

THE IMPACT OF SOFTSCAPE VARIABLES ON FORMAL AND SYMBOLIC AESTHETICS CHILD'S PREFERENCE

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ABSTRACT

When designing places for people, the first important thing is to know the users to determine their needs and expectations. Therefore, design of outdoor spaces for children requires to know child's psychology such as growth, age, and aesthetics preference and so on. It is necessary to involve their views in the design of these environments to make them attractive. The first impression of the child is very important in his interaction in the space. Thus, aesthetics preferences of softscape settings within the child open spaces were studied as a main responsible factor for the first impression to the space. The purpose of this paper is to introduce a new approach to design children spaces that depends on aesthetics child's preference by the investigation in the relation between sensory aesthetics (softscape variables: number, color, and size, etc.) and other aesthetics aspects (formal and symbolic) to evaluate the aesthetics child's preference in outdoor spaces by considering the psychology of children according to their ages.

KEYWORDS: Softscape variables, aesthetics preference, child open spaces, symbolic aesthetics, formal aesthetics.

1. INTRODUCTION

Children constitute a significant part of users in urban open spaces. Because children's playtime spent in open spaces is extremely important and necessary in terms of physical, social, emotional, and cognitive aspects [1] Therefore, nature of the play space is very important. Since the softscape elements and facilities of the space affects the nature of child's playing. When the importance of play for children is considered, the design of open spaces becomes an extremely important issue [2].

The research is based on the problem that aesthetics aspects in design for children has often been treated with less importance than it deserves [3]. This is possible due to the following reasons: The tendency to link the subject of aesthetics with art and not

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with nature and the world we live in. Also, the prevalence of the traditional scenic mode of landscape aesthetics, which sees the experience as separate from everyday life [3, 4].

The purpose of this paper is to introduce a new approach to design softscape in open spaces that depends on aesthetics child's preference by considering the psychology of children to expressing the beauty of space. In fact, the beauty of the children spaces impacts the child's creativity, feelings and confidence [4, 5].

The study will discuss the impact of changing softscape variables in open spaces on aesthetics child's preference degree. First, it will focus on the general classification of formal organizational aesthetics principles, symbolic aesthetics (objectives of design) and their influencing variables. Second, how changing softscape variables affect formal and symbolic aesthetics preference in open spaces. Finally, evaluated aesthetics children's expectations by questionnaires to present aesthetics values to design an ideal outdoor space for children, the differences between results of participants will be presented.

2. CHILDREN AGE CATEGORIES

The childhood age was classified and defined by scientists to different periods from birth to teenage [5]. From birth to the age of three, the child spends the sensitive years of his life in the family and home environment and each of these factors impact the child's behavior and generally the child's character. From age three, the child begins to understand the concepts of space and time and its world becomes a sensible and objective world [5]. In the next period, between three and six, the child can distinguish between homes and elsewhere, they begin to consider general points about the environmental sensory aesthetics commensurate with their age, [5, 6]. Children love nature and like to be in contact with it and touch what that they see. Thus, it called the sensory-motor stage [1, 2, 6] but other aesthetics aspects are not yet realized (formal and symbolic), therefore, the study is concerned with children older that six.

Between the age of six to twelve, children have a more logical mode and function. They have a keen interest in nature and this main principle must be always observed.

The environment should not be outside their real-world and the aesthetics principle with their different classifications must always be respected [6].

3. AESTHETIC PRINCIPLES OF SOFTSCAPE SETTINGS

Attention to the aesthetic aspects has a special importance, because priority of the variables related to the softscape aesthetics is different in the all age groups of children and adults [7, 8]. On the other hand, the need for the aesthetic perception in the hierarchal model of Maslow's hierarchy of needs is known as one of the most sublime of human needs. Therefore, the identification and position of this concept are important in order to improve the quality of open spaces [7, 9, 10].

The aesthetic subject can be investigated in both theoretically and experimentally. A theoretical aesthetics outlines the philosophical discourses related to the nature of beauty and has not much related to the issue of the urban-environmental aesthetics, but the experimental aesthetics can be generalized to the public and outlines the aesthetic experience analysis [3, 11, 12]. According to George Santayana perspective, the experimental aesthetics as shown in Fig. 1 are separated into three main categories as follows:

- Sensory aesthetics: includes activating the person's perceptual system, Children interact with the environment through their senses as a result (Sight Sense - Hearing Sense - Taste Sense - Smell Sense - Touch Sense), the senses play an important role in children's perception of the surrounding space [3].
- Formal aesthetics: Formal aesthetics consider the geometric o of an object. Including the regular variables such as rhythm, balance, etc. [13].
- Symbolic aesthetics: symbolic aesthetics outline the association ideas and enjoyable meaning. Thus, the image of a place related to the symbolic aesthetics that deals with the features beyond the form, meaning the affiliated features in the object are recognized by the organization process [9, 13].

Simon also adopted that there is a lack of a common language of visual expression which would enable a proper debate on aesthetic issues. One way to solve this is to use an aesthetic vocabulary which enables us not only to identify pattern but

allows to discuss and evaluate what they see (or a proposed design). So that a view on the value of a particular landscape which involves aesthetics can be reached which has a broad agreement. It is noted that the basic landscape elements can be seen in relation to many variables (aesthetic vocabulary), limited but fundamental number of ways of varying them: Number, position, direction, size, shape (form), texture, density, color, light, visual force [14].



Fig. 1. Aesthetic factors in architecture.

4. ORGANIZATION AESTHETICS PRINCIPLES OF SOFTCSAPE SEETINGS

The ultimate visual objective in any landscape design is to balance unity with diversity and to respect the genius loci, the spirit of the place. The patterns and structure of a design, composition or landscape result from the organization of the basic elements in their endless variations [8, 15]. It is necessary, therefore, to relate the concepts of unity, diversity and genius loci with the various means by which elements can be organized through the design process. These organizational principles can be grouped into three categories [14]:

- Spatial: nearness, enclosure, interlock, continuity.
- Structural: balance, tension, rhythm, proportion, scale.
- Ordering: symmetry, hierarchy, transformation.

Every principle has one or more variables affecting the enhancement of the existence of principle, for example enclosure is a function of the shape and position of elements. The fabric of urban landscapes may be perceived as a sequence of different sizes of enclosed space. While factors affecting visual balance include direction, size, density, color. Table 1 summarizes the aesthetic principle [14, 16] and what variable has a great effect of each principle [14].

Table 1. Classification of aesthetic principles.

Sensory aesthetics		Formal Aesthetics												Symbolic Aesthetics				
		Organizational principles												Objectives				
		Spatial cues				Structural elements				Ordering								
Variables		Nearness	Interlock	Enclosure	Continuity	Balance	Tension	Rhythm	Proportion	Scale	Symmetry	Hierarchy	Transformation	Unity	Diversity			
Sight Sense	Number	O														Sense of Unity according to	Sense of Diversity according to	
	position	o	o	o	o	o					o							
	Direction					o							o					
	Density	O				o												
	Natural Light	o																
	Size	O	o			o	o			o	o	O						
	Shape	o		o					o			o	O					
	Color					o							o	O				
	Visual Force	O				o												
Touch Sense	Texture	o	o			o												
		↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑					

5. OBJECTIVES AND HYPOTHESES

This investigation is carried out with correlation to a major hypothesis stating that softscape variables (number, color, and size, etc.) have a great effect on realizing landscape organization principles (Formal aesthetics) and both are responsible for configuring the perceptual experience for symbolic aesthetics that were suggested by Simon. This relation is of high importance especially in child's perception of open spaces [12, 14].

A set of research photos were analyzed to help in exploring possible relationships between these aesthetics classifications and design of softscape elements. Hence, it shows how change of softscape variables influences the child aesthetics preference in child areas. These photos can be analyzed according to two major concerns as shown in Fig 2. The first is about the design of softscape features embedded in the open spaces for children (formal aesthetics), while the second is about the impact of the formal organizations on symbolic aesthetics in outdoor areas from the child's perspective.

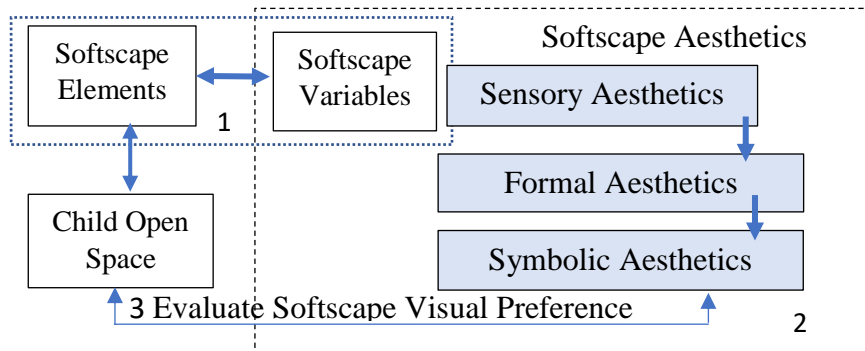


Fig. 2. Hypothesized integrated model.

6. METHOD

6.1 Participants

In order to achieve the objectives of the research, the sample was divided into two categories with one group having no architectural background but have carried out studies on child psychology. The research sample includes of 50 landscape architects and 50 child psychologists. This gives the total final sample size of 100 participants.

6.2 Stimuli

The questionnaire consisted of 48 printed colored photographs of softscape settings that represent the three different formal aesthetics principles. Printed photographs were selected from 10 locations. The rationale for photos selection was:

1. Photos must represent softscape settings of children outdoor spaces. The selected sample was decided to be closely related to human scale.
2. The sample was selected to cover a variety of locations in Egypt and abroad for example: Central Park garden, Biltmore garden-America, Dutch garden-German, Outdoor Playgrounds – Singapore, family park-Egypt.
3. Each photo represents one or more sensory variables relating to formal aesthetics items which are measured in the research.

6.3 Procedure

Empirical data were collected by photo-questionnaire through the interviews or sent by e-mail. Each participant received a questionnaire to evaluate it according to child

preference. The questionnaire form was 6 pages. The first page described the purpose of the study, requested personal information, determined the child age category, and how the respondents would be evaluating the aesthetics principles.

The questionnaire was divided into two parts. The first part, the participant was asked to evaluate 12 formal principles according to child preference by Likert scale. The preference evaluated scale ranged from 1 (Not attractive at all) to 3 (very attractive) [17].

The following pages were divided into 12 different formal aesthetics principles classification under three main categories of plants elements organizations spatial cues, structural elements and ordering as shown in Table 2. Each of the aesthetics principles was represented by four photos with different degrees of existence of the principle to its absence by change of sensory softscape variables (30V) which is associated with its existence as shown in Table 3. Each photo was described in the column next to it by explaining the sensory softscape variables that represent aesthetics principles to help participant compare between photos and to understand the purpose of the study.

Table 2. Effect of variables on existence of softscape formal aesthetics.

Formal Aesthetics	Changing of Softscape Aesthetics Variables									
	Number	Position	Direction	Density	Nat. Light	Size	Shape	Color	V. Force	Texture
Spatial cues										
Nearness										
Interlock										
Enclosure										
Continuity										
Structural elements										
Balance										
Tension										
Rhythm										
Proportion										
Scale										
Ordering										
Symmetry										
Hierarchy										
Transformation										

Table 3. Changing of variables (points of describing questionnaire photos).

Changing of Softscape Aesthetics Variables																															
Number			Pos.		Direction			Density		Nat. Light			Size			Shape			Color			V. Force		Texture							
Increased	Medium	Decreased	Nearest	Separated	Centered	Neutral	From side	to side	Surrounded	High	Medium	Low	High	Medium	(semi	Low	Same	Similar	Different	Same	Similar	Different	Dark	Pale	Light	High	Medium	Low	Same	Similar	Different
V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19	V20	V21	V22	V23	V24	V25	V26	V27	V28	V29	V30		

The second part of the questionnaire asked the participants to evaluate the aesthetics principles by answering two questions “to what extent do you think this softscape setting is preferred by children?”, “which variable has a greater effect on the sense of this formal aesthetic?”. Three points rating scale was used to answer each question. The preference evaluated scale ranged from 1 (not attractive at all) to 3 (very attractive) [17].

In Table 4, nearness as a one of formal aesthetics principles represented by 4 photos with different degrees of the nearness existence (from photo1: strong sense of existence to photo 4: weak sense of it). Variables of measuring nearness are number of softscape elements, position, density, size, visual force and texture [14].

Table 4. Part of questionnaire, nearness principles as a part of spatial cues.





Formal aesthetics	Photos represent Formal aesthetics with different degrees			Description of photo by Softscape variables									
	To what extent do you think this Softscape setting preferred by children?			please evaluate variables according to which variable has a greater effect on the sense of formal aesthetics									
Spatial cues Nearness		High preference □ 3	Medium preference □ 2	Low preference □ 1	Photo (1) of Nearness		Number	Increased	V1	□ 3	□ 2	□ 1	
							Position	Nearest	V4	□ 3	□ 2	□ 1	
							Density	High	V10	□ 3	□ 2	□ 1	
					Size	Different	V18	□ 3	□ 2	□ 1			
					Visual force	High	V25	□ 3	□ 2	□ 1			
					Texture	Different	V30	□ 3	□ 2	□ 1			
		High preference □ 3	Medium preference □ 2	Low preference □ 1	Photo (2) of Nearness		Number	Increased	V1	□ 3	□ 2	□ 1	
							Position	Nearest	V4	□ 3	□ 2	□ 1	
							Density	High	V10	□ 3	□ 2	□ 1	
					Size	Same	V16	□ 3	□ 2	□ 1			
					Visual force	High	V25	□ 3	□ 2	□ 1			
					Texture	Same	V28	□ 3	□ 2	□ 1			
		High preference □ 3	Medium preference □ 2	Low preference □ 1	Photo (3) of Nearness		Number	Medium	V2	□ 3	□ 2	□ 1	
							Position	Nearest	V4	□ 3	□ 2	□ 1	
							Density	Medium	V11	□ 3	□ 2	□ 1	
					Size	Same	V16	□ 3	□ 2	□ 1			
					Visual force	Medium	V26	□ 3	□ 2	□ 1			
					Texture	Same	V28	□ 3	□ 2	□ 1			

Table 4. Part of questionnaire, nearness principles as a part of spatial cues, (Cont.).

Formal aesthetics	Photos represent Formal aesthetics with different degrees			Description of photo by Softscape variables							
	To what extent do you think this Softscape setting preferred by children?			please evaluate variables according to which variable has a greater effect on the sense of formal aesthetics							
	Photo (4) of Nearness			Number	Decreased	V3	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1		
				Position	Separated	V5	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1		
				Density	Low	V12	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1		
	High preference	Medium preference	Low preference	Size	Different	V18	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1		
				Visual force	Low	V27	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1		
				Texture	Different	V30	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1		
	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1								

The empirical study used SPSS program to analyze the results of preference responses by means of Standard Deviation and the Main Rotations to use it as inputs for the statistical analysis. The main rating for each formal aesthetics principles range from one to three [17], as follows: high attractive aesthetics principle (H) if the average score is higher than 2.33, moderate attractive (M) if it between 2.33 and 1.66 and if it is less than 1.66 then the overall rank is considered of low attractive aesthetics principle (L).

The empirical study then analyzed the results of question two in the questionnaire to illustrate the relation between the formal aesthetics principles and the most influential variables (30V) to child. This part depends on the final numerical values of the variables in photos with higher mean rating.

7. RESULTS

7.1 Reliability of Measurements

To evaluate the measurement reliability of each variable, a reliability analysis test was run by SPSS software using the Spearman-Brown formula. The reliability coefficients were more than 0.70 as shown in Table 5. Thus, the reliability of measurement seems adequate [17].

Table 5. Reliability of measurements.

Participant	Formal Aesthetics			
	Spatial cues	Structural elements	Ordering	Whole questionnaire
Landscape Architect	0.862	0.735	0.720	0.772
Child Psychologist	0.755	0.733	0.709	0.740

7.2 The Formal Aesthetics Preference for Softscape Elements

Table 6 shows the distribution of participants on preference values of two categories of participants as a step to calculate the mean preference ratings of evaluating formal aesthetics variables in child spaces by SPSS software.

Results of part one of questionnaire indicate that preference of all formal principles is similar except for two principles. Landscape architects categorized the scale as a high attractive child's aesthetics principle, while psychologists categorized it as moderately attractive. In addition, the architects categorized hierarchy as moderately attractive while psychologists categorized it as a highly attractive variable, as shown in Fig. 3.

Table 6. Questionnaire results for the two categories of participants (part one)
(6:12 years) Result of questionnaire: Child preference of formal aesthetics

	Dis. of participant on preference values								M.R of evaluating Aesthetics Principle					
	Landscape Architect				Child psychologist				Landscape Architect			Child psychologist		
	3	2	1	Total	3	2	1	Total	Standard Deviation	Mean Rating		Standard Deviation	Mean Rating	
Nearness	32	15	3	50	34	15	1	50	0.72	2.58	H	0.75	2.66	H
Interlock	30	15	5	50	35	13	2	50	0.58	2.50	H	0.93	2.66	H
Enclosure	18	20	12	50	14	23	13	50	0.64	2.12	M	0.80	2.02	M
Continuity	20	14	16	50	14	24	12	50	0.81	2.08	M	0.62	2.04	M
Balance	13	18	19	50	16	10	24	50	0.62	1.88	M	0.44	1.84	M
Tension	34	10	6	50	28	15	7	50	0.74	2.56	H	0.83	2.42	H
Rhythm	8	12	30	50	9	9	32	50	0.75	1.56	L	0.80	1.54	L
Proportion	13	25	12	50	9	30	11	50	0.93	2.02	M	0.81	1.96	M
Scale	28	12	10	50	25	16	9	50	0.80	2.36	H	0.76	2.32	M
Symmetry	4	9	37	50	2	18	30	50	0.81	1.34	L	0.47	1.44	L
Hierarchy	13	26	11	50	25	17	8	50	0.76	2.04	M	0.92	2.34	H
Transformation	32	15	3	50	33	11	6	50	0.47	2.58	H	0.75	2.54	H

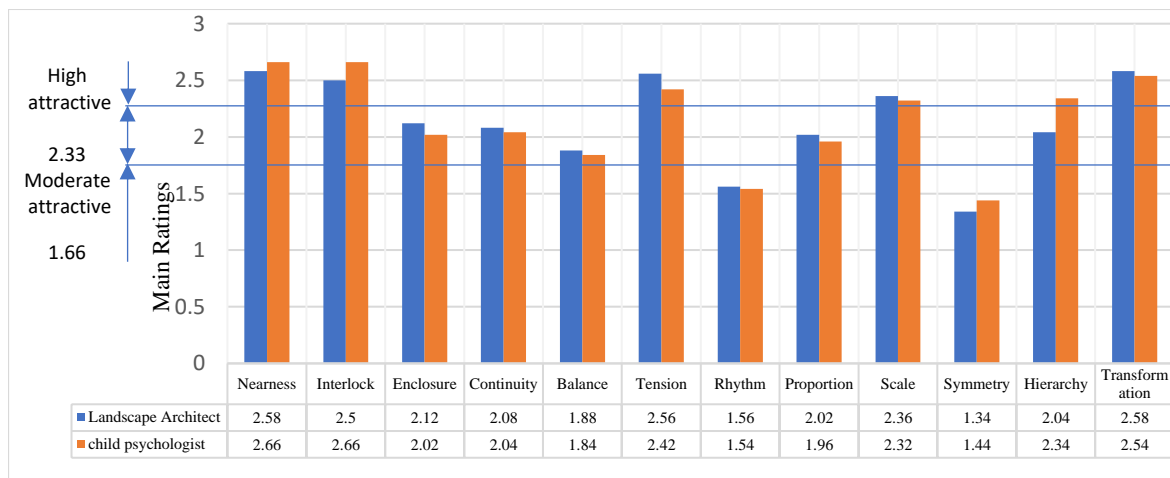


Fig. 3. Child preference of formal aesthetics.

7.3 The Effect of Sensory Aesthetics on Formal Aesthetics Preference

Part two of questionnaire was divided into two steps as shown in Table 7. Step one: determination of the formal principle existence degree which child prefer (mean preference ratings of two categories of participants and mention photos with higher mean rating in each principle). The second part of Table 7 covers step two: the mean ratings of influent softscape variables (sensory aesthetics) in each determined photo.

Table 7. Questionnaire results for the two categories of participants.

Step 1		Result of questionnaire: Child preference of formal aesthetics degrees														
		Distribution of participant on preference values (4 photos)								Mean Rating of evaluating S.S						Prefered photo
		Landscape Architect				Child psychologist				Landscape Architect		Child psychologist				
		3	2	1	Total	3	2	1	Total	Standard Deviation	Mean Rating	Standard Deviation	Mean Rating			
Nearness	Photo1	30	10	10	50	14	20	16	50	0.82	2.40	H	0.72	1.96	M	* photo2
	Photo2	35	13	2	50	32	15	3	50	0.77	2.66	H	0.58	2.58	H	
	Photo3	13	27	10	50	13	12	25	50	0.66	2.06	M	0.64	1.76	M	
	Photo4	5	11	34	50	8	12	30	50	0.83	1.42	L	0.57	1.56	M	
Interlock	Photo1	37	9	4	50	40	8	2	50	0.49	2.66	H	0.55	2.76	H	* photo1
	Photo2	28	20	2	50	33	16	1	50	0.60	2.52	H	0.64	2.64	H	
	Photo3	12	28	10	50	25	15	10	50	0.81	2.04	M	0.83	2.30	M	
	Photo4	5	13	32	50	9	13	28	50	0.67	1.46	L	0.49	1.62	L	
Enclosure	Photo1	12	28	10	50	11	26	13	50	0.64	2.04	M	0.60	1.96	M	* photo 4
	Photo2	10	31	9	50	18	30	2	50	0.53	2.02	M	0.86	2.32	M	
	Photo3	8	20	22	50	8	15	27	50	0.70	1.72	M	0.71	1.62	L	
	Photo4	20	22	8	50	31	10	9	50	0.68	2.24	M	0.82	2.44	H	
Continuity	Photo1	20	24	6	50	34	10	6	50	0.91	2.28	M	0.77	2.56	H	* photo2
	Photo2	35	11	4	50	40	6	4	50	0.82	2.62	H	0.69	2.72	H	
	Photo3	3	15	32	50	3	7	40	50	0.80	1.42	L	0.53	1.26	L	
	Photo4	1	9	40	50	-	12	38	50	0.83	1.22	L	0.67	1.24	L	
Balance	Photo1	18	30	2	50	9	36	5	50	0.49	2.32	M	0.82	2.08	M	* photo2
	Photo2	36	10	4	50	34	14	2	50	0.60	2.64	H	0.78	2.64	H	
	Photo3	10	28	12	50	8	30	12	50	0.86	1.96	M	0.88	1.92	M	
	Photo4	-	5	45	50	1	2	47	50	0.71	1.10	L	0.62	1.08	L	
Tension	Photo1	42	8	-	50	46	4	-	50	0.92	2.84	H	0.44	2.92	H	* photo1
	Photo2	10	35	5	50	40	8	2	50	0.75	2.10	M	0.83	2.76	H	
	Photo3	20	22	8	50	5	25	20	50	0.75	2.24	M	0.83	1.70	M	
	Photo4	12	20	18	50	10	27	13	50	0.91	1.88	M	0.83	1.94	M	
Rhythm	Photo1	3	4	43	50	2	10	38	50	0.82	1.20	L	0.80	1.28	L	* photo3
	Photo2	15	25	10	50	18	21	11	50	0.80	2.10	M	0.70	2.14	M	
	Photo3	34	10	6	50	45	5	-	50	0.75	2.56	H	0.72	2.90	H	
	Photo4	30	15	5	50	38	10	2	50	0.93	2.50	H	0.83	2.72	H	
Proportion	Photo1	30	15	5	50	28	21	1	50	0.80	2.50	H	0.83	2.54	H	* photo2
	Photo2	40	8	2	50	42	7	1	50	0.80	2.76	H	0.90	2.82	H	
	Photo3	6	10	34	50	12	5	33	50	0.92	1.44	L	0.79	1.58	L	
	Photo4	42	4	4	50	28	20	2	50	0.75	2.76	H	0.82	2.52	H	
Scale	Photo1	38	10	2	50	42	6	2	50	0.75	2.72	H	0.83	2.80	H	* photo1
	Photo2	18	28	4	50	22	20	8	50	0.43	2.28	M	0.68	2.28	M	
	Photo3	5	10	35	50	5	12	33	50	0.66	1.40	L	0.80	1.44	L	
	Photo4	4	6	40	50	12	10	28	50	0.65	1.28	L	0.75	1.68	M	

Table 7. Questionnaire results for the two categories of participants, (Cont.).

Symmetry	Photo1	3	6	41	50	2	13	35	50	0.81	1.24	L	0.53	1.34	L
	Photo2	1	11	38	50	1	8	41	50	0.62	1.26	L	0.75	1.20	L
	Photo3	38	10	2	50	45	5	-	50	0.74	2.72	H	0.68	2.90	H * photo3
	Photo4	10	26	14	50	8	20	22	50	0.73	1.92	M	0.77	1.72	M
Hierarchy	Photo1	25	20	5	50	38	11	1	50	0.86	2.40	H	0.53	2.74	H
	Photo2	46	4	-	50	39	10	1	50	0.54	2.92	H	0.53	2.76	H * photo2
	Photo3	7	10	33	50	10	26	14	50	0.65	1.48	L	0.51	1.92	M
	Photo4	2	8	40	50	12	28	10	50	0.53	1.24	L	0.53	2.04	M
Transformation	Photo1	39	8	3	50	33	12	5	50	0.75	2.72	H	0.74	2.56	H
	Photo2	42	8	-	50	47	2	1	50	0.68	2.84	H	0.59	2.92	H * photo2
	Photo3	11	28	11	50	12	34	4	50	0.65	2.00	M	0.70	2.16	M
	Photo4	6	14	30	50	12	28	10	50	0.62	1.52	L	0.72	2.04	M
Step 2		Result of questionnaire for Softscape Variables													
		Distribution of participant on preference values								Mean Rating and Standard Deviation of evaluating Softscape Aesthetics Variables					
		Landscape Architect				child psychologist				Landscape Architect		child psychologist			
		3	2	3	2	3	2	3	2	S. D	M.R	S. D	M.R		
Nearness Photo2	V1	43	7	-	50	39	9	2	50	0.62	2.86	H	0.53	2.74	H
	V4	40	9	1	50	44	6	-	50	0.44	2.78	H	0.75	2.88	H
	V10	22	20	8	50	32	15	3	50	0.83	2.28	M	0.68	2.58	H
	V18	21	28	1	50	11	20	19	50	0.83	2.40	H	0.54	1.84	M
	V25	41	9	-	50	42	7	1	50	0.93	2.82	H	0.55	2.82	H
	V30	18	30	2	50	15	18	17	50	0.80	2.32	M	0.86	1.96	M
Interlock Photo1	V4	39	8	3	50	42	7	1	50	0.81	2.72	H	0.71	2.82	H
	V14	36	12	2	50	38	11	1	50	0.76	2.68	H	0.82	2.74	H
	V21	31	11	8	50	11	20	19	50	0.47	2.46	H	0.77	1.84	M
Enclosure Photo 4	V5	41	8	1	50	38	11	1	50	0.80	2.80	H	0.69	2.74	H
	V16	26	20	4	50	20	23	7	50	0.73	2.44	H	0.53	2.26	M
	V19	7	12	31	50	3	10	37	50	0.62	1.52	L	0.75	1.32	L
	V28	1	9	40	50	-	7	43	50	0.44	1.22	L	0.93	1.14	L
Continuity Photo2	V4	35	10	5	50	42	8	-	50	0.83	2.60	H	0.80	2.84	H
	V8	41	8	1	50	43	4	3	50	0.80	2.80	H	0.80	2.80	H
Balance Photo2	V5	13	34	3	50	20	25	5	50	0.82	2.20	M	0.92	2.30	M
	V7	9	40	1	50	7	39	4	50	0.77	2.16	M	0.75	2.06	M
	V12	10	32	8	50	11	38	1	50	0.69	2.04	M	0.75	2.20	M
	V16	40	8	2	50	38	7	5	50	0.53	2.76	H	0.43	2.66	H
	V22	45	4	1	50	40	7	3	50	0.53	2.88	H	0.66	2.74	H
Tension Photo1	V25	43	4	3	50	47	3	-	50	0.67	2.80	H	0.73	2.94	H
	V30	2	28	20	50	8	22	20	50	0.82	1.64	L	0.65	1.76	M
Rhythm (ph3)	V20	40	9	1	50	41	7	2	50	0.78	2.78	H	0.65	2.78	H
Prop. Ph2	V16	42	8	-	50	38	10	2	50	0.88	2.84	H	0.75	2.72	H
Scale Photo1	V18	40	6	4	50	42	7	1	50	0.62	2.72	H	0.68	2.82	H
Symmetry Photo3	V17	40	6	4	50	38	9	3	50	0.65	2.72	H	0.54	2.70	H
	V21	42	8	-	50	46	3	1	50	0.65	2.84	H	0.55	2.90	H
	V24	11	38	1	50	16	32	2	50	0.75	2.04	M	0.86	2.28	M
Hierarchy Photo2	V5	27	20	3	50	30	18	2	50	0.69	2.48	H	0.73	2.56	H
	V8	42	7	1	50	40	6	4	50	0.53	2.82	H	0.68	2.72	H
	V17	38	10	2	50	42	8	-	50	0.68	2.72	H	0.43	2.84	H
Transformation Photo2	V18	42	5	3	50	40	7	3	50	0.65	2.78	H	0.66	2.74	H
	V21	43	4	3	50	44	6	-	50	0.92	2.80	H	0.80	2.88	H
	V24	16	32	2	50	11	38	1	50	0.70	2.28	M	0.92	2.20	M

From previous table, the effect of the value of variables (V1:V30) has been statistically different or similar according to participant category, also according to formal principle.

According to participants: The results indicate that participants' categories gave different influent values to softscape variables in four formal aesthetics principle only. For example, in nearness: Landscape architects categorized V10 which is the high density of softscape elements as moderately influent while psychologists categorized it as highly influent. Landscape architects categorized V18 which is the different size of landscape elements as a highly influent variable while psychologists categorized it as moderately influent as shown in Table 7, step 2.

According to formal principle: The results indicate that effect of the degree of all variables is different depending on their use in which principle. For example, V5, the separated in softscape elements position, was considered as a moderately influent variable in "balance" but was considered as a highly influent variable in "hierarchy" and "enclosure". Figure 4 summarizes the different influent variables and its correlation with formal aesthetics. Each principle is represented by symbol, the variable may be repeated in more than one formal principle, each variable can determine in influent zone (high-moderate-low) according to the symbol of principle.

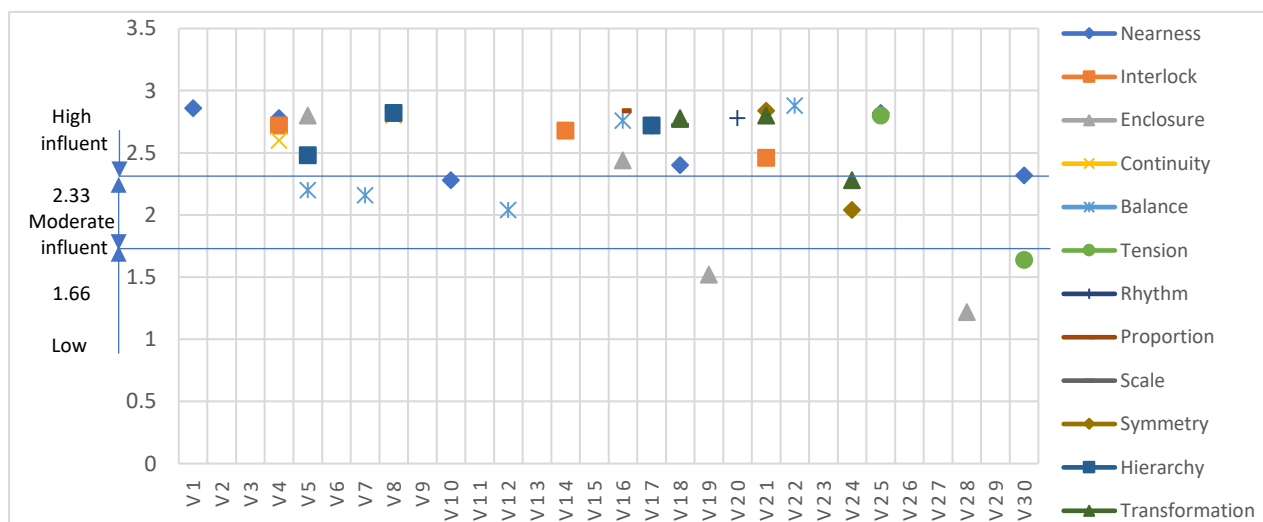


Fig. 4. The difference of influent values of softscape variables (landscape architects result).

7.4 The Symbolic Aesthetics Preference for Softscape Elements

The research revealed the correlation between aesthetics categories. The sensory depends on change of softscape variables which has a great effect on formal, the symbolic achieved by applying formal principles. Hence, it appears that the unity and diversity would be related to some principles of formal aesthetics (nearness, scale, etc.) that is also affected by other variables including size, shape, etc. Based on this relation, the preference value of symbolic can be deduced in two steps: First, calculate the average formal preference value of participants. Second, calculate the mean rating of unity by calculating the average of mean rating of principles, which affect the sense of unity or diversity. Table 8 shows all the child preference results and the relation between aesthetics categories.

Table 8. The correlation between softscape aesthetics categories.

Sensory Aesthetics (Changing of Softscape Variables)										Symbolic										
Number	Position	Direction	Density	Natural Light	Size	Shape	Color	V. Force	Texture	Formal Aesthetics	Mean Rating of evaluating Softscape formal aesthetics Principle				Average of mean ratings of participants results					
Increased	Nearest	Separated	Neutral side to	High	Low	Medium (semi shaded)	Same	Similar	Different		Same	Similar	Different	Dark	Light	High	Same	Different	Unity	Diversity
V1	V4	V5	V7	V8	V10	V12	V14	V16	V17		V18	V19	V20	V21	V22	V24	V25	V28		
H	H			M	H						H	M					H	M		
										Spatial cues	Nearness	2.58	H	2.66	H	2.62	2.62			
											Interlock	2.50	H	2.66	H		2.58			
											Enclosure	2.12	M	2.02	M	2.07				
											Continuity	2.08	M	2.04	M	2.06				
										Structural	Balance	1.88	M	1.84	M	1.86				
											Tension	2.56	H	2.42	H	2.49				
											Rhythm	1.56	L	1.54	L	1.55				
											Proportion	2.02	M	1.96	M	1.99				
										Ordering	Scale	2.36	H	2.32	M	2.34	2.34			
											Symmetry	1.34	L	1.44	L	1.39				
											Hierarchy	2.04	M	2.34	H	2.19				
											Transform	2.58	H	2.54	H		2.56			
The impact of the formal organization’s preference values on symbolic aesthetics																		2.05	2.52	
																		M	H	

The statistics of mean ratings suggest that diversity as a design objective in child spaces has high attractive preference, while unity has a moderate attractive preference which is similarly related to other sensory and formal principles, as shown in Fig. 5.

This is attributed to that the younger child may tend to calm and balance. The nature and personality of the target age however is to study and make the adventure, diversity and change essential to design an attractive space for them.

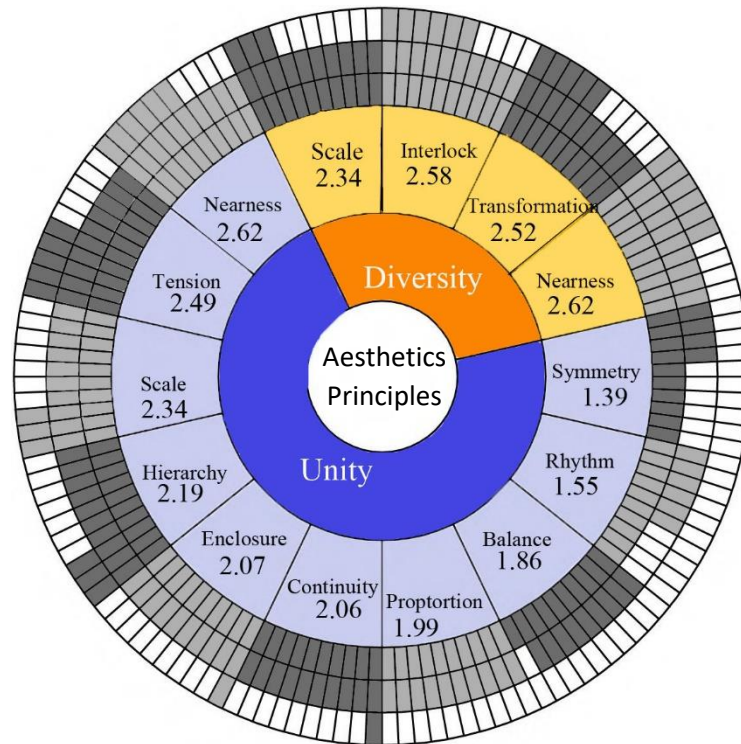


Fig. 5. Concentric chart: the impact of the formal organization's preference values on symbolic aesthetics

8. DISCUSSION

A central question motivating this research was whether aesthetics child preference can be controlled by changing design principles of softscape settings through the softscape variables (number, color, and size, etc.) that were suggested by Simon. The answer to this question appears to be yes. The empirically study of more than one group of visual aesthetics principles, indicated that different preference values were found which is significantly related to child age category.

The first group of aesthetics was formal aesthetics, which included (rhythm, scale, nearness, etc.). The evaluation revealed that preference has been different in hierarchy and scale according to participant categories, and agreed on child preference of nearness, interlock, transformation and tension in landscape design more than the

others (rhythm, symmetry). These results seem appropriate and logical for their age, nature and sensory aspects.

The second group of aesthetics evaluated by the study was the symbolic aesthetics, which included (unity, diversity). The analysis of results suggested that preference of diversity was high in preference compared to unity for the target child age. The reason is that the nature and personality of the child between 6 and 12 prefers the adventure and diversity. Therefore, change in designs are essential step to make attractive open space for them.

9. CONCLUSIONS

Softscape and plants specifically are considered one of the most effective elements that influence aesthetic preference of open spaces for children. Softscape visual evaluation has been and still is one of the most important research concerns, because of the fact that the aesthetic aspect of landscape design is perceived by the nature of users, compared with other aspects of design. Several studies have been carried out to evaluate preference of landscape settings in child indoor or outdoor spaces. This research differs in two points. First, it revealed the relationship between softscape variables and aesthetic preference. Second, it showed the correlation between aesthetic categories and how they affect each other.

The findings of this research suggest that aesthetics preference degree of child differ in formal principles according to participants nature, but they agreed that child's preference has lower degrees in symmetry and rhythm. It may be thus concluded that similar size and similar shape in softscape elements do not have any influences preference on design for children.

Additionally, the results suggest that softscape variables, hence the formal aesthetics have great influences on symbolic aesthetics. It was also found that age preferred diversity of softscape settings than other design objectives (high attractive).

Finally, these findings are intended to be a guide to design open spaces to be more attractive for the child according to age. This research was concerned with

softscape in outdoor spaces. Further researches are recommended to evaluate aesthetics preference of other landscape elements in other types of child spaces.

DECLARATION OF CONFLICT OF INTERESTS

The authors have declared no conflict of interests.

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تأثير متغيرات عناصر تنسيق الموقع الطبيعية على التفضيل الجمالي الرمزي والشكلي للطفل

يهدف البحث إلى تقديم مدخل لتصميم الفراغات الخارجية للأطفال معتمده على تحديد التفضيلات الجمالية للطفل عن طريق تحقيق الربط بين الجماليات الحسية والمتمثلة في متغيرات عناصر تنسيق الموقع الطبيعية (الشكل - اللون - الملمس ... إلخ) مع النواحي الجمالية الأخرى (الجماليات الشكلية - الرمزية) وقياس درجات التفضيل الجمالي للطفل لعناصر التنسيق الطبيعية في فراغات الأطفال الخارجية من خلال استبيانات تعتمد على طبيعة الطفل كمستخدم. وتشير نتائج البحث الى اختلاف درجات التفضيل لدى الأطفال وفقا لطبيعة الفئة العمرية المستهدفة في أغلب المبادئ الجمالية ماعدا التماثل والإيقاع وبالتالي يمكن استنتاج أن الحجم والشكل المماثل ليس لهم أي تأثير على التصميم للأطفال بوجه عام وكلما ارتفعت الفئة العمرية كلما كان التنوع من الأهداف التصميمية الجذابة للطفل.