

# Color Determinants for Kindergarten Furniture Designs in Baghdad

Shaima Harith Muhammad, Lubna Dhafer Taha

College of Education for Women- University of Baghdad Email:  
Shaimaa.harith@coeduw.uobaghdad.edu.iq

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## Abstract

This research aims to identify the color determinants that were adopted in the designs of furniture used in kindergarten classes in Baghdad , from color determinants based on scientific foundations for this type of furniture, and to achieve the research objectives, the researchers adopted the descriptive approach (content analysis) to identify the colors used in the furniture of kindergarten classes in the research sample, which numbered (18) kindergartens, then selected them by simple random method from the total number of government kindergartens in Baghdad , which numbered (191) kindergartens, and the personal observation form was used as a research tool, which included a group of colors that were chosen through what was reviewed from the literature and previous studies, in addition to a previous survey study conducted by the researchers for a number of kindergartens in Baghdad city to identify the opinions of the teachers of those kindergartens on this subject, and using the percentage, the results showed:

- Blue and pink were used more than other colors in the chairs of Baghdad kindergarten classrooms.
- Green is the most used color in the designs of Baghdad kindergarten tables, followed by blue and pink.
- Pink, brown and white were used more than other colors in the designs of the bags and clothes closet.
- For the toy closet, black was used more than other colors.

**Keywords:** color determinants, kindergarten.

### Research Problem:

The early childhood stage represents an important stage in a person's life. At this stage, the foundations and foundations on which the individual's personality is based are laid, as education is a purposeful and continuous process to help the child grow in an integrated manner

and from all aspects (mental, emotional and social)

(Al-Ani and Marwa Saleh, 2021: 439)

The kindergarten is the educational institution in which various activities are practiced by the child, especially the educational classes, which makes paying attention to it a necessary and important matter, as the presence

of a suitable and effective environment helps both the teacher and the child to achieve the desired goals.

(Al-Nashef, 1997: 13)

The classroom environment includes two basic elements: the physical element represented by furniture and the human element represented by the children and the teacher. The physical environment plays a major role in learning, as it contains necessary supplies that contribute to learning events.

(Sharif, 2014: 135)

To ensure the best performance of the classroom environment, some important foundations must be taken into account in designing this environment with all its furniture and learning supplies, as it is important that the surrounding environment be enjoyable and provide psychological comfort, and that everything the child deals with be enjoyable, beautiful and attractive to the eye, including the furniture in the classroom.

(Al-Ghariri et al., 2013: 86)

Furniture usually consists of a set of elements such as (shape, size, color, texture, and raw material). Color has a special and distinctive importance, as it gives shapes an aesthetic value and is the most capable design element for visual communication. Color has physical properties that are perceived sensually and also has psychological properties that have the ability to communicate and transmit information, as color is considered the property that distinguishes shapes in the environment, and it is an important structural element in design and through which other elements are perceived.

(Daoud, 2017: 213)

Accordingly, paying attention to colors and how to use them in various fields, including kindergarten furniture, is necessary and important.

After the researchers reviewed the literature and studies related to the research topic, and through the initial survey studies they conducted for a number of kindergartens in Baghdad, they noticed a lack of interest in this topic, as the

furniture used in kindergarten classes suffers from many problems, including the colors used in them, as the colors were not chosen in a scientific and thoughtful manner. The research and investigation process resulted in the absence of a specific study of this topic, which prompted the researchers to:

Choose the topic of their research and define it with the following question:

What are the scientific foundations that were adopted in choosing the colors of furniture in kindergarten classes in Baghdad?

Importance of the research:

Providing a physical environment rich in potential, stimuli and various materials for the child is an essential element for providing the appropriate climate and stimulating the child's love for learning and his desire to research, compare, explore, innovate, imagine and his ability to solve problems.

(Shahbaz, 2019: 96)

The importance of the current study comes from the fact that it is concerned with an important segment of society represented by children from (4-6) years old. This stage is the basic foundation for growth in later stages, and the importance of preparing a suitable environment for them inside the classroom by paying attention to all requirements and from all aspects.

Color has a special importance represented in its psychological effects on feelings and behavior, as colors are one of the most important elements that help attract children's attention and are used as an incentive for learning because they give shapes an aesthetic advantage. Children are particularly affected by colors, as studies have shown that children are naturally inclined to attractive and bright colors, including primary and secondary colors, for example (red, green, yellow, blue, orange, purple) and others, and colors have psychological connotations for children and they bring them pleasure.

(dewier,1971:223)

The importance of the current study lies in the fact that if it achieves its objectives, it can benefit the following parties:

- Ministry of Education / Kindergarten Directorate.

- Ministry of Higher Education / Kindergarten Department in public and private universities and the Design Department in the Faculties of Fine Arts.

- Public libraries.

Research objectives:

The research aims to:

Identify the color determinants currently used in the designs of kindergarten furniture in Baghdad.

Set color determinants according to scientific controls for the colors used in kindergarten furniture according to studied scientific controls.

Research limits:

- Spatial limits: Government kindergartens in Baghdad city / Karkh Directorate with its three sides (first, second, third).

- Objective limits: Colors of kindergarten classroom furniture.

Definition of terms:- First: Determinants Linguistically

(Ibn Manzur 2008)

The verb of determine, meaning specific and dedicated, specific to what should be (Ibn Manzur, 2008: 799)

Terminologically

(Al-Jawarani and Khalil Ibrahim 2015)

Determinants are the legislation and specific foundations for design and are set by the state and society and are often unchangeable.

(Al-Jawarani and Khalil Ibrahim: 22)  
Second: Color

Physiologically (Frederick 1993)

It is a description of the sensation received by the brain as a result of stimulating the retina by certain wavelengths of light.

(Frederick, 1993: 143)

(Al-Ta'i 2018)

A sensation reflected from the eye as a result of analyzing white light, and each color has its effect, either negative or positive.

(Al-Taie, 2018: 603)

(Muslim and Ru'a Ali, 2024)

It is the physiological effect resulting from the interaction of light with the surface and its reflection on the retina, which produces the sensation of color and its mental perception.

(Muslim and Ru'a Ali, 2024: 156)

Psychology (Abdulghani 2015)

It is the effect that color has on the human psyche, mood, emotion and mind. (Abdulghani, 2015: 58)

Third: Design

(Salman 2012)

It is the process of formation and innovation and includes choosing a group of lines, colors and objects and forming them in a way that enhances comfort.

(Salman, 2012: 2)

(Bash 2017)

It is organizing a group of elements such as colors and material objects according to specific relationships that make them more capable of achieving psychological and functional comfort.

(Bash, 2017: 2)

Fourth: Furniture (Fattah 2017)

All fixed and moving things that benefit a person in his home, workplace, and public places, and help him perform his life activities such as sleeping, sitting, and storing his things.

(Fattah, 2017: 95)

According to the research requirements, the researchers did not find a specific definition for kindergarten furniture, so they defined it as:

All the tools a child needs to help him meet his needs for sitting, storing his things, and during his activities inside the classroom.

Fifth: Kindergartens (Ministry of Education 2016)

An educational institution that follows a program that combines learning and play, managed by a group of trained and professionally qualified people, receiving children between the ages of (6-4) years.

(Ministry of Education, 2016: 7)

## Theoretical Framework and Previous Studies

### Theoretical Framework

#### The Importance of Kindergartens

Early childhood is the foundation for building a human being and is a stage of physical, mental, motor, emotional, cognitive and social growth. It is the golden period for stimulating and developing the child's abilities and creating opportunities for learning and acquiring skills.

(Ibrahim, 2012: 99)

At this stage, children need a suitable descriptive learning environment to help them develop talents and abilities. The physical environment represented by the place, furniture and means has a great impact on revealing these abilities and talents, as the richness of the environment in terms of stimuli stimulates children to discover, research, compare and experiment.

(Manal, 2010: 12)

#### Kindergarten Furniture

Kindergarten furniture is one of the basic requirements within the child's surrounding environment, and the type of furniture in kindergartens is linked to the characteristics of this stage, as its selection is subject to conditions and determinants to suit the child's psychological and physical characteristics. The child cannot grow in an unsuitable environment with repulsive colors and uncomfortable furniture, so choosing furniture inside kindergarten classes requires skill, experience and study of the nature of the educational process and activities and programs prepared in advance.

(Qandeel, 2007: 33)

Since kindergartens are an educational institution that includes an important segment, which is children from (6-4) years old, which is a sensitive stage, it is necessary to choose special types of furniture with specifications that provide comfort for the child through their measurements and special specifications, and they must also be

able to achieve enjoyment and attract the child's attention with their favorite shapes and colors.

### Color

Color is a physical phenomenon that occurs when light rays are reflected from objects to the eye at certain wavelengths and from there to the optic nerve, creating a sense of light and color in the brain, as color is the cause of color and visuals.

(Al-Ubaidi, et al., 2016: 995)

Color is one of the important design elements due to its ability to communicate visually. Color acts as a complementary medium for emotions and has physical properties that are perceived sensually. It also has psychological properties that have the ability to transmit and organize information. Colors are closely related to shape. The purpose of coloring shapes may be to draw attention to some concepts present in the shape or drawing and facilitate the acquisition of these concepts and retain them for a longer period of time.

(Muslim, 2014: 2)

Colors have an effect on the design of shape, size and texture, as they create harmony between the parts of the design, creating a tactile illusion that suggests roughness or smoothness or the largeness or narrowness of the space.

(Al-Amiri, 2003: 772)

Colors are divided into: Primary colors

They are red, yellow, and blue. They are the origin of all colors and the rest of the colors are derived from them, including:-

- Secondary colors

These colors are derived from the primary colors by mixing two of the primary colors, which are (green, orange, violet)

- Complementary colors

They are six colors that we get by mixing a secondary color with a primary color in a larger proportion, which are:-

Red-orange (reddish-orange) Yellow-orange (yellowish-orange) Yellow-green (yellowish-green) Blue-green (blue-green)

Red-violet (reddish-violet) Blue-violet (blue-violet)

For example, we get reddish-violet by mixing violet (Secondary) is less than the red (primary). (Al-Qahtani, 2021: 109)

There are also

- neutral colors

which are black and white, and mixing them together produces a secondary color represented by shades of gray.

(Al-Rubaie, 2012: 804)

Color has three characteristics used to indicate color:

- Color Origin (Hue): It is the characteristic that distinguishes one color from another and is physically united by wavelength.

- Color intensity (Ehroma): It represents the degree of color saturation, which is the degree of color purity and strength through the entry of black or white.

Light value (value): It is the amount of light reflected by light. (Lloyd, 1986: 95-96)

Colors play a role in influencing mood and emotions, as there are colors that reflect joy and happiness when looking at them, and others cause depression and sadness, and these psychological effects of colors differ according to people, their ages, and the impressions generated automatically from the effect of color. (Potter, 1997: 64)

Colors are also divided according to the impression they leave on the human soul into:-

-Warm colors (warm colors): This is the hot group of the color wheel and includes (red, orange, yellow, yellowish green), and they are called warm or hot because they resemble the flame and the sun's rays that emit warmth and heat, and these colors affect making large spaces appear smaller and warmer.

-Cold colors (cold colors): This is the cold group of the color wheel and includes (violet, blue, blue-green), these colors emit a feeling of freshness and coolness and affect spaces, making them appear larger than they are.

(Abu Hantash, 2000: 23)

Each color has characteristics that distinguish it from other colors. We will try to present them briefly:

Red: It is a color that symbolizes love, hatred, fire and blood, and symbolizes violence. As for its physiological effect, it stimulates inflammation, and its radiation is close to infrared rays, which helps with anger and increases the heart rate.

Blue: It is a cold color and is associated with water and the sky in nature. It is a color that symbolizes calm, the coolness of the night and serenity.

Yellow: The yellow color expresses joy and is the cheerful color of the sun that stimulates thought. It is one of the hot colors and is the most luminous and luminous color.

Green: It is a color that indicates comfort and safety and inspires calm. Green symbolizes spring.

Orange: It symbolizes ignition and glow. It is a warm and exciting color and inspires a feeling of well-being.

Purple: It is a cold color that symbolizes sadness and combines love and wisdom. It is used in small quantities as it brings a feeling of comfort.

White: This color symbolizes purity, cleanliness, peace, cold and snow, and can be used as a background for other colors.

Black: It is a sad color and indicates strength and power. It is used in very small quantities and is useful in contrasts with white and other colors.

Brown: It is a color that indicates reassurance and relaxation.

Gray: It is a color that lacks vitality and the darker it becomes, the more it tends toward despair. It is produced by mixing white with black.

(Al-Attar, 2021: 102)

Colors have their connotations and psychological effects on children in particular, as exposing a child to hot colors such as red leads to attraction and happiness for some, but increased saturation in the color red leads to nervous tension. The use of primary colors creates visual excitement in children, while secondary colors bring them pleasure. Some studies have indicated that pre- school children

prefer the color red more than other colors, followed by yellow in their most preferred colors. The reason for children's preference for the color yellow more than green and blue may be due to it being brighter and more luminous, which are factors that help attract children's attention. (Shawky, 2001: 112)

Psychological studies have confirmed that color affects the child's perception of the surrounding environment, as complex interactions and interactions occur between the child and the environment and continuously through which the child understands the world around him. The child begins visual perception of colors with focus and attention, then increased integration, so he has the opportunity to explore and search for new experiences, as colors are stimuli that arouse alert behavior in him, which increases his level of learning, and each color creates a stimulus with a specific pattern of response in the child.

(Malnar, 1992: 97)

The colors preferred by children aged (4-5) years vary according to their growth and gender. Studies have shown that children (males and females) prefer red more than other colors.

(Al-Khafaf, 2016: 47)

From the above, we find that children are greatly affected by colors and their contrast. We find that the child chooses his toys and the colors of his drawings according to his preference for colors. Even children choose the furniture they sit on. We find the child choosing the chair and table with colors that suit his preferences and attract his attention. From here, the importance of colors in attracting children's attention to the classroom environment emerged, as we always find harmony between the child's desires and his preferences for colors.

Previous Studies

Al-Khafaf Study 2016 (Children's Favorite Colors Through Their Games)

The study aims to identify the favorite colors of kindergarten children through their games according to the gender variable. The research sample consisted of (200) boys and girls from the

preparatory class in the Second Rusafa Education Directorate for the academic year (2011-2012). To achieve the research goal, the researcher prepared a list of games and two games were chosen (the car for males and the doll for females). The basic colors were also relied upon for the Lusher test (red, yellow, green, blue). The results showed that children of both sexes (males, females) prefer the color red over the rest of the colors. The results also showed that there are no statistically significant differences in the favorite colors of kindergarten children through their games according to the gender variable, green for males and blue for females. (Al-Khafaf, 2016)

Hamid and Shaima Harith's study 2022 (Color determinants in puppet theater designs used in kindergartens in Baghdad)

The study aims to identify the color determinants that were adopted in the designs of puppet theaters in government kindergartens in Baghdad and then set color determinants based on scientific foundations for this type of theater. To achieve the objectives of the study, the researchers followed the descriptive approach to analyze the content of colors used in the theaters of the selected sample from the research community that was identified in government kindergartens in Baghdad and selected a percentage (45%) of it as a sample for the research. Thus, the number of selected kindergartens reached (86) kindergartens out of the total number of kindergartens of (191) kindergartens. The personal observation form was used as a research tool, and by using the percentage as a statistical method, the results showed that there is a large difference in the colors used in the designs of puppet theaters and no controls or standards were adopted in the process of selecting them. The reason is that kindergartens are equipped with theaters by different sources, almost all of which are not specialized in the field of design. (Hamid and Shaima Harith, 2022)

Research Procedures

First: Research Methodology

According to the research requirements, the descriptive method (content analysis) was used in analyzing the research sample as it is the appropriate method for the purposes of describing facts related to the subject of the field study and interpreting them in terms of the available facts, as the descriptive method is defined as:

(A method of describing the subject to be studied according to a correct scientific method and organizing the results that were collected and reached in expressive digital forms that can be interpreted).

(Al-Mahmoudi, 2019: 46)

Second: Research community (population of research)

The research community is defined as (all the items under research that share the same characteristics, whether these items are people or things).

(Al-Omrani, 2013: 67)

The current research included the furniture of government kindergarten classes affiliated with the Karkh Education Directorate in the city of Baghdad, which number (82) kindergartens,

Table (1)

Directorates	No. Of kindergartens
Alkarkh 1st	31
Alkarkh 2ed	30
Alkarkh 3ed	21

The research community is distributed according to the government kindergartens affiliated with the General Directorates of Education in Baghdad/Karkh

Third: Research sample (method of research)

The sample is defined as (part of the study community that was selected in an appropriate manner and has the same characteristics of the original community, the purpose of which is to obtain information and facts related to the community by selecting a group of individuals for the study who represent the community).

(Al-Naimi, 2015: 78)

The current research sample consists of (18) kindergartens that were selected by simple random method from the kindergartens of Baghdad city/the first, second and third Karkh Education Directorates, which number (82) kindergartens, i.e. (22%) of the total number of kindergartens .

Table (2) Shows the names of the kindergartens (research sample) in the city of Baghdad/Karkh Education Directorate

Directorates	Names of Kindergartens	Quarter
1st karkh	Al Mansour Foundation Kindergarten Al Ameriya Kindergarten Al Khadra Kindergarten Al Eskin Kindergarten Al Jamia Kindergarten Al Sanabel Kindergarten Dijlah Kindergarten	Al Mansour Al Ameriya Al Khadra District Aliskan Al Jame’a District Al Ameriya Haifa Street
2ed Karkh	Al-Nisreen Kindergarten Al-Nusour Kindergarten Al-Alia Kindergarten Al-Zohour Kindergarten Al-Salam Kindergarten Al-Aqhawan Kindergarten Al-Baraem Kindergarten	Al-Amel neighborhood Al-Risala neighborhood Al-Shuhada Al-Illam neighborhood Al-Salam neighborhood Al-Sayyidiyah Al-Bayaa
3ed Karkh	Ocean Kindergarten Justice Kindergarten Spring Kindergarten	Al-Kadhimiya Al-Adl neighborhood Al-Hurriya

	Anemone Kindergarten	Al-Atifiyah
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#### Fourth: Research tool (tools of research)

To achieve the research objectives, the researchers built an observation form that included a number of paragraphs representing a group of colors, namely (red, green, yellow, blue, pink, orange, purple, brown, white, black, gray), Appendix (1).

##### Building the form:

The research form was built based on:

Reconnaissance visits conducted by the researchers to a number of kindergartens in Baghdad City/Karkh Education (1).

Reviewing the literature and previous studies related to the research topic.

Reviewing the standards of the local Ministry of Education for kindergarten furniture 2). Validity of the tool

Face validity is defined as (the general appearance of the test in terms of the type of vocabulary and its clarity and how it is formulated, and it also includes the test instructions, their accuracy, degree of clarity, and degree of objectivity, and whether the test is suitable for the purpose for which it was developed).

(Al-Kubaisi, 2010: 34)

To know the face validity of the research tool and verify the validity of its paragraphs, the researchers presented the questionnaire to a group of specialists in the field of kindergartens, education, psychology and design(3), and it was agreed on the validity of the paragraphs of the questionnaire with an agreement rate of (100%) with the addition of a number of colors that were not included in the questionnaire, which are (gray, purple, pink).

##### Instrument reliability

Reliability means (the accuracy and clarity of the results and the high degree of agreement if they are repeated at another time by another researcher).

(Attia, 2009: 109)

To verify the reliability, the researchers sought the help of external analysts with

experience in the field of design(4), and after analyzing the same model for the research sample, the reliability of the instrument was confirmed as follows:

##### Application of the tool

To apply the research tool, the researchers prepared an 18-day program to visit kindergartens (research sample), at a rate of one kindergarten per day. The researchers allocated one hour to each kindergarten during the period between (31/3/2024 to 28/4/2024), taking into account official holidays and emergency cases. The form was filled out by the researchers and personal notes were recorded about the furniture (research sample). After completing the recording of the notes, the data was emptied and appropriate statistical and computational methods were used to reach the research results.

Table 3 Reliability

The analyzers	Percentage of agreement
First analyzers + the two researchers	100%
Second analyzer +the two researchers	100%
The first and the second analyzer	100%
General average	100%

##### Fifth: Statistical methods

To reach the research results, the researchers relied on a number of statistical and computational methods, which are:

The percentage to reach the proportions of colors used in kindergarten classroom furniture Total frequencies

$$\text{Percentage} = \frac{\text{Number of times of agreement}}{\text{Total}} \times 100$$

Total

Cooper's equation for measuring reliability to reach the reliability of the instrument used Number of times of agreement

$$\text{Reliability} = \frac{\text{Number of times of agreement}}{\text{Total}} \times 100$$



Number of times of agreement + number of times of disagreement Research results and interpretation

First goal:

Identifying the color determinants currently used in the designs of kindergarten furniture in Baghdad city.

After emptying the data and using the percentage as a calculation method, the results showed the following, Table (4)

Table (4) Color ratios used in kindergarten furniture in Baghdad city

Colors	Child chair		Child table		Playing cabinet		Clothes cabinet	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Red	7	39%	4	22%	2	11%	0	0%
Green	11	61%	9	50%	2	11%	0	0%
Yellow	6	33%	4	22%	1	6%	0	0%
Blue	12	67%	6	33%	2	11%	0	0%
Pink	13	72%	6	33%	0	0%	4	22%
Orang	6	33%	3	17%	2	11%	0	0%
Grey	0	0%	0	0%	0	0%	0	0%
Brown	1	17%	5	28%	0	0%	2	11%
Black	3	6%	0	0%	3	17%	0	0%
Purple	4	22%	0	0%	1	6%	1	6%
White	1	6%	1	6%	0	0%	2	12%

- Regarding chairs, red was used by 39%, green by 61%, yellow and orange by 33%, blue, pink, brown, black, purple and white were used by (67%, 72%, 17%, 6%, 22%, 6%) respectively, and sand was never used, as the results showed that its use rate was (0%).

- Regarding tables, red and yellow were used by 22%, green by 50%, while blue and pink were used by 33%, orange by 17%, brown and white by (28%, 6%) respectively, while gray, black and purple were not used in tables, as their use rate was (0%).

- Regarding the toy cabinet, green, blue and orange were used by 11%, while yellow and

Purple by 6% and black by 17%, and pink, gray, brown and white were not used in any of the toy closet designs, as the results of their use showed (0%).

- With regard to the bag and clothes closets, the results indicated that the percentage of orange use was 22%, while the percentage of brown and white use was 11%, and purple by 6%, and the rest of the colors were not used in any of the bag and clothes closets, as the results of their use showed (0%).

Based on the above, the percentages of color use in kindergarten furniture designs are in order from highest to lowest, as shown in Table (5).

Table (5) Ratios of colors used in the furniture of kindergartens in Baghdad city, arranged from highest to lowest

Children chair		Child's table		Playing cabinet		Clothes and suitcases cabinet	
Colour	Percentage	Color	Percentage	Color	Percentage	Color	Percentage
Pink	72%	Green	50%	Black	17%	Pink	22%
Blue	67%	Blue	33%	Red	11%	Brown	11%
Green	61%	Pink	33%	Green	11%	Purple	11%
Red	39%	Brown	28%	Orange	11%	Red	0%
Yellow	33%	Red	22%	Blue	11%	Green	0%
Orange	33%	Yellow	22%	Purple	6%	Blue	0%
Purple	22%	Orange	17%	Yellow	6%	Orange	0%
Brown	17%	White	6%	Brown	0%	Grey	0%

Black	6%	Black	0%	White	0%	Black	0%
White	6%	Purple	0%	Grey	0%	White	0%
Grey	0%	Grey	0%	Pink	0%	Yellow	0%

#### Interpretation of results:

From the research results, we note that the use of the blue color in kindergarten chairs is the most used, which is one of the favorite colors for males, as well as the pink color, which is one of the favorite colors for females. The reason for using these two colors may be that they are characterized by being colors that achieve visual comfort. The diversity in chair colors is due to the lack of color determinants within the Ministry of Education standards that determine the colors of chair designs. The colors red, yellow, green, orange, black, brown, purple and white come in second place after blue and pink, as they were used at a lower rate.

As for the tables, green was the most used color and it is also among the favorite colors for children, but it is not in the first place, but its use may be for functional reasons, as the tables are used for eating meals by children, and this color is related to the colors of nature and may be a factor that helps stimulate the appetite, as it is comfortable for the eye. The second place is for the colors blue and pink, then red, yellow, orange, brown and white, which were available in close proportions. This may be due to the diversity of sources of supplying the kindergarten with furniture and to the lack of color determinants for kindergarten classroom tables. This diversity may be a factor of attraction for children and both sexes, but some of the colors that were used are not on the list of favorite colors for children, such as white and brown, and therefore they will not be a factor of attraction for children and will not provide them with pleasure. As for the toy cabinet, although black is not originally included in the group of colors used for children, the research results showed that it was used in a high percentage in the toy cabinet, even if its use was in a higher percentage than red, green, yellow, blue and orange, which were used in similar percentages.

The reason for this may be that these cabinets were not originally designed for this type of function, as they are ordinary cabinets purchased from local markets and are used for the purpose of storing some household supplies that have nothing to do with children.

As for the closet of bags and clothes, the most used colors for this type of furniture according to the research results are pink, brown and white. This is due to the diversity of furniture sources and the use of what is available in local markets, which may not be designed primarily for this purpose, in addition to the lack of color determinants for this type of furniture, which makes it unable to attract children's attention and does not provide them with pleasure.

#### Second Objective:

Setting color determinants according to scientific controls for the colors used in kindergarten furniture according to studied scientific controls.

Achieving this goal depends on the results of the first goal and the conclusions, as well as the theoretical research framework through what the researchers will present in recommendations that can be considered color determinants that can be adopted by kindergarten furniture designers as well as the authorities responsible for selecting and supplying kindergartens with this type of furniture, such as the (Directorate) of Kindergartens in the Ministry of Education and the Riyadh Administrations

#### Conclusions

The colors used in kindergarten furniture varied, but the percentages of their use were not correct and were not based on studied scientific foundations, as there are colors that are not supposed to be used because they are not preferred by children.

There are no specific color determinants used in kindergarten furniture designs.

Some toy cabinets, clothes cabinets and bags were not specifically designed to be included in kindergarten furniture, which made their colors dull or completely unsuitable for children, such as brown and black, which may lead to children being repelled by them and not wanting to use them.

The variety of colors in furniture pieces may be due to the raw material from which the piece of furniture was made, such as wood.

According to the kindergarten administration, one of the reasons for the colors used in kindergarten furniture not being suitable for the child's inclinations and desires is the diversity of sources of this furniture, as it is purchased from local markets by the kindergarten administration or parents, which means that it is often not originally intended for such an age group.

### Recommendations:

Use attractive colors according to scientifically studied foundations and according to children's preferences such as red, blue and pink, taking into account the diversity in one piece to be more attractive to children.

Use bright colors and avoid dull and unstable colors because they do not suit the child's tendencies and desires and do not provide him with pleasure.

Avoid black, white, gray and brown because they are not suitable colors for children's desires and preferences.

Suggestions:

Conduct a similar study on children's favorite shapes and the percentage of their use in kindergarten furniture.

Conduct a similar study on the color determinants of kindergarten furniture designs in other governorates.

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