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International Journal of Curriculum and Instruction
12(Special Issue) (2020) 222–232

IJCI
International Journal of Curriculum and Instruction

Examining the factor of color on street facades in context of the perception of urban aesthetics: Example of Antalya

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Abstract

In this study, the visual assessment of building facades, which define the boundaries of avenues, were based on the color factor with the aim of revealing its effect on the aesthetic perception of a city. Being part of the façade coloring work implemented in the Province of Antalya, the facades along the Avenues of Gulluk, Yuzuncuyil and Mevlana were selected as the sample for this study.

In the first stage of this study, a survey assessment form was developed with reference to similar studies. For the online survey, random participants were asked to evaluate the former and current appearance photos showing the coloring work on the selected avenues based on five selected criteria (Like-Dislike, Boring-Exciting, Compatible-Incompatible, Disturbing-Relaxing, Appealing-Unappealing). Research suggest that coloring work did not have a significantly positive effect neither on the aesthetic value of the city nor on people's degree of liking of the avenues. However, in scope of given criteria, different relations do emerge when the degree of liking scores for the former and current appearance is evaluated. There is a strong relation between Compatible-Incompatible criteria and degree of liking before the coloring work however, the relation between Boring-Exciting criteria and degree of liking after the coloring work is stronger. Accordingly, it is possible to say that the standard colors used formerly on the avenue facades were liked because they were compatible however, the applied colors are liked because they are found more exciting.

Keywords: aesthetics, buildings, environment, perception, visual

1. Introduction

Formed of natural and built environments and containing a variety of urban spaces and components, cities are dynamic and complex spaces that change with the needs of societies. Accommodating a multitude of disciplines and shared by thousands-millions of people, urban spaces also have different effects on people. According to Lynch (1960) roads is an urban symbol that effects people. Travelling down streets, people observe the city and associate environmental factors (Lynch, 1960). Including inner-city

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transportation circulation carriageways, pedestrian walkways and railroads, these diverse spaces are a city's dynamic canals used commonly in the observer's (city dweller's) daily life. Among inner-city roads, avenues bear the load of most circulation density and accommodate both vehicle and pedestrian traffic. Facades form the boundaries of and shape these urban spaces in which vehicles and pedestrians are in constant movement. Facades are one of the most intense visual components of a city and in this sense, they have an impact on a city's aesthetic value. The physical and psychological effects of urban design on each person observing the city can be relative. However, research on the measurability of the concept of spatial aesthetics in studies addressing environmental psychology suggest that aesthetic judgement is a measurable value and that there are common impressions concerning it (Nasar, 1992). Based on these common impressions, it is possible to produce a result on the kind of effect a city's image has on the observer.

Developing a perception of a city relies more on our sense of sight rather than senses of sound, smell or feel. However, there are variables that affect perception which include figural qualities like form, color, proportion, scale, geometry, shadow as well as symbolic qualities like giving relaxed or secure feelings (Nasar 1997). Favoring or liking urban spaces is the positive reflection of these qualities on a person's psychology. Facades are an important factor in the development of urban aesthetics and their design involves many variables like texture, material and color. Symbolic meanings associated with certain colors have different effects on human psychology. Color can also cause optical illusions, altering the perception of the shapes of objects. Criteria considered for a conventional aesthetic assessment on an architectural design are rhythm, proportion, form, contrast, decoration, composition and color. Having both psychological and aesthetic dimensions, color is an indispensable component of design which affects the visual satisfaction of a city.

Changes taking place in cities also alter an individual's perception of a city. In this regard, a survey was carried out to measure user perception about the coloring work carried out on the Avenues of Mevlana, Yuzuncuyil and Gulluk and the results were analyzed in context of urban aesthetics. It is expected that this study will act as a guide for similar initiatives in the future.

2. Method and Material

Antalya Province is located in the southwest of Turkey, between 29° 20'-32°35' E and 36° 07'-37° 29' N. The province lies between the Mediterranean Sea to the south and the Taurus Mountain Range to the north with neighboring provinces of Mersin, Konya and Karaman to the east, Isparta and Burdur to the north and Mugla to the west. Dominated by the Mediterranean climate, the city has hot and dry summers and temperate and wet

winters; in other words, and tropical sea climate category. Summer temperature averages range between 30 to 34 C with January averages in the range of 9 to 15 C.

The coloring work carried out on the facades of the buildings is the main reason why Antalya's Avenues of Gulluk, Yuzuncuyil and Mevlana were chosen as the study area. These centrally located avenues are used jointly by many public bus lines and accommodate a multitude of small to large stores, making them some of the most important centers of circulation in the daily lives of city dwellers. This study aims to evaluate the impact of façade coloring on the avenues on urban aesthetics and act as a reference for future studies.

In the first stage of this study, a survey was developed with reference to similar available studies. The first section of the survey is about the demographic profile of the participants. The second section consists of three sets of photos. The first set of photographs showing Mevlana, Yuzuncuyil and Gulluk Avenues before the coloring work, and the second set showing the same avenues after the coloring work. Photographs in both sets are in wider angle to provide a general perspective of the avenues. The third set of photographs feature a specific building from each avenue; one stand-alone shot from outside the building and one from the opposite side of the avenue (at a range of approx. 15 m – where width of the road permitted). Participants were shown a total of nine photographs. Criteria adaptable to our study were identified with reference to O'Connor's (2008) study. Participants were asked to evaluate Like-Dislike, Boring-Exciting, Compatible-Incompatible, Disturbing-Relaxing and Appealing-Unappealing criteria for each photo according to a 7-point Likert scale. Mutually determined quality attributes range from 1 as the most negative to 7 as the most positive.

SPSS software was preferred to analyze the data collected from the survey. Firstly, defining statistics have been presented alongside frequency, percentage, mean, standard deviation and minimum-maximum values and the normality assumption has been verified with the Shapiro-Wilk Test. The Mann-Whitney U Test has been used because data was incoherent with normal distribution in analyzing the difference between the numeric data between the two groups. The Wilcoxon Pair Test was used to analyze the past and present attitudes of the two groups. A binary logistic regression analysis was performed to investigate the impact of other factors on the degree of liking among survey participants. Relations between numeric data was analyzed with the non-parametric Spearman Correlation Test. Analyses were carried out on the SPSS 23.0 software. $P<0.05$ value has been accepted as statistically significant.

Figure 2.1. Study Area

3. Results and Discussion

In this study, participants make their evaluations based on the photographs they have been shown. Therefore, there is a need to specify points that should be considered. Firstly, light is an important factor in perception of color, making it one of the variable qualities in this study. Although photographs on the current appearance of the facades have been taken on the same date and time, this is not the case for the photographs taken before the coloring work. Photographs showing the former appearance have been found on internet archives and unfortunately lack date and time information. Light exposure on building facades vary depending on the month and time of day, and this can alter perception of façade colors. The second issue is the angle of the shot. In order to conduct an efficient analysis between the former and current appearance, the variable in analysis must focus on color. For the wider angle former and current appearance photographs of the avenues featured in this study we have tried to take the shots from similar angles. However, differences in angles observed in the photographs is another point that must also be taken into consideration. While these variables are a factor in

comparing former and current appearances, this is not the case for the close-up photographs used for the current appearance analysis.

The colors chosen for the coloring work have been defined as Mediterranean colors which predominantly feature blue on white. From the three avenues undergoing the coloring work, Mevlana Avenue differs from the other two. While only the white and blue combination has been used for the other avenues, Mevlana Avenue features the color combinations of white-turquoise, white-green and white-purple. Compared to other colors, white has been used more prevalently on the surfaces of all avenues. White is frequently preferred on exteriors for having connotations to the concept of plainness (Köseoğlu; Çelikkayalar 2016). It is also a neutral color that combines easily with other colours, effectively emphasising secondary color. Applying white with varying secondary color combinations on Mevlana Avenue is considered to be an active factor for the difference in the assessment of the avenues. In the study a comparison and assessment has been carried out on the former and current appearance of the selected avenues in Antalya City center. The differences in the coloring work carried out on these avenues has helped determine participants' perception and preferences.

The survey was first analyzed to look at the relation between participants' demographic profile and degree of liking. 58% of participants lived in Antalya while the remaining 42% resided in other cities. Participants' city of residence does affect the degree of liking in which residents of Antalya have a lower degree of liking. While 57% of the participants are at the capacity of designers, the remaining 43% have different occupations. Analyzing the degree of liking between designers and non-designers returned quite similar mean values and an insignificant difference. A total of 145 people completed the survey of which 73 were female and 72 were male. The impact of colors on females and males, and the differences in color preference between genders has been the subject of many studies that have proven the existence of a relation between gender and color. This study also analyses the gender-color relation in context of degree of liking. The difference between female and male participants' degree of liking concerning the former appearance is significant, however the difference concerning the current appearance is insignificant. That said, there is a significant difference between females and males concerning the degree of liking between the former and current appearance.

Aesthetic judgement is also influenced by whether a design is complex or simple, similar or different (Berlyne, 1971). So, the reason why Mevlana Avenue had a lower degree of liking compared to the two avenues could be linked to two fundamental differences: color and color combination. The design composition preferred on Mevlana Avenue is simpler and has been applied in the same way for all buildings. From a general perspective, the buildings look quite alike. Their structural features are indistinct and can only be differentiated by variation in color.

Figure 3.1. Photographs of the former and current appearance of the avenues included in the study

Table 3.1 Differences in female-male liking

	Gender	N	Mean	Std. Deviation	Min.	Max.	p
F.A.D.L.	Male	72	3,8796	1,54768	1	7	0,047
	Female	73	3,4064	1,2841	1	7	

Gender		N	Mean	Std. Deviation	Minimum	Maximum	p
Male	F.A.D.L.†	72	3,8796	1,54768	1	7	<0,046
	C.A.D.L.‡	72	4,1667	1,69322	1	7	
Female	F.A.D.L.	73	3,4064	1,2841	1	7	<0,001
	C.A.D.L.	73	4,2374	1,51991	1	7	

† Former Appearance Degree of Liking
‡ Current Appearance Degree of Liking

The use of similar compositions on all buildings which are mostly the same height has resulted in a dull appearance along Mevlana Avenue. However, although the same color combination has been used, the compositions on Yuzuncuyil and Gulluk Avenues are varying (vertical and horizontal applications) and thus it is possible to say that dynamic facades have reduced dullness to a certain extent. Besides using different colors, applying a more complex figural color pattern is also a factor here.

Besides the individual qualities of a color, another factor to consider in design is compatibility with other colors in the surrounding environment. There is one thing certain, the impact of a color is defined with its relation to the colors beside it. In other words, a specific color is always considered to be related to its surroundings (Itten, 2003). Color harmony in design is achieved with harmony of tone, harmony of similar colors or harmony of contrasting colors. It is possible to achieve harmonious compositions from the use of contrasts like warm-cold or pale-dark. The colors turquoise, purple and green used alongside white on Mevlana Avenue have poor saturation values making them look faded. This is why the contrast these colors create with white is also weak. Although the facades of the other two avenues do not feature completely contrasting coolers, the use of a high saturation blue tone has added vibrancy to the composition. The reflection of the differences between the three avenues on the degree of liking supports Berlyne (1974) who argued that objects with moderate stimulation potential provides maximum satisfaction in the observer, while objects with very low or high stimulation potential are disliked.

Façade color can be a practical tool in taking decisions on visible dimension, visual dominance and harmony of buildings (O'Connor, 2011). Colors define and express form, influence proportion and reveal scale, and partly provide a sense of gravity. It is hard to perceive the scale of a mono-color building from a distance, but scale can be perceived more easily, giving clearer visuality when the structural components have different colors (Sarıca, 2011). The facades along Mevlana Avenue have been painted according to a certain pattern. color has been used to equally divide the facades vertically, thereby increasing the perception of building storeys and magnifying the visibility of height. On the other hand, a different approach has been preferred for the facades of Yuzuncuyil and Gulluk Avenues. The roof parapets of all the buildings have been painted blue, giving visual integrity with horizontal continuity on buildings of the same height. However, blue has mostly been applied on balcony parapets and under-window walls. Lacking a common design style (e.g. like not all balconies being shown in blue), color has failed to give a common meaning and function to architectural components.

The buildings lined along the avenue are of a similar age and have a similar silhouette. Formerly, the buildings looked worn and old with different faded façade colors on each of them; but now the facades look better-kept after repainting. Although quite dependent on the color type and color composition, repainting the facades with a new color has been

associated with qualities like cleanliness, tidiness and novelty. These findings show coherence with Gjerde's (2010) comparisons in that it is possible to say that coloring gives a sense of cleanliness and is received positively (Gjerde, 2010).

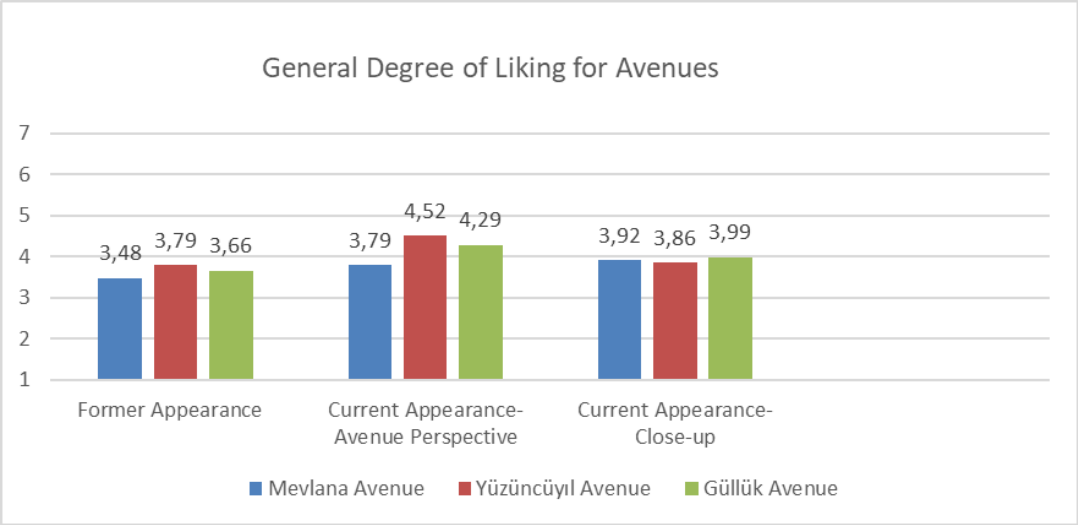

Figure 3.2. Mean Degree of Liking for Former and Current Appearance Graph (1 = Strongly Dislike, 7= Strongly Like)

A comparison on the degree of liking for the former and current appearances of all avenues included in the coloring work on a 7-point scale revealed a liking score of 3.62 for the former appearance and a liking score of 4.21 for the wide-angle photographs of the current appearance. However, the liking score for the close-up photographs of the current appearance was lower at 3.92. This is because the close-up photographs of the building reveal more detail compared to the general view. Looking at the avenue from a general perspective, buildings with uniform paintwork give the individual a sense of liking however, this is not the case from close-up. The close-up photographs of the facades make it possible to assess the balance, harmony and order of the color composition, giving a better idea of the success or failure of the composition. In their study analyzing the different components found in commercial areas, Çubukçu et al. carried out a survey on signboard colors and discovered that too many colors were disliked (Çubukçu et al. 2014). The photographs in the survey focus on the painted surfaces of the building facades as much as possible however, the signboards of ground floor shops do appear in the frame as well. Besides shop signboards, other visible factors on building facades that can alter the degree of liking include exterior AC units and balcony curtains.

Figure 3.3. Facade Close-ups of Gulluk, Yuzuncuyil and Mevlana Avenues (from L to R)

In their 2011 study on building facades, Şenyiğit and Altan analysed facades within the scope of design principles that included balance, repetition, proportion-scale, harmony, dominance, asymmetry and color and demonstrated that the principle of color is not a priority factor for urban users unless it is dominant over other principles (Şenyiğit and Altan, 2011). However, the same study also observed that the application of bright colors on avenue facades have an absorbing and positive effect. The former façade colors along the sample area of Gulluk, Mevlana and Yuzuncuyil Avenues were standard exterior colors like white, cream and brown. The brightness of the color is also an important factor in creating visual interest. Survey results show that participants perceive the current appearance after the paint work to be more exciting. This suggests that the use of brighter and non-standard colors magnify the impact of color.

4. Conclusion

With both physical and psychological dimensions, colors used in urban spaces affect individuals, resulting in visual communication. Facades are the vertical surfaces of cities and choices on façade color and composition influence the visual aesthetic value as much as the image of a city. By enabling a comparison between the former and current appearance of the avenues included in the sample area, the survey conducted in scope of the study has been used to investigate the change in urban perception after the coloring work based on different parameters. In this context, the first step was to conduct analyses on the demographic profile of the participants. Although participants in the capacity of designers demonstrated a more negative attitude compared to participants from other occupations, the difference between the two was insignificant. It has been found that gender is a significant factor in the differentiation of degrees of liking. From an equal amount of female and male participants, females were found to give higher evaluation scores.

The relation between the degree of liking for the former and current appearance and other questions in the survey was also analyzed. Results suggest that there are significant results in the attributes “boring-exciting”, “incompatible-compatible”, “disturbing-relaxing” and “unappealing-appealing” for the former appearance of the avenues. While there is a strong relation between the qualities of compatible-

incompatible and degree of liking in the former appearance photographs, in the current appearance photographs, there is a strong relation between the qualities of boring-exciting and degree of liking. Therefore, it is possible to say that former and common façade colors are liked for being compatible, and the current appearance using non-standard colors is liked for being perceived as exciting.

According to the results of this study based on the qualities asked in the survey, participants' attitude towards the avenues undergoing coloring work is generally positive. However, the difference between negative attitudes is insignificant suggesting that the coloring work did not achieve complete success. In terms of color choice, facades featuring similar, cold tones of blue, purple, turquoise, violet and green has been found attractive. That said, the application of the same colour and similar colour compositions along other avenues in the city has created an identity problem on facades made up of adjacent buildings of similar height. A more original outcome could have been achieved if the application was limited to a single avenue, giving it a new identity. However, identical applications on multiple avenues has altered the nature of the project, effectively creating almost identical avenues.

Rather than applying the same coloring work on all avenues, by permitting alternatives it is possible for an avenue to have a unique color or composition. Although there are differences in color type and composition between Mevlana Avenue and the other avenues, color choices have failed to give a distinct difference. For similar applications, it is possible to make positive changes in urban perception by improving the visual stimulation level of avenues through choosing colors unique to an avenue and the harmonic designs created with the tones of that color which all starts by choosing the right color from the beginning.

One of the shortcomings of color-focused urban design projects like this is the absence of color specialists, which is still a new field of expertise. color specialists are needed in a design team in order to achieve effective results in color-based designs. The colors used in the design process must be evaluated aesthetically, handled with an understanding of quality and discussed including the city and its inhabitants. Approaches should care for user involvement at the project development stage; and specialists should propose designs that consider the physical and psychological effects of color. Including users alongside designers and specialists and developing holistic design suggestions are approaches that increase the success of the project and application.

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