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Retail Design: Color-Light Influence on Brand Identity-Image Perception

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Abstract: In this study, it is aimed to find out the brand identity in interior design, especially the effects of color and lighting scheme at brand image, retail, store. This paper presents an experimental study by 121 participants with a special emphasis on the influence of color and light on environmental perception in retail design. The perceived image and identity of a store are affected strongly by color and light, for this reason a survey is conducted to measure the perception of the color preferences and lighting scheme in the space in regard to the cognitive memory of customers and store satisfaction by using square method. Regression analysis is applied to identify the role of color and lighting attributes in shopping for the store satisfaction.

Key words: Retail design · Color · Light · Brand identity · Image perception · Square method

INTRODUCTION

Atmosphere is the affective evaluation of the environment and it gives information about the expected effect of the built environment. It is a holistic concept, consumer reactions and behaviors to store atmospherics are shaped largely by the design of interiors; color, light, HVAC, acoustics and all related sub-service systems, as well as the quality of products, which result in user's comfort and satisfaction. According to Kotler (1973) the atmosphere of the place can be more influential than the product itself in the purchase decision. He referred to a five dimensional experience, based on our five senses. This leads designers to manipulate cues such as image (brand identity and brand image), space identity (furnishing and finishing design, music, scent), physical attractiveness and even employee appearance [1].

Store environments can stimulate emotional response in customers. Through contemporary store design, image is an abstract picture of an idea in an individual's mind. In the framework of a brand, all media that a corporation uses to describe itself, such as name, terminology, symbol, sign, design define the brand. In shareholders' mind, each brand has a brand identity, which is built through the main brand components, structure, functionality and design.

These design elements and brand image all contribute to stimulate consumer reactions. Changes in physical store characteristics can affect comsumer's shopping activity as well. A correctly illuminated, properly designed (color scheme, material property) store (interiors and store window) can catch the attention of the passerby, may entice people to visit the store, also may increase the frequency of their visit. As Schielke reported, lighting not only facilitates the visual task, but also it helps to present the merchandise and contributes to the feeling of well-being and augments the communication of a brand's appearance [2].

As being an environmental stimuli, color and light strongly affect the perceived image and identity of a store, so we conducted a survey to evaluate light-color effects on consumer behavior and understanding of brand identity, store satisfaction. Consumer experience-store satisfaction is studied by square method at a popular, high quality store in Turkey which has high annual return.

Previous Researches: In order to leave strong impression on consumers, the means of distinguishing themselves and using creative, interesting and diverse activities to attract consumers have become urgent matters of merchants. Kotler suggests that the store atmosphere is an affective sales tool with its purchasing environment.

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Each brand has its own features such as expensive-ordinary; sport-classic; feminen-masculine etc. and in interior design, color and lighting scheme tend to appear in brand identity and store image. Literature suggests that there is a linkage between store environment, merchandise, service quality and store image.

One of the key roles of a retail design has been "making difference". This idea shall offer consumers an interior with different approaches and new retail concepts. For this reason, retail design is related with several disciplines, such as, ergonomics, semiotics, psychology and sociology. All these disciplines shall come together at a harmonious design which identifies the brand identity.

Ambient factors are influential on store image as well, such as, lighting and acoustical scheme, climatic design which may serve as a cue to the quality of a brand and/or vice versa. Custers *et al.* investigate the contribution of lighting at 57 clothing stores with a special focus on lighting attributes and store context (identity). Results revealed that brightness, contrast, glare and sparkle are important lighting attributes which are assessed and are quantified independently[3]. Human comfort conditions rely on these physical parameters which also affect human psychology as well. A body of knowledge has been produced for the interaction between physical environment and human behavior in many different settings.

Additionally, the emotional states that are induced by the physical feature (color, lighting, music, scent, temperature) in the environment are positive or negative effects. For instance, a well-lit, properly designed and colored interior store atmospherics make customers to feel pleased and awoke the feeling of merchandising. The study which is conducted by Baker *et al*, (1994) integrated concepts from marketing and environmental psychology to develop and test a theoretically based model of the cognitive influence of the store environment and image [4]. It was seen that ambient and social factors enhance the customers' perception of merchandise quality, whereas social factors influence perception of service quality.

Cognitive influence of a store environment depends on how environmental factors influence the subconcious. Recognition of any space generates perceptual understanding and we respond to these issues by means of positive/negative responses. As such, atmospheric models generally make stimulus-organism-response type (S-O-R) predictions [5]. Store cues cause specific cognitive and affective reactions and these reactions modify shopping behavior.

Among the ambient factors, color scheme and lighting design lower or increase patronage intentions through their effect on customer. They act as a scene which are remarkable on the holistic view of a store [6], [7]. Turley and Milliman (2000), give a complete review of the influence of atmospherics on consumer behaviour [8]. In the study, it was concluded that, individual atmospheric variables had a demonstrable affect on the outcome of evaluations such as the store image, judgement of brands or quality of merchandise.

Retail Lighting Design: Starting from 1960's, researchers have been studying the effect of lighting on people's feelings [9]. However, research on psychological effects of lighting on experience has not extensively been studied until 1990s. Remarkably, little research has been conducted regarding the effect of store environment on customer attitudes and/or behavior [10]. Environmental psychologists state that small changes in lighting conditions can change the mood and emotional state of building occupants [11,12]. As an environmental stimuli, the presence or absence of light can produce positive or negative emotions. Excitement, satisfaction or being anxious, unsatisfaction are some of the sensations that lighting evokes [13]. Lighting states the social behavioral response of the occupants, even the problem-solving process [14]. Beyond perception, it has a cognitive, emotional and biological influence on customer [15]. POPAI (1998) suggests that up to two third of purchase desicions are made in stores[16]. This brings into the importance of the retail environment design, together with all the related sub-systems. These associations are very important for designing the physical environment [17].

A well-designed lighting scheme and color application at a store shall create dramatic spaces which motivate customers to purchase merchandise. It shall also attract customers while reinforcing the image of the store. It is advised to use high luminance contrast where quick purchases are desired and on the contrary, to lower luminance level in order to encourage customers to stay longer. Meanwhile, glare shall be avoided and it is desired to achieve suitable brightness ratios [18].

Lighting scheme in retail design shall provide both conceptual approach and technical explanation. In regard to these, the "density" of the lighting scheme at a store environment shall establish the tempo of a space, giving rhythm, hierarchy, movement...etc.

"Density" at a store environment has both conceptual and technical approach. The visual understanding of the effect of density in a store environment depends on the spacing and rhythms of light through precise numeric count[19]. The organizational character of fixture placement can be identified into three typologies-linear, random and organized pattern.

Linear organization refers to a lighting condition where the effect of a grouping of fixtures is perceived as a single, linear light. Random organization describes a grouping of light fixtures whose individual placement follows no geometric logic and whose holistic organization defines a specific pattern in contrast, the individual placement of lights in an organized pattern follows geometric logic and their holistic organization can be categorized as a recognizable shape or pattern. Hierarchy, rhythm and movement, narrative, space navigation and depth perception are sub factors of density.

Color Design of Retail Interiors: Color is the result of different wavelengths of light which stimulates certain parts of the brain. It is not only the property of objects, spaces or surfaces, but also it is the sensation caused by certain qualities of light that the eye recognizes and the brain interprets [17].

Human response to a particular color depends on the intensity of light, the way it is reflected/transmitted from a surface and the color scheme of the surrounding environment. As supported by the literature, color's effect on human performance and cognition provide important evidence by suggesting customer reactions [20], [21]. For example, cool-colored store interiors are preferred over warm-colored store interiors. The blue color evokes better feelings than orange [22]. According to Babin *et al*. (2003), violet, blue colored interiors evoke higher level of positive affective tone while increasing purchase intentions with respect to red, orange colored store interiors[23]. On the contrary, customers believe warm-colored store atmospherics are more up-to-date than cool colored store atmospherics [24], [25]. Chromatic information is crucial for visual performance when achromatic information is weak or missing. When the luminance contrast is less than approximately 0.20, some task colors with excitation purities greater than 40 % can be used to achieve a level of visual performance close to 90%. When the luminance contrast is higher than 0.60, visual performance is determined only by luminance information. As long as the luminance contrast is between 0.20 and 0.60, both luminance contrast and chromatic information are satisfied for visual performance [26].

Therefore, light and color are inseperable and in the design of human habitat, equal attention must be devoted to their psychological, physiological, visual, aesthetic and technical aspects [17]. The experience of color depends on the intensity of light, the way it is reflected from a surface and the color of surrounding objects.

Retail Lighting -The Square Method: A store is described as having a combination of bright /fluorescent light and popular background music causes consumer reactions consistent with a discount image, whereas having a combination of soft/incandescent lights and classical background music causes consumer reactions consistent with a prestige image [2]. A concept typified by specific environmental cues can cause a favorable or unfavorable reaction depending on its congruence with specific shopping motivations [27-29].

Literature shows that; consumers evaluate soft lighting (low illuminance, warm color temperature, low luminance contrast), mood music, carpeting, clean and large dressing rooms, wide aisles, nicely dressed salespeople correlate in an environment with a prestige image. Harsh lighting (high illuminance, cool color temperature, high luminance contrast), no music, linoleum floors, dirty and small dressing rooms, narrow aisles, sloppily dressed salespeople correlate in an environment with a discount image.

Color and lighting scheme are identified as contributing factors to store image. The prestige image can be supported by low-level lighting at cool colored environment, whereas the discount image evokes by high light level at warm colored environment [30-33]. Mehrabian (1974) theorized that brighter light increases arousal and the combination of pleasentness and arousal make individuals more susceptible to influence [5]. The effects of lighting scheme on the retail environment is described by a chart, named as "the square method" which depends on the store image and product type (Figure 1).

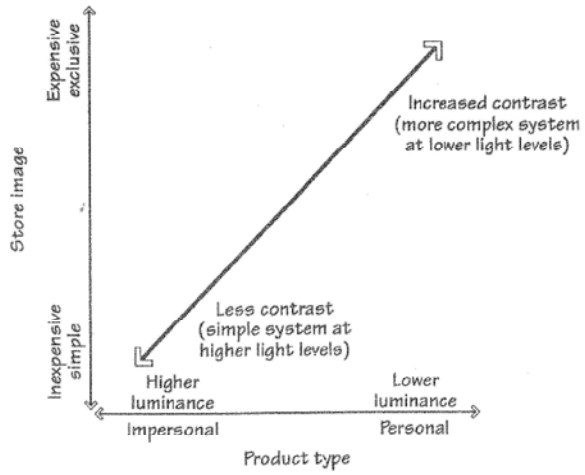


Fig. 1: Square Method For Retail Lighting Design [18]

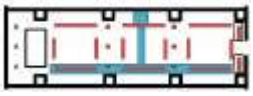
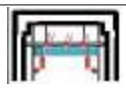
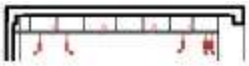
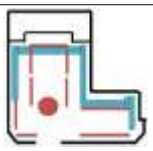
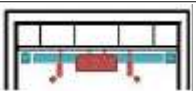
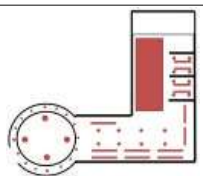
MATERIALS AND METHODS

In the study, a survey is conducted to identify consumer perception at a high quality store image in Turkey by visiting 4 different stores of the same brand in Istanbul. Istanbul is the biggest city in Turkey which reflects a heteregeneous population. This brand is selected on purpose for its high annual return and also for being highly preferrable by various professional groups.

Analyses are conducted according to the "*square method"*. This chart is related to the physical effects of the light-color stimuli. Meanwhile, a survey is carried out by a "questionnaire" which covers questions related to psychological effects of the two environmental stimuli. The responses of the participants are supported by statistical analysis as well.

The physical properties of the selected store is as follows; located at a shopping mall with a symmetrical shop window design, its' plan type is close to square. The interior design and color scheme is identical to the other store interiors of the same brand. Light-color stimuli is used in this brand at a conceptual manner. The conceptual approach by means of lighting design is as follows; there is visual order, it is well defined and organized, there is rhythm and movement, it is narrative, there is depth perception. The color stimuli supports the lighting design to emphasize the exhibited products. The optical-physical properties of the vertical surfaces (wall and exhibition panels) are matt and painted in light colors, wooden parts are closer to white (reflection coefficient of the vertical surfaces are approxiametly r=0.70), the material of the floor area is light colored wooden parquet (r=0,50). The suspended ceiling is white gypsium board (r=0.80) and the details of the lighting plans and partial sections can be seen in Table 1.

Table 1: Lighting Plan and Section of The Visited Stores

	Plan	Section
No.1 Capitol Store		
No.2 Nautilus Store Case Study		
No. 3 Cevahir Store		
No. 4 Nisantasi Store		

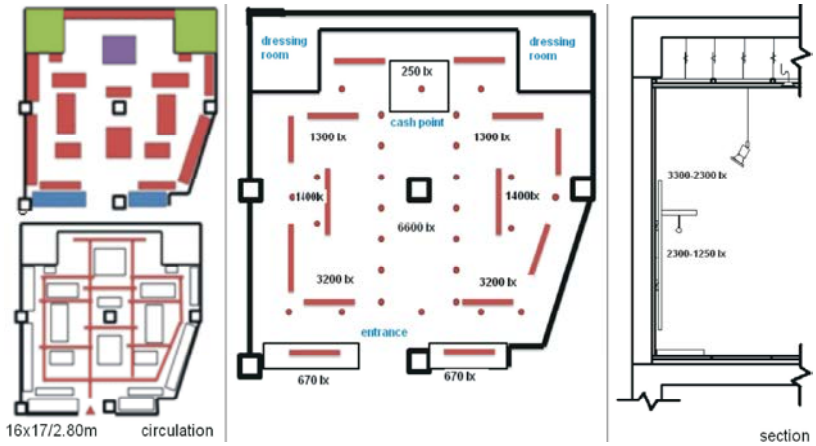


Fig. 2: Lighting Scheme – Measured Illuminance / Case Study

In the study, Nautilus store which is defined as no:2 is studied. It has symmetrical shop window and a square like plan type with the following dimensions; 16m (l) x17m (w)and 2.80m (h) as seen in Figure 2.

The light-color stimuli for the selected store interior and for the brand identity is evaluated from both psychological and physical point of views. In order to evaluate the physical effect of the lighting design, illuminances on the display units, the circulation area, the cash point and store windows are all measured by Extech Light Meter EA30.

The psychological effect is evaluated by a questionnaire. The questionnaire is prepared according to the parameters at the square method–retail lighting evaluation chart [18].

RESULTS

The study explores the positive effect of light-color scheme on consumer perception. Based on the literature review and on the environmental psychology models [5], color scheme of store interiors intervene with consumer perception and positive effect of store atmospherics are affective on consumer perception.

Physical Effects: According to the CIBSE Lighting Code, the relation between the display effect and the illuminance incident on the display is expressed in terms of the ratio of the illuminance on the object plane to the general horizontal plane illuminance[34]. The measured $E_{object\ plane}$ to $E_{average}$ values indicate that the visual effect is subtle as seen in Table 2.

Visual satisfaction is related to the visual scene in general with its surrounding. The ratio of mean vertical illuminance (E_c) to horizontal illuminance (E_h) has been found to be one of the indicators strongly associated with visual satisfaction [34]. A high value of E_c / E_h ratio has been associated with satisfaction in relation to the appearance of people's features. Values from 0.3 to 0.66 have been associated with increasing satisfaction. In the study, the following ratios are calculated;

$$E_c / E_h = 2750/1593 = 1.72 \quad (1)$$

$$E_c / E_h = 1775/1593 = 1.11 \quad (2)$$

As the calculated values (E_c / E_h), 1.72 and 1.11 are above the reference limits (0.3-0.66), it can be argued that visual satisfaction has decreased. At retail lighting, E_c is often found to be approximately equal to the wall illuminance which affects visual satisfaction.

Table 2: The measured Illuminance for Vertical and Horizontal Surfaces

	$E_{object\ plane}/E_{average}$	Ratio	Effect
Vertical	3300/1593	2	Subtle
	2300/1593	1.44	Subtle
	1250/1593	0.78	Subtle
Horizantal	1300/1593	0.81	Subtle

Table 3: Measured Illuminance and Luminance Values / Case Study

Activity zone	$E_{reference}$	$E_{Measured}$	Emin/Emax	L
Showcase	2000	2050	1	1400
Circulation area	200	6600-1300	0.19	980-910
Desk	300-1500	250	1	175
Display units	750	3300-1250	0.37	2310-875
Dressing room	300-1500	200	1	140

Table 4: Breakdown of The Responses of The Profession Group for Color Scheme Effect

Profession	No	Yes	Partially	Total
Academician	3 17.6%	13 76.5%	1 5.9%	17
Student/Design	1 1.6%	48 76.2%	14 22.2%	63
Res. Assistant	0 0.0%	4 66.7%	2 33.3%	6
Instructor/College	0 0.0%	2 100.0%	0	2
Medical staff	0 0.0%	3 100.0%	0 0.0%	3
Architect/Int. Arch	0 0.0%	4 57.1%	3 42.9%	7
Self-employement	0 0.0%	5 83.3%	1 16.7%	6
Management	0 0.0%	3 100.0%	0 0.0%	3
Other	0 0.0%	6 42.9%	8 57.1%	14
Total	4 3.3%	88 72.7%	29 24.0%	121

In the study, illuminances at various points have been measured for different activity zones (showcase, circulation area, desk, display units, dressing room) as well. The measured illuminance for each zone is compared with $E_{reference}$ values as indicated in Table 3, E_{min}/E_{max} ratio and *L* are also calculated. The reflectance value (r =0.7) is taken for the vertical surfaces and luminance values are calculated according to the following formulae; Table 3 indicates the illuminance and luminance values, at different activity zones.

$$E\ (lx)=L(cd/m^2)\ x\ r\ (\%) \quad (5)$$

At retail lighting design, each product shall be visualized at its true color. In the study, the lighting fixtures have high color rendering index (CRI) which is suitable to visualize products and surrounding at their true colors. The lighting system is supplied by movable electroray spots located at the suspended ceiling. As seen in Table 3, illuminance levels are above the $E_{reference\ values}$, except for the desk and dressing room. Supplementary lighting is required for the desk area and the dressing room.

Psychological Effects: A total of 121 consumers with an age range of 15 to 60, 15 % male, 85 % female participated to the study voluntarily. They filled in a questionnaire which consists of 8 questions. The questionnaire is designed to evaluate the store image by means of light-color scheme on the brand identity.

In the study, The Chi- square test is applied to evaluate the relation between the profession group and interior color scheme. Computed p values indicate that, there is a relation between the profession group and preferences (p=0.035<0.05) Table 4 illustrates the profession groups, their opinions on the relation of color scheme on brand-image identity. Color scheme of store interiors intervene with consumer perception is accepted at p<0.05 level. Among the profession group (academicians/university, students, research assistants, instructors/college, medical staff, architects and interior architects, managers), academicians at 75.5% and students at 76.2% believe that color scheme of the store interior is affective on the brand image identity. Out of 121 consumers 72.7 % indicates that interior color scheme is affective on brand image- identity.

The consumer group was also asked to evaluate the store image on a given scale varying from inexpensive/simple to expensive/exclusive. 105 of the consumer group (83.3%) indicated that the store image is stylish. 12.7% of the consumers indicates that the store is luxurious, whereas 4% indicates the store image is simple. Figure 3 gives the distribution of the responses on the Square Method Chart. As the results are clustered according to the consumer preferences in regard to light-color stimuli, it can be concluded that, the store image is above the medium (standart). In this evaluation, the illuminance level (horizontal and vertical), luminance contrast, lamp color properties (CRI) and placement were observed by each consumer and the questionnaire is filled in accordingly.

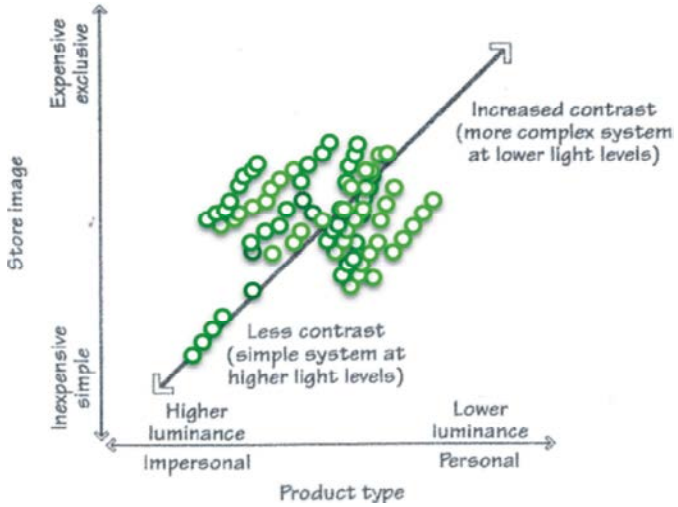


Fig. 3: Distribution of Responses on the Square Method Chart

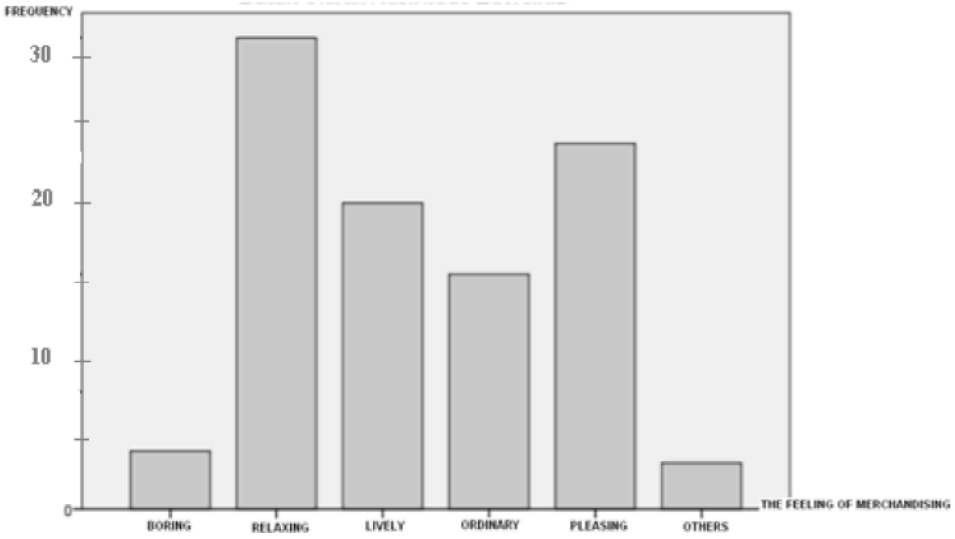


Fig. 4: Store Atmospherics Evaluation Diagram

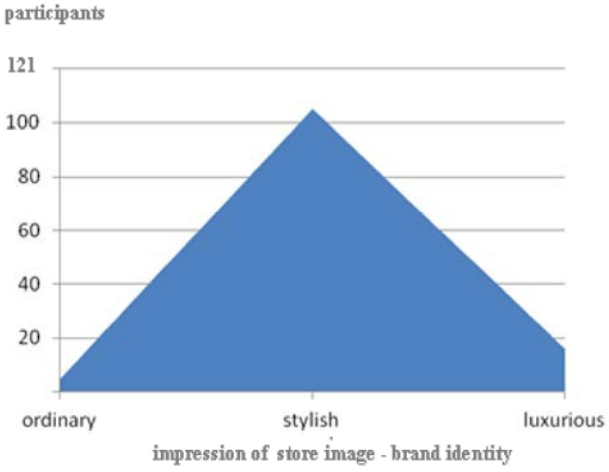


Fig. 5: Consumer Evaluation on Store Image-Brand Identity

As being stimulators, light-color scheme affects environmental perception. According to the given responses, 31.7 % indicates that the lighting-color scheme of the interiors are relaxing, 24 % believed that it is pleasing and awokes the feeling of merchandising 20.6 % indicates that it is lively, only a small group (23.1 % indicates it is boring and other factors). As depending on the responses, product type, illuminance versus store image is illustrated including contrast factor as seen in Figure 3. The final result is parallel to Baker's research which examines the effect of the physical features (color, lighting design) on the emotional states of consumers.

Consumers demonstrated how the store meant to them in regard to brand identity-store image. The store is not only a functional environment but also a stylish one when it is evaluated by means of light-color design as seen in the Figure 5.

CONCLUSION

In retail design, the perceived image and identity of a store are affected strongly by light and color. These two parameters are important for the architectural concept, patronage behavior, cognitive memory, as well. This view suggests that consumers process atmospheric characteristics holistically more than piecemal.

In the present study, the importance of image identity and the power of light-color on cognitive memory is investigated by a case study. A survey is conducted to evaluate the perception of color preferences and lighting scheme in regard to customers' perception and physical factors by using square method. According to the results, it can be concluded that the image of the selected retail shop is above the standart (ordinary) level. Lighting design (high level illuminance, luminance, contrast, etc.) and color scheme (light colored surfaces with high reflectivity) are contributing factors to the brand image. Consistent with previous research [24], [25] consumers react favorably to cool store interiors, achromatic color scheme. Effects of color-light scheme and brand-image identity on behavioral intentions are mediated by cognitive and affective reactions they create. It is hoped that the findings will support designers in evaluating the complexity of store design as well informing the development of store image theory. For further research, other ambient factors like sound and temperature can be studied in combination to light and color.

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