displayed a more negative approach compared to males in the evaluations for spaces where flat, L-, and U-shaped cash desks were used.'

Finally, statistically significant differences were found in the functional evaluations for checkout counters by customers in the 18-35, 36-45, and 56-60 years of age groups for the F2, F3, F4, and F6 components at levels of $p<0.05$ and $p<0.10$. It is observed that there were similarities in the functional evaluations of customers for the other three components in the 18-35, 36-45, and 46-60 years of age groups. Accordingly, the customers in the 18-35 years of age group displayed a more negative approach compared to customers in the 46-60 years of age group on the matters of 'putting the products purchased', 'making rapid payment', 'passing shopping cart', and 'displaying sales promotion products.' This situation shows that age has an evident effect on the functional evaluations of checkout counters. These results support the study results conducted previously by Ikei & Miyazaki (2020), Coşgun et al. (2022), and Yıldırım et al. (2022) showing that spatial evaluations developed more negatively together with age. The findings show that the knowledge, experience, and observation acquired connected to age could pave the way to a more negative approach in spatial evaluations.

In summary, the results of this research show that there are significant differences among the perceptual and functional evaluations of customers using the flat and L-shaped checkout counters. These results show that the two different types of checkout counters used prevalently in recent years could affect positively or negatively the perceptual and functional evaluations of customers. Especially in supermarkets, by using the L-shaped checkout counters that have a broader product placing or storage surface would be a more realistic approach for increasing customer satisfaction and contributing to the potential of customers becoming permanent. Consequently, enterprises engaged in activities in the retail sector, by making use of results of this research, can present more effective and high-quality shopping experience for their customers by selecting the most suitable checkout counter type. This study undertaken emphasizes the critical role played for customer satisfaction and service quality in the retail sector area of operations and checkout

counters and stresses the importance of design characteristics in this field. It can be proposed that enterprises, by revising the checkout counter preferences in a manner suitable to the expectations and needs of customers, take steps that would improve shopping experience. These results obtained could guide retail enterprises in the development of customer-focused design strategies.

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