Research Article GU J Sci 31(4): 996-1005 (2018)

Gazi University

Journal of Science

http://dergipark.gov.tr/gujs

The Impacts of Perception Criteria on Aesthetic Response to Urban Streets: A Case Study in Downtown Ankara, Turkey

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Article Info

Received: 16/12/2017
Accepted:15/08/2018

Keywords

Street
Aesthetic response
Perception criteria

Abstract

Man-environment relations- more specifically the aesthetic response of people to certain qualities of their environment- is a significant research area for urban design, as such studies provide for a solid ground for urban design criteria. The purpose of this study is to investigate the perception criteria that have greater impact for satisfactory streets. For this, a web-based 'virtual tour' was used to elicit response to scenes of three urban streets in downtown Ankara, Turkey; each one exhibiting a range of different characteristics. The 70 subjects who participated in the study were selected from undergraduate student population. Our analysis resulted in categorizing variables of perception according to their relationship with aesthetic response to urban streets and to find out criteria that mostly effect sense of aesthetics toward urban streets. Findings of the study are significant as they can show urban planners and designers criteria for designing streets to reinforce the satisfaction derived from urban streets.

1. INTRODUCTION

Man-environment relations- more specifically the aesthetic response of people to certain qualities of their environment- is a significant research area for urban design, as such studies provide for a solid ground for urban design criteria. For this, we must recognize the relationship between perception criteria and aesthetic response to urban places and discover the most important aesthetic variables that affect the sense of satisfaction in public spaces. Examining aesthetic experiences on urban spaces may help finding out what kinds of physical features make such places satisfying.

The interaction between man and environment necessiatates perception as the first step. Perception is "gathering, organizing and making sense of information about the environment" [1]. According to Ittelson [1] there are four dimensions of perception:

- Cognitive: involves thinking about, organizing and keeping information.
- Affective: involves our feelings, which influence perception of the environment.
- Interpretative: meaning or associations derived from the environment
- Evaluative: İncorporates values and preferences about the environment

During environmental perception and evaluation, Rapaport [2] suggests, perceptual inputs pass through a series of filters that involve cognitive judgments and affective responses. He proposes that "the built environment is partly the organization of meaning and communication… and the environment can be conceptualized as a form of communication".

Aesthetic response results from this continious human-environment relations and it is defined as "favorouble emotional appraisals or evaluations" [3]. Altough it may vary with social and cultural experiences, personality or intentions etc., aesthetic response also has some commonalities among

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individuals [3]. Nasar develops a 'probabilistic model of aesthetic response' in relation to buildings however it may be adapted to other natural or built environments (Figure 1).

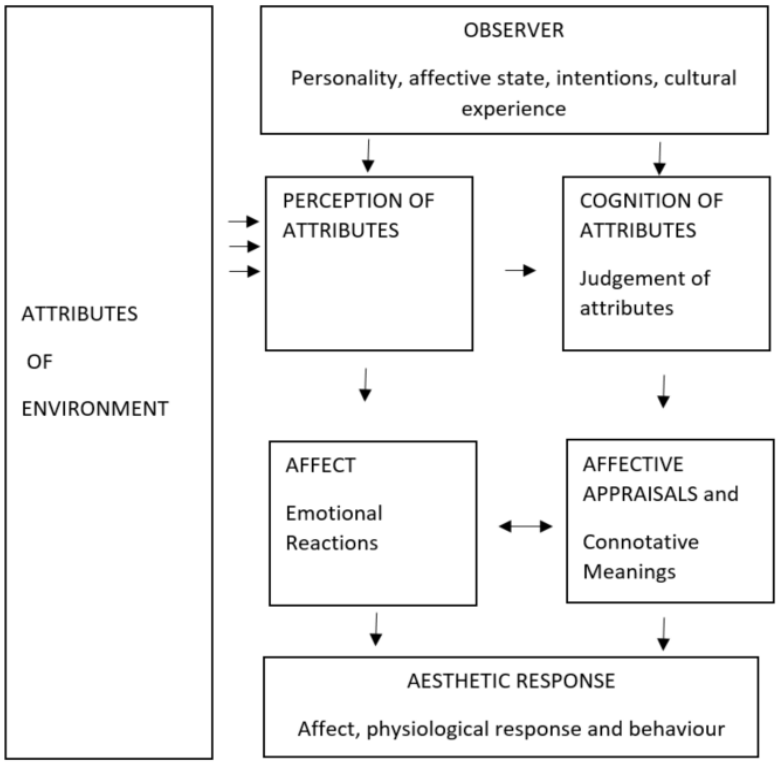

Figure 1. *A probabilistic model of aesthetic response, redrawn from Nasar [3]*

According to Lynch [4] environmental image is the outcome of a two-way process between the observer and his environment. He analyzes environmental image into three components: identity, structure and meaning. According to him an image first should be identified as an object- a seperate entity-, distinct from other things. Then it must have the spatial or pattern relation to the observer and the other objects and finally it must have a meaning for the observer to have imagebility. Apart from this Lynch [4] defined legibility "the ease with which its parts may be recognized and can be organized into a coherent pattern" as a significant quality. He utilized cognitive mapping studies and found out that 5 elements were crucial for a legibile city: paths, nodes, edges, districts and landmarks.

Cognitive mapping studies of Lynch did not include the affective qualities induced by physical elements. Nasar [5] argued that imageability alone was not a sufficient citerion for shaping city as people have feelings and associations, both positive and negative, about their surroundings and these are also crucial to people's perception of and reaction to the environment. As imageability helps people orient themselves within a city, evaluative responses affect people's decisions about how to behave.

Therefore following the work of Lynch, Nasar [5], based on an empirical study- concluded that people liked "naturalness (landscaping, countryside, rivers, lakes, water, mountains), good upkeep (cleanness, good maintenance, new homes), open views (open space, scenery), order, and historical significance. They disliked obtrusive man-made nuisances (commercial strips, industry, poles, wires, and signs), dilapidation (dirtiness, dilapidation, weeds), restriction (crowding, congestion, narrow roads), and disorder (chaos, lack of uniform style)". Therefore he defined five criteria of 'urban likability' which are naturalness, upkeep, openness, historical significance and order.

Another theory related to aesthetic response is the information processes theory developed by Kaplan et al. According to this theory, information is central to all human experience and survival [6], and the environment is itself a source of information. How the parts of an environment is arranged, significantly affects people's preferences [6,7]. According to their environmental preference framework there are four

cognitive aspects of landscape; coherence, legibility, complexity and mystery [8]. While the immediate appreciation of the environment which is related to understanding, is linked to coherence and complexity; qualities of legibility and mystery encourage people's exploration of the environment (Table 1).

Table 1. *Environmental preference framework [1]*

	Making sense	involvement
Present or immediate	(Coherence) Environments easy to organize or structure	(complexity) Environments with enough in the present scene to keep one occupied
Future or promised	(legibility) Environments suggesting they could be explored extensively without getting lost	(Mystery) Environments suggesting that, if they were explored further, new information could be acquired

On the other hand Smith [5] argues that there are four components of aesthetic response that transcend time and culture:

1. Sense of rhyme and pattern; where rhyme is about similarity in the elements with the simulataneous existance of complexity
2. Appreciation of rhythm; which involves a stricter repetition than rhyme. It is the result of grouping of elements creating emphasis, accent, direction, interval etc.
3. Recognition of balance; which is hamony among parts
4. Sensitivity to harmonic relations; where different parts fit together to form a coherent whole

Actually most of these criteria such as depend on the relationship between parts and wholes; how different parts are orginized into wholes. Here Gestalt psychology plays a significant role. The word Gestalt means configuration, structure, form or more properly an 'organized whole'. It is against the elementaristic and mechanistic thinking in psychology and philosophy has became dominant and was the prevailing view until the 19th century. Therefore humans appreciate environments as ensembles- ordered, coherent and harmonious; rather than single, isolated parts [1].

According to Gestalt psychologists what brings aesthetic order and coherence is the grouping and recognition of patterns. Wertheimer [9] was the first to formulate these laws of organization which were similarity (like parts banding together), proximity (close parts banding together) and orientation or good continuity (elements that show continuence). New rules were added in time, such as closure (banding together of parts enclosing a void. Other well-known design principles such as symmetry, alignment and simplicity are also among the gestalt rules [10].

The process of aesthetic response ends with an evaluative judgment of the perceived features of the environment [11]. Russel and Pratt [12] pointed out that this can be measured according to a two-dimensional bipolar space model, which could be defined by eight variables (Figure 2): pleasant, exciting, arousing, distressing, unpleasant, gloomy, sleepy and relaxing.

With this background, informed by the literature in the field of environmental aesthetics, an analytical framework is derived (Figure 3).

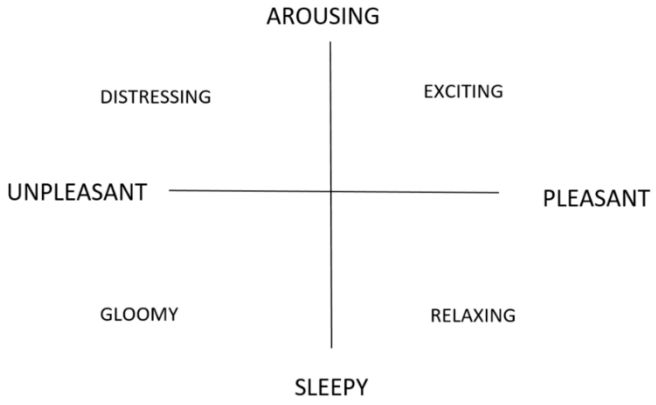

Figure 2. *A spatial representation of descriptors of the affective quality of environments, redrawn from Russell et al. [12]*

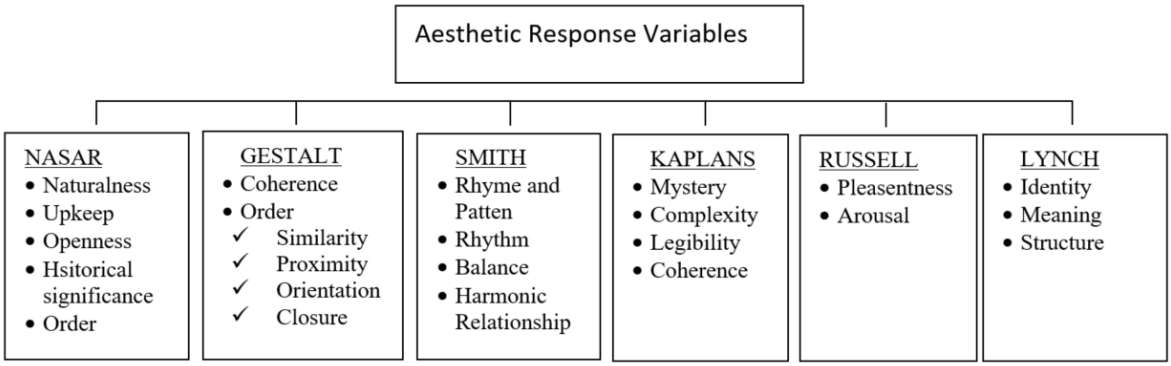

Figure 3. *Aesthetic response variables elicited from theory*

2. RESEARCH OBJECTIVES

The first objective of this study is to examine if perceivable places are mentioned as aesthetic ones. For this intent perception variables were compared to aesthetic response to urban streets. The second objective was to investigate which perception criteria have greater impact on satisfactory of streets.

3. METHODOLOGY

3.1. Study Site

The study sites are three urban streets with different characteristics in downtown Ankara in Turkey. Yüksel Street is located in the city center of Ankara: Kızılay (Figure 3), Tunalı Hilmi Street is in the southern part of Kızılay a part of the a latter developed extension of the city center (Figure 4) and Koyun Pazarı Street is a traditional street in historical part of Ankara (Figure 5). All of them are located in central parts, most known and used routes in the city for pedestrians. Yüksel Street is a pedestrian route that runs along for approximately 730 meters. This street has heavy use in different times of the day for both commercial purpose and for social activities. Tunalı Street is a multi-usage street for both pedestrians and cars with approximately 1100 meters length that receives heavy usage for transportation, commercial and social purposes. Koyun pazarı is a pedestrian route in historical district of Ankara that runs for approximately 500 meters around Ankara historical castle and it has mainly recreational use.

Figure 4. *View from 'Yüksel' street' and example of a 'virtual tour' viewpoint selected along 'Yüksel' street.*

Figure 5. *View from "Tunalı" Street and an example of a 'virtual tour' viewpoint selected along 'Tunalı' street*

Figure 6. *View from "Koyun Pazarı" Street and an example of a 'virtual tour' viewpoint selected along 'Koyun Pazarı' street*

3.2. Environmental Stimuli

In order to create kinesthetic nature of streets in a virtual tour, serial pictures were taken along streets from different viewpoints. To present a single viewpoint, different pictures were taken from one point. Images were processed using ADOBE Photoshop CS3 to create approximately 120 degree views from one point to stimulate a person's viewpoint while walking through street.

3.3. Sample

70 subjects were selected from undergraduate students at Gazi University of Ankara who take courses in the department of urban planning. The subject average age was 22 years. The sample was 31.4% (n=22) male and 68.6% (n=48) females (Table 2).

Table 2. *Sampling*

		Frequency	Percent	Valid Percent
Valid	Male	22	31.4	31.4
	Female	48	68.6	68.6
	Total	70	100.0	100.0

Subjects were scheduled to take part in a virtual tour experience in two groups. Each group was seated in front of display monitors to take the web based tour. The study was introduced to participants and they were told that they were about to enter an urban street. At the first stage we displayed a whole scene of street with street map in one corner and serial pictures of streets in other corner of a scene (Figure 6) and at the second stage we showed serial pictures of street one after another to the participants. Participants viewed the scenes and responded to the survey. The outcomes of the observations and spatial analysis were compared with each other.

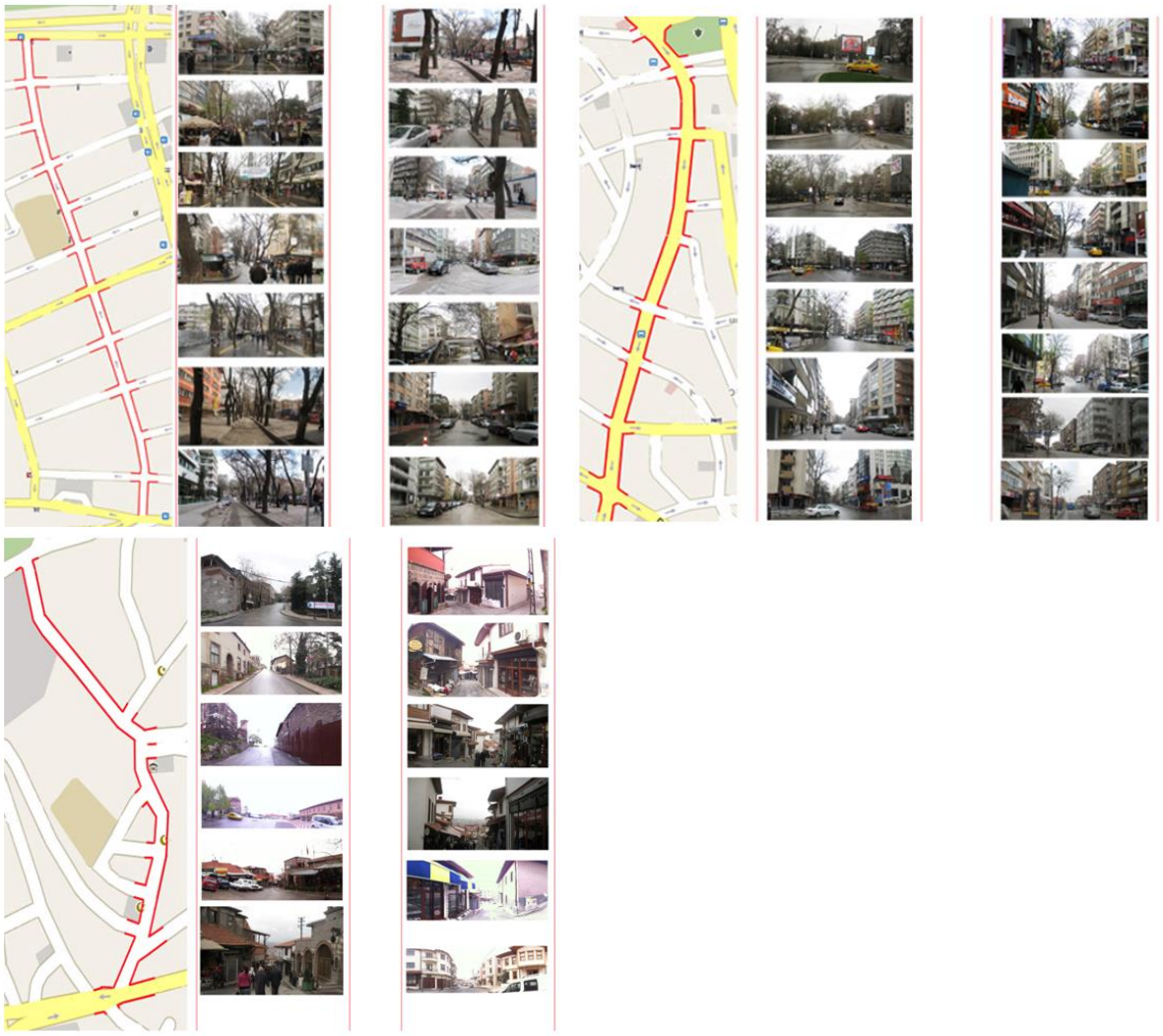

Figure 7. *Displayed street scenes for 3 streets*

3.4. Measures

The perceptional variables were selected from existing theory as it is mentioned before. 39 Variables were selected expanded from these variables from the theory (Table 3). The variables were scored from 1 to 5. The left to right (1 to 5) relationship was established from negative (completely disagree) on the left -1, and positive (completely agree) on the right- 5.

Table 3. *Aesthetic response dimension and variables*

Perceptional Dimention				
Dimension	**Variable**	**Dimension**	**Variable**	**Dimension**
Upkeep	• Chaotic • Inviting • Confusing • Repelling • maintained • tidy • harmony • ordered • chaotic	**Order**	• Legibility • Coherence ➢ Similarity ➢ Proximity ➢ Common ground ➢ orientation • Transparency • Harmonies in colors • Complexity • Diversity • variety	**Naturalness** **Uniqueness** **Rhythm and Good Continuity**
Openness	• Panorama • Vista • Openness			
Significance	• distinctness • Historical Significance • Symbolic Significance	**Image**	• Identity • meaning	**Rhyme and Pattern**
Balance	• Symmetry			
Harmonic relationship	• Human scale			
Emotional Dimension				
Dimension	**Variable**	**Dimension**	**Variable**	
Pleasantness	• Safe • Calm • Stressful • Comfortable	**Arousal**	• Boring • Exiting	

To assess the validity of the evaluation a reliability test was taken by SPSS analysis (Cronbach's Alpha >.60) (Table 4). A One-Way ANOVA test by SPSS analysis was used to determine if there is a significant relationship between aesthetic response to streets and aesthetic variables. Minimum of 0.05 were used for item inclusion ($p<.05$)

Table 4. *Reliability Statistics*

Reliability Statistics	
Cronbach's Alpha	N of Items
.852	128

4. RESULTS OF THE STUDY

4.1. Satisfaction from Streets

A TUKEY test was taken to compare three streets to determine if there is difference between aesthetic response toward these streets which present different characteristics and to analyze what kind of variables positively or negatively affect satisfaction derived from these streets. According to this test the traditional "Koyun Pazari" street is perceived more positively compared to other streets (Table 5).

Table 5. *Tukey Test Analysis*

Factors	Street		Yuksle	Koyunpazari	Tunali
			Mean	Mean	Mean
Order	Coherence	Orientation	3.26	3.96	3.11
		Proximity	3.81	4.17	3.76
		Similarity	3.43	3.86	3.73
	Diversity		2.78	3.71	2.80
	Order		2.91	3.16	3.51
	Variety		2.64	3.70	2.20
	Harmony in colors		2.61	3.80	2.91
Upkeep	Inviting		2.61	3.83	2.51
	Repelling		2.71	2.24	2.86
	Maintained		2.67	2.89	3.39
	Harmony		2.91	4.23	3.06
Openness	Openness		2.53	3.19	3.04
	Panorama and Vista		2.20	3.67	2.73
Significance	Architectural significance		1.60	4.56	1.53
	Historical significant		1.40	4.47	1.31
	Distinctness		2.74	4.57	2.37
Balance	Symmetry		3.11	2.73	3.59
Harmonic relationships	Human scale		2.77	4.70	2.00
Naturalness			1.86	2.60	1.56
Meaning	Identity		2.20	3.67	2.73
Rhyme and Pattern			2.35	3.57	2.50
Pleasantness	Stressful		2.96	2.37	2.80
	Calm		2.19	3.53	2.30
	Comfort		2.41	2.80	2.84
Arousal	Exiting		2.11	3.67	2.23

Note: This table shows variables that were scored significantly different in three streets.

Yellow items are the items that have been scored different compared to other streets, Grey items are the items that have been scored more significantly different compared to other streets.

As we can see in Table 6 "Koyun Pazarı" street was scored more positively compared to others. In addition, we found the aesthetic response variables that more positively affect satisfaction of this street. According to this test **Significance, Order, Upkeep, Pleasantness, Arousal, Rhyme and Pattern, Harmonic relationships**, are the dimensions that have the most and positive effect on satisfaction of "Koyun Pazari" Street. Among these dimensions, significance of this street was the most important dimension that affects participants. In this test we can see factors that negatively affect satisfaction of these streets: being stressful, being repelling are the factors that have been scored high in two other streets.

4.2. Aesthetic Response and Perception Variables

Another objective of our research was to examine if there is any relationship between perception variables and aesthetic response to urban streets. To examine this, a Chi-Square (Crosstab) test was taken to examine the relationship between aesthetic response to urban streets and any variable that was given as questions to participants which were scored by them from 1 to 5 (Pearson Chi-Square <0.05). This analysis resulted in categorizing variables that are related to aesthetic response to urban streets (Table 6).

Table 6. *Crosschecking aesthetic response to urban streets and perception variables*

Crosstabs (aesthetic response to streets and perceive variables)		
	Cognitive response	
Aesthetic response to urban streets	**Significance** Distinctness Historical significance Symbolic significance **Openness** Openness Panorama and vista **Upkeep** Repelling- Inviting Order- Chaotic **Balance** Symmetry **Rhyme and pattern** **Uniqueness**	**Order** orientation Harmony Similarity Common ground proximity diversity Harmony in colors Variety Common ground **Image** identity **Naturalness**
	Affective response	
Aesthetic response to urban streets	**Pleasantness** Comfort Stressful Calm Safe **Arousal** boring exiting	

Note: In this table unrelated variables are eliminated (p<0.05)

5. CONCLUSION

Our analysis resulted in categorizing variables of perception according to their relationship with aesthetic response to urban streets and to find out criteria that mostly affect sense of aesthetic toward urban streets. According to the research, perception criteria highly affect the aesthetic response to urban places and consequently the sense of pleasure and satisfaction for people in their daily experience of urban streets. In addition, a comparative analysis was taken to determine what kinds of variables positively or negatively affect sense of satisfaction in urban streets. According to this analysis, we found that **Order, Upkeep, Pleasantness, Arousal, Rhyme and Pattern, Harmonic relationships**, and above all "being significance" positively affect sense of satisfaction in streets. Instead "**Being Stressful" and "Being Repelling"** are factors that negatively affect sense of satisfaction. Knowledege about aesthetic response provides a guidance for urban planners and urban designers in the design and control processes, and also for the decision makers of urban form to be more responsive to the users of urban form.

CONFLICTS OF INTEREST

No conflict of interest was declared by the authors.

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