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Analysis of Artistic Drawings and their Role in the Boosting of the Psychological Interior Design Concept Based on Evidences EBD (Form and Material as Example)

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Abstract:- The present study aims at learning about the role of the artistic drawings in directing the designer to choose the form and materials that meet the requirements of the interior spaces users. This aim was achieved via application of an experimental study on a group of children affected from the catastrophes in Syria in 2020 during which the correlative descriptive methodology was employed. The group was selected in accordance with the statistical probabilities theory* (different in experiences and ages). The analysis of the drawings assisted in the definition of the disorders resulting from the catastrophes that were represented in (fear, desperation, despair, lack of self-confidence, hesitation, insecurity, defeat). Such results were projected on a previous study relating between the brain waves of the human behavior and the space form and material. That this study is deemed a complementation of an analytical study conducted by the researcher aiming at reaching EBD designing bases that use in their content some of the interior design elements to elevate health and change of behavior.

Keywords: Psychological Design – Artistic Therapy – Artistic Drawings Analysis.

INTRODUCTION

The present study belongs to the group of researches that attend to development of behavior and elevate it through learning about the limit of influence of design and psychology in recognition. The question is then:-

HOW CAN PSYCHOLOGICAL DESIGN HAVE A ROLE IN HEALTH ELEVATION AND CHANGE OF BEHAVIOUR?

The significance of research lies in the necessary utilization of sciences and correlating them to find EBD design bases which help in the production of a space that meets the needs of its users. This research is deemed a continuation of the experimental studies findings on the relationship of form and material with the brain waves.

Ruggles* confirmed in a study (Ruggles, 2017) that there are three components of space that have positive psychological influence namely: form, function, and aesthetics. Recognizing space shall give the user the feeling of cheer due to the release of the anti-depression Dehydroepiandrosterone DHEA. The pretty spaces are spaces that comprise design elements that can be recognized and interacted with; they have positive features regarding form, content, and influence.

In support of the above, the AIA (American Institute of Architects) produced in 2006 the “Evidence Based Design” EBD, a term that is being used in the domain of design of spaces for boosting of wellbeing based on the evidence and experimental proofs that would be a basis for decision making of spaces that (help in the social support, change of negative behaviour, boosting of wellbeing psychologically and physically). [(1)]of such EBD evidence is the influence of the human brain waves (Alpha – Beta – Gama - Theta) on behaviour, which can be measured using EEG* of the scalp. The norms of the brain waves change pursuant to the type and strength of the stimulant influencing the behaviour of the space occupiers. This supports the findings of previous researches that refer to such waves as representing the brain mechanism and takes part in the functions of memory and recognition, in addition to focusing the attention increasing the ability awareness.

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1) The relationship between the brain waves and human behaviour

The brain produces electric waves in response to the senses effects (touching – audio - visual) that can be measured via EEF related to scalp. Columbia University team study, under the supervision of the Neurologist referred to that Joshua Jacobs (Makin, 2018) that such waves show us the supra cognitive functions, they relate to behaviour and take part in the memory, recognition, and concentration functions, hence, the ability to recognition. This confirms an academic study (Bayraktaroglu Z, Alsan K, 2006) that was conducted in University Istanbul which aims at finding a relationship among the waves, awareness, and recognition, of persons not suffering from any disorder, and it finds that the psycho-neurological tests address specific cognitive functions and highlight the following:

Table 1 Characteristics of brain waves and their effect on behavior

Brain Wave Delta 0.5 – 4 Hz	
Hz	**Effect**
0.5	Relaxation - headache relief
0.5 – 1.5	Mind Relief - Pain Relief
1.0	feeling joy
2.5	Mental comfort - Pain relief - Anxiety relief - Headache relief
3	relax mind
3.5	The Beginning of Perception - Harmony with the Ocean
4.0	Reduce stress - increase the ability to learn
Brain Wave (4.5 – 7.8 Hz) Theta	
Hz	**Effect**
4.5	Reduce stress - increase the ability to learn
5	Relax - deep sleep
5.5	Inspiration - intuition
6.5	Starting a creative brain activity
7.0	calm - peace of mind
7.5	Stimulating artistic and creative thought - increasing problem solving ability
7.8	Increase in activity - intellectual balance
Brain Wave (8 – 12 Hz) Alpha	
Hz	**Effect**
8.0 – 9.5	Increase in mental comprehension
10.0 – 10.5	improve mood
11.0	Relax - rest - improve mood
12.0	Balance and stability of thinking
Hz	**Effect**
14.0	Increased focus and mental comprehension
16.0 – 27.0	Increase in focus - increase in activity
30.0 – 40.0	Problem Solving - Think Consciously

University study in 2006 - Source: Istanbul

The previous study notes that the behaviour can be changed in case of influence on persons and change of the brain wave. The change of brain needs the perception of the influencer and interaction of the senses with it; this supports achieving the goal of research

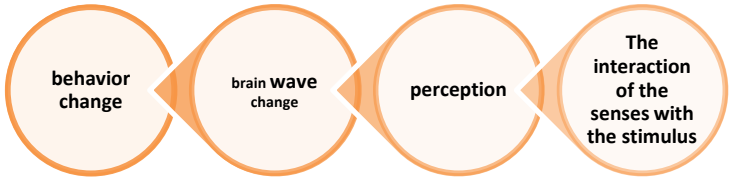

Figure (2) The stages of behavior change in the presence of an influencer

Source: the researcher

2) Influence of the volume space form and its materials on health and behaviour

The form and material of the space is considered among the basic interior design elements. Regarding the correlation of such elements to the behaviour of space users, a study of (Vijayalakshmi K, 2011) the influence of looking at a pyramid building in India* (Pillai S. , 2022) from inside and outside on a group of persons, and the study of their brain waves before and after the experiment. The result was that a large amount of them reached a state of relaxation and tranquility after meditation. Another

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study was conducted in Cairo in 2014 on persons brain waves before and after meditation of a historic building with a huge dome for 20 minutes, the findings were that they reached a state of relaxation and tranquility after meditation too. This was referred to by (Elbaiuomy, 2017) study on the influence of looking at engineering volumes and their cladding materials on the brain waves of users through a practical experiment where six basic engineering volumes were used (cone, pyramid, cube, cylinder, dome, and basin) in four different materials (beton, steel, wood, and glass) to define how much such forms and materials would affect the user's brain waves.

Table (2) The effect of volumetric space shape and materials on brain wave

Effect of the cone and its substance on brain waves	wave type	Cone building material	MHz
	Beta	beton	23
	Beta	Metal	16.5
	Alpha	Wood	11
	Alpha	glass	14

Effect of cylinder size and material on brain waves	Wave type	cylinder building material	MHz
	Alpha	beton	8
	Theta	Metal	7.8
	Theta	Wood	7
	Theta	glass	6.5

Effect of vaulting tube and material on brain waves	Wave type	vaulting tube building material	MHz
	Theta	beton	4.5
	Theta	Metal	6.5
	Alpha	Wood	11
	Theta	glass	6.5

The effect of the pyramid and its substance on brain	Wave type	pyramid building material	MHz
	Beta	beton	4
	Beta	Metal	2.5
	Alpha	Wood	1.5
	Alpha	glass	3

The effect of the cube and its substance on brain	Wave type	cube building material	MHz
	Alpha	beton	9
	Delta	Metal	1.2
	Alpha	Wood	14
	Alpha	glass	10.5

Effect of dome and material on brain waves	Wave type	dome building material	MHz
	Delta	beton	1.5
	Theta	Metal	7.8
	Theta	Wood	7
	Beta	glass	18.8

It was noted that a significant change of brain electric activity for the group of people in the three experiments after staying for some time inside such buildings, or by just looking at them. This supports achieving the goal of the research. Recognizing the form and materials of the interior design helps in finding a solution for the difficult immersion with the ambience; this can be achieved through an EBD space design that meets the user's needs.

Figure (3) The stages of the effect of form and matter on behavior

Source: researcher

3) The experimental study

The controlled experimental study was conducted to identify the psychological dimensions of the artistic drawings and their role in discovering the post-traumatic stress disorders PTSD (such as war) taking a part in achieving the goal of the research motivating us as researchers to attend to those affected with catastrophe through responding to:

Can artistic drawings have a role in discovering the psychological problems of children despite their different ages?

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In this section, we are going to use one of the artistic therapy strategies, i.e. drawings analysis that is used for the assessment of the interior reality of a person. It is believed that the projected drawings provide details on the person character, concerns, desires, points of strength, and motivations (Kaufman, B., & Wohl, A, 1992).
The research conducted the experiment on the group via performing a number of experiments, including:

1) Portraits, the significant part of such drawings during analysis is the body parts details.
2) Family drawings, that the relationship between the persons to each other are attended to, in addition to their sizes.
3) Drawing the future career of a person (mostly used in children drawings analysis).

1-1 Study methodology

The study was conducted in 2020 and relied upon one of the artistic therapy techniques (free drawing and drawings analysis technique) based on the following axioms: (portraits – family drawing – future career drawing). This technique was applied on 53 children aging from 7 to 12 years distributed on two categories. The experiment was conducted to each category on three days corresponding to the three axioms (each session duration is 15 minutes). However, regarding the drawing tools, A4 white sheets were used with pencils, without colours.
First Group: a group comprises 23 children ranging from (7 – 10 years), a category that was not previously trained on drawing.
Second Group: a group comprises 30 children ranging from (10 – 12 years), a category that was not previously trained on drawing.
The analysis of the children drawings was conducted based on the references and researches that rely upon precise meditation on the presence of the drawing elements. Such elements are represented in (type of line – size of form – location of drawing – head drawing style – neck drawing style). The differences testing was performed (One way ANOVA) and (Independent t test) for the comparison of the differences between the drawing case election in each group, hence, the statistical reference of the existence or non-existence of in approving the drawing state using SPSS software for striking such comparisons. Then, the experiment outcomes were sent to a specialized artistic therapy centre in the Republic of Sudan for the opinion of specialists.
First/ Lines type: each line stands out for a specific psychological reference. The flexible line refers to normal correspondence, balance of the central neurological system, and having a capacity for good concentration, giving a good impression on the potential and easy recognition and attention (Ramsen, Paul and others1986) the studies have shown that drawing a straight line refers to inner solidness (Alsheikh, 1987); however, regarding the dark heavy line, the line strength relates to the person high energy, ambition, motivation, and vice versa concerning the light line (Malika. Louis, K., 1968)
Second/ Forms size: painters of small forms are distinguished of depression due to their weak ability on normal communication with environment and surrounding world. Hence, their feel of security is slight leading to seclusion. Thus, drawing in normal size shows balance and ability to communicate with the surrounding environment. Lastly, the drawings of large sizes refer to aggressive tendency towards persons (Adel, 1989)
Third/ Forms distribution: drawing on the right side refers to balance and self-control (Abdulhamid, 1987) while drawing on the upper part refers to lack of self-confident and social isolation corresponding to drawing small sizes that those painters are distinguished to seclusion and thus hindering the social communication process. It is highly possible that that a person may have lack of self-confidence as a result of losing one of the senses.
However, drawing in the middle refers to balanced and self-relied character, and it is accompanied with altruism and easy adaptation with ambience. Drawing on the left part refers to non-self-realisation, and feeling of insecurity. Hence, it shall be difficult to immerse with the ambience where constant feeling of threat. Lastly, drawing on the bottom part refers to having a fixed character despite the feeling of defeat and contraction. (Malek, 1966) .
Fourth: Head and neck drawing style:
The category drawing a large head is distinguished of compensatory imagination resulting from the psychological conflicts in case of losing one of the senses; in case of not losing a sense, this refers to an increase in the thinking domains. Drawing a small head refers to the feeling in timidity and lack of thinking domains. The largeness of head is related to compensation and its smallness is related to shortage (Malika. Louis, K., 1968), regarding drawing the neck, not drawing it refers to the presence in the reaction expression conflict, the neck is the linking part between the centre of thinking and the body. Drawing a long neck refers to the existence of semi-paranoid features, mostly for the ages between (4 – 7) years, and they mostly relinquish automatically, thus, the person requires monitoring. However, for the ages above 7, the long neck refers to vanity and self-esteem.

1-2 Analysis of the study group drawings

I. Analysis of the drawings of the First group

First: Line

Table 4 Results of the first group (line thickness and type)
Source: the researcher

Line		number of graphics	% Ratio		Total graphics	Sample count	T	SIG
Line thickness	light line	11	23.9	%100	23	23	3.42	0.002
	heavy line	35	76.1					

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Line type	Flexible - curvy line	9	19.6	%100	23		5.32	0.000
	Straight line	37	80.4					

Result: An independent t test was conducted to compare the differences in the axis of fine formations / the first group, the line (line type) between a straight line and a flexible line. line) between an (Flexible – curvy) line and a straight line in the sample.

Second: the size of the shapes

Table 5 Results of the first group (size of shape) Source: the researcher

Shape	number of graphics	% Ratio		Total graphics	Sample count	T	SIG
Big size	21	45.7	%100	46	23	4.58	0.002
Small size	18	39.1					
Normal size	7	15.2					

Result: One way Anova test was conducted to compare the differences in the axis (size of shapes) between large, small, normal group one, we find that the statistical significance of the difference test Sig=0.002 is less than 0.05 and therefore. There are statistically significant differences in the dependence of the font (size of shapes) between large, small, and natural, among the research sample.

Third: the distribution of shapes

shape distribution	number of graphics	% Ratio		Total graphics	Sample count	T	SIG
Right side	3	6.5	%100	46	23	4.025	0.002
Left side	2	4.3					
Top side	4	8.7					
Bottom side	16	34.8					
Middle	21	45.7					

Result: The One way Anova test was conducted to compare the differences in the axis distribution of shapes / (distribution of shapes) the first group and we found that the statistical significance of the test for differences Sig = 0.002 is less than 0.05 and therefore: There are statistically significant differences in the distribution of shapes among the sample (right, lower, upper, left, middle)

Fourth: The axis of expression of the human figure (head - neck)

Table 7: Results of the first group (expression of the human shape) Source: the researcher

Category	number of graphics	% Ratio			Total graphics	Sample count		T	SIG
big head	10	43.5	% 91.3	%100	42	21	23	3.021	0.021
small head	11	47.8							
neck length	14	60.9	% 91.3						
no neck	7	30.4							
Not drawing people	2	8.7	% 8.7		4	2			

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Result: One way Anova test was conducted to compare the differences in the axis of expression of the human figure. We find that the statistical significance of the test for differences Sig = 0.021 is less than 0.05 and therefore: There are statistically significant differences in the expression axis (head and neck, large and small head) in the sample.

Findings of the first group

a group comprising 23 children ranging from (7 – 10 years), it is a group that was not trained previously on drawing. Statistically relevant differences existed in the drawing and thickness of the lines. Those who drew straight lines were 80.4%, and those who drew with heavy line were 76.1%. The larger percentage of those having inner solidness beside a high level of energy, ambition, and motivation; there are also statistically relevant differences in the drawing of forms, that those who drew very large forms were 45.7%, they have aggressive tendency towards persons, and those who drew very small forms were 39.1% and they have a feeling of weakness and insecurity. Besides, there were statistically relevant differences in the location of drawing, that those who drew in the middle of the sheet were 45.7%, and they have a balances character, and those who drew in the bottom part were 34.8% referring to having a fixed character despite the feeling of defeat and contraction.

Lastly, there were statistically relevant differences in drawing the human body. The larger percentage was 60.9% drawing a long neck referring to vanity and self-esteem. The percentage of those who drew a large head (an increase of the thinking domain) and small head (feeling of timidity) were close relatively at 45%.

II. Analysis of the drawings of the second group

First: Line

Table 8: Results of the second group (line thickness and type) Source: the researcher

Line		number of graphics	% Ratio		Total graphics	Sample count	T	SIG
Line thickness	light line	12	40.0	%100	30	30	3.25	0.001
	heavy line	18	60					
Line type	Flexible - curvy line	10	33.4	%100	30		3.65	0.003
	Straight line	20	66.6					

Result: An Independent t test was conducted to compare the differences in the line thickness axis and its type (Second group / light heavy line) We find that the statistical significance of the difference test Sig = 0.000 is less than 0.05 and therefore:
There are statistically significant differences in the line dependence (line thickness) between the light line and the heavy line in the sample.

Second: the size of the shapes

Table 9: The results of the second group (size of shape) Source: the researcher

Shape	number of graphics	% Ratio		Total graphics	Sample count	T	SIG
Big size	4	13.3	%100	30	30	4.65	0.001
Small size	21	70.0					
Normal size	5	16.7					

Result: The one way Anova test was conducted to compare the differences in the shapes size axis for the second group. We find that the statistical significance of the Sig difference test = 0.001 is less than 0.05 and therefore:
There are statistically significant differences in the dependence of the font (size of shapes) between (small, large and normal size) in the sample

Third: the distribution of shapes

Table 10: The results of the second group (the distribution of drawings) Source: the researcher

shape distribution	number of graphics	% Ratio		Total graphics	Sample count	T	SIG
Right side	5	8.4	%100	60	60	5.324	0.000
Left side	5	8.4					
Top side	7	11.6					
Bottom side	19	31.6					
Middle	24	40					

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Result: The one way Anova test was conducted to compare the differences in the distribution axis of the figures, the second group. We find that the statistical significance of the test for differences Sig = 0.000 is less than 0.05 and therefore:

There are statistically significant differences in the dependence of the distribution of shapes (right hand side and lower middle side) among the research sample

Fourth: The axis of expression of the human figure (head - neck)

Table 11: The results of the second group (expression of the human shape)
Source: the researcher

Category	number of graphics	% Ratio			Total graphics	Sample count		T	SIG
big head	8	26.7	93.4	%100	56	28	30	4.25	0.001
small head	20	66.7							
neck length	17	56.7	93.4						
no neck	11	36.7							
Not drawing people	2	6.6	6.6		4	2			

Result: The one way Anova test was conducted to compare the differences in the axis of expression of the human figure. We find that the statistical significance of the test for differences Sig = 0.000 is less than 0.05 and therefore:

There are statistically significant differences in the dependence of the distribution of shapes (large and small head and neck length) among the research sample

Findings of the second group

a group comprising 30 children ranging from (10 – 12 years), it is a group that was not trained previously on drawing. Since the ages of the children in this group were older than the former one, the style of expression was more precise.

Statistically relevant differences existed in the drawing and thickness of the lines. Those who drew straight lines were 66.7%, and those who drew with heavy line were 60%. The larger percentage of those having inner solidness beside a high level of energy, ambition, and motivation; there are also statistically relevant differences in the drawing of forms, that those who drew very small forms were 39.1%, they have a feeling of weakness and insecurity. Besides, there were statistically relevant differences in the location of drawing, that those who drew in the middle of the sheet were 40%, and they have a balances character, and those who drew in the bottom part were 33.6% referring to having a fixed character despite the feeling of defeat and contraction. Lastly, there were statistically relevant differences in drawing the human body. The larger percentage was 66.7% drawing a small head (feeling of timidity) then 56.7% drawing a long neck referring to vanity and self-esteem.

Based on the above, we note that the present study provided the answer to the question of the experimental study regarding the potential role of the artistic drawings in exploring the psychological problems of children despite their different ages through the following:

- The study benefited from the findings and features of the cognitive sciences such as linkage of art to psychology for boosting the behaviour and alleviation of the psychological wellbeing.
- The findings of the study corresponding to that drawing is an effective tool for exploring and defining the psychological problems; and that disorders have specific features in the drawings that they were manifested in:

Lack of self-confident, timidity, depression, despair, hesitation, fear and insecurity, feeling of defeat and contract which cause difficulty in immersion with the surrounding community and the emergence of aggressive tendencies towards others.

- Analysis of the drawings assist those of different specialties (therapists, teachers, designers…etc.) in providing assistance to the different categories of society in general, and to the children and the elderly in specific.
- **Bases of EBD utilization of form and material in the psychological interior design of the spaces for children affected with catastrophes in Syria.**
- **The designer is now able to cooperate with the art therapist to find out the type of disturbance for the users of the interior spaces, then the brainwave table is taken advantage of, and finally it is linked to the table of block and materials**

Recommendations

1) Benefiting from the drawing tests in identifying the psychological condition of the person pursuant to the drawings features.
2) Holding training courses on expression through drawing within the schools and institutes under the supervision of specialists.

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3) Opening qualification courses of artistic therapy targeting specialists, teachers, and parents.
4) Designing of EBD wellbeing societal centres for boosting the psychological wellbeing with a preventive, non-therapeutic, aim.
5) Utilization of VR technique to ensure that the brain waves are related to the space form (and its reflection in the brain) or being related to the size and matter energy.
6) Similar studies on another category affected with the catastrophe for a more precise definition of disorders.

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