Space Psychology for Sustainable Residential Buildings in the COVID-19 Era - Case Study: Egypt

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Abstract

In recent years, pandemics have altered humanity in various ways. People were quarantined in their homes due to COVID-19 to sustain their lives, which necessitated that they alter their views of their homes to be able to live comfortably and healthily. During the long lockdown periods, homes were found to affect some of their users psychologically in a negative way. Some felt trapped, stressed, and uncomfortable in their homes. Thus, this paper aims at studying space psychology and how it can affect the quality of the indoor environment for residential units. This will be achieved by demonstrating the houses' three main interior elements: materials, colors, and natural lighting. The paper will strive to illustrate further dimensions of those three elements with regard to functional, environmental, economic, and sanitization in relation to the psychological dimension. Furthermore, it will assess the space psychology impact on Egyptians during and after COVID-19 in relation to materials and colors. The study's main finding was that unexpectedly, personal preferences and costs still domain the materials' selections in Egyptian society. As for colors, neutrals prevailed as an indication of cultural effect and ease of usage.

Keywords: Sustainable Interior Design, Indoor Homes' Quality, Materials, Colors, COVID-19 design Requirements

1. Introduction

Homes are the mirror of their owners' personalities in addition to being their relaxing spaces. Previously, they were mostly used as places where families would return to after work, school, or any other outdoor daily activity [1]. However, during the quarantine periods, their importance came from how they could affect their users' mood, ability to work, and even their physical well-being, in addition to their psychological behavior [2] & [3]. This effect starts with the flow of movement within the residential space, passing by its biophilic design, and ends with the impact of the materials used, furniture, and equipment. It was discovered that people are affected by the space's scale, proportions, lighting, colors, materials, and acoustics [2] & [3]. They generated various feelings and psychological effects. Thus, the Mental Health Foundation stated that anxiety, stress, and depression can be reduced throughout using various interior design approaches and techniques [4]. However, unfortunately, indoor space psychology was never a priority for designers and users. The COVID-19 pandemic altered all that when it forced people to change their views of how they perceive their homes and their needs in a residential space in order to be able to adapt in ways never imagined possible before [1]. During quarantine periods, people ate, slept, worked, and even entertained themselves at home. Although this did not last for long, it will have a long-term psychological impact [5]. Thus, designers must correctly shape the home's interior because they shape people and their lives. This means that studying space psychology, which is the interaction between users and the spaces they live in, becomes very crucial now to the quality of the indoor environment and sustaining humans' physical and psychological health [3]. Thanks to the pandemic, there is a chance for a lot of innovation in the residential interior design industry, where residential spaces have become far more than just mere living spaces, and creating adaptive spaces by architects will have huge consequences in the near and far future [6] & [7].

2. Research Objectives & Methodology

The purpose of this paper is to improve the internal environmental quality of residential buildings by studying space psychology for home interiors. This requirement became critical during and after the COVID-19 pandemic when quarantining people at their homes to keep them safe became a necessity to sustain their lives. Thus, the research strives to illustrate how using the psychology of interior design in relation to materials, colors, and natural light improves residents' moods and feelings while simultaneously increasing indoor environmental quality, making people more comfortable and healthier in their homes [8]. This will be achieved while illustrating their environmental, functional, economic, and sanitization values. Additionally, space psychology will be further discussed in relation to Egyptian society. Where a survey will be conducted assessing participants' opinions of the materials and colors used in their homes and how they view them

Thus, the research will use the systematic analytical approach and observation methodology that were used over a period of two years. The paper established its findings and laid the groundwork with regard to the spatial interior elements of the residential spaces in relation to various aspects. Furthermore, the electronic questionnaire conducted to assess the paper's findings in relation to Egyptian society was administered at a specific time (January 2022) in order to avoid COVID-19's lethal peak, with its state of panic and fear, while still maintaining its psychological effect on memory.

3. Space Psychology Overview

3.1. Definition

Space psychology is described by professor Dave Alan Kopec as "the study of human relations and behaviors within the context of the built and natural environments" [3]. Thus, home space psychology can be simultaneously defined as the study of residents' relationships and behaviors to interior design and its elements, as well as their effect on them, in order to improve the quality of the indoor environment.

3.2. Effect & Importance

As previously mentioned, humans can be psychologically affected by their homes. Interior design elements can develop positive or negative emotional responses in them [4]. They can make them more comfortable or irritated. What they see, hear, taste, smell, and touch evoke emotional responses and behaviors [9]. Hence, colors, lighting, materials, textures, artwork, and layout can be manipulated to create interior spaces that will encourage creativity, peace, happiness, and trust, making the rooms feel calmer, more comfortable, cheerful, or dramatic [4] & [10].

As for the pandemic, it created a feeling of anxiety, grief, and discomfort among people, which made them crave certain colors to instill a sense of reassurance and comfort in their homes, transforming them into sanctuary-like spaces in these uncertain times. Some believed that the need for biophilic design would increase with the use of hues that mimic nature and its sensations [6]. Thus, studying and applying space psychology in the interior of residential units to decrease the mental burden on humans in a pandemic era is crucial, especially during the quarantine periods.

4. Interior Elements

4.1. First Element; Materials

Materials are one of two critical elements in the interior design process. Materials are not only used to create the best aesthetic experience due to their psychological effect but also due to their environmental, functional, and economical effects [11]. Materials, for example, can evoke both physical and psychological responses in humans with shared attitudes toward them [12]. Furthermore, during quarantine, people spent many hours in rooms that emit various substances from the materials used that are absorbed via the respiratory system and skin. If the substances emitted are noxious or harmful, they develop negative effects on the body. These effects may include allergies, nausea, skin irritations, headaches, numbness, respiratory problems, asthma attacks, and even cancer in extreme cases [13]. Thus, this part will introduce the most commonly used materials in homes' interiors, with a special focus on Egypt, from a psychological, environmental, functional, economical, and sanitization point of view, as illustrated in Table 1. They are the materials that are used in fixed and/or movable elements, as well as ceilings, floors, walls, and furniture.

Table 1. Four Dimensions related to materials' selection [1], [2], [6], [9], [11], [14], [15], [16], [17], [18], [19], [20], [21], [22], [23], [24], & [25]

Material (1) Stone (Natural & Engineered)	
Psychological Effect	• It can provide a real connection with the earth. • It creates a cool atmosphere when used on floors. • **Natural Stones;** such as marble, Limestone, and granite can provide visual variations and natural beauty. • **Engineered Stones;** such as Caesarstone, Silestone, Essa Stone, Quantum Quartz, and Smart Stone are made mainly of quartz and can provide visual uniformity.
Environmental Effect	• Natural stones are considered environmentally friendly. For example, marble doesn't need manufacturing for its creation and is recyclable. • Natural stones are renewable materials if they are not overharvested. • Some engineered stones use recycled stone or ceramic bases, with up to 75% of their content being recycled. • For example, terrazzo tiles are made of recycled glass. • It is more environmentally friendly to use stone chips than slabs. • Some engineered stones use corn-based resins instead of petroleum-based ones.
Function/ Economical Effect	• **Natural Stones:** can be used in kitchen benchtops, the tops of vanity units, splashbacks, and edge trimming in bathrooms. However, it is an expensive material compared to other materials. • **Engineered Stones:** are used in kitchen and bathroom benches. • Both natural and engineered stones are durable. • Engineered stones are more cost-effective than natural stones and have a wider color range.
Sanitization	• **Natural Stones:** are porous materials that can absorb elements but still is bacteria-resistant. • **Engineered Stones:** are nonporous and thus bacteria can not settle on the surface.
Material (2) Wood / Timber	
Psychological Effect	• It links humans to nature. • It gives the homes a warm, lived-in feel.
Environmental Effect	• Natural timber is a renewable natural material if it is not overharvested. • As a result, it is now preferable to use certified wood.

Function/ Economical Effect	• **Doors:** They can use solid hardwood to control noise. • **Decoration:** They can use a multi-faced surface, such as timber slates, to control noise. • **Engineer hardwood Veneer:** It is less expensive than natural wood used for floors.
Sanitization	• Timber is considered an easily sanitized material in general. • Bamboo and timber are antibacterial.
Material (3) Metals	
Psychological Effect	• Metals can give the interior space a sense of modernity. • It includes copper, aluminum, stainless steel, and iron.
Environmental Effect	• Metals are durable and light. • Most metals, such as stainless steel, can be recycled easily.
Function/ Economical Effect	• **Stainless steel:** It is used in kitchen countertops. It is easy to have fingerprints, dents, and scratches. • **Copper:** It is used in kitchen and bathroom faucets. • **Iron:** It is used in windows and doors protection. • Metals vary in cost in relation to their type and function.
Sanitization	• Metals are easy to clean and disinfect. • For example, stainless steel and copper are anti-bacterial materials.
Material (4) Glass	
Psychological Effect	• It can give the impression of transparency. • It can also add light and clarity.
Environmental Effect	• It is a completely recyclable and environmentally friendly material. Thus, it contributes to mitigating climate change. • It also allows natural lighting into the space.
Function/ Economical Effect	• **Windows:** They can use double or triple glazing to control noise. • **Sliding Doors**: They give access to outside spaces. • Glass varies in cost in relation to its type and function.
Sanitization	• Simple to clean and disinfect.
Material (5) Ceramic/ Porcelain	
Psychological Effect	• It has a gloss, semi-gloss, and matte finishing look, with various designs and colors that develop various psychological effects. • Wood-like porcelain tiles share the feel of natural wood.
Environmental Effect	• They are made of clay and other earth-based materials. • **Ceramic:** During its manufacturing, it generates various environmental hazards for the environment and human beings. • **Porcelain:** It is made of natural materials; clay, silica, and flint, which during extraction have a minimum negative impact on the

	environment, produce little waste during manufacturing, and can be recycled.
Function/ Economical Effect	• They are commonly found on floors and bathrooms. • Ceramic is less durable than porcelain. • Wood-like porcelain tiles are less expensive than natural wood. • Porcelain is a good option when stones such as marble are not affordable.
Sanitization	• They have a smooth texture that is easy to clean and sanitize.

Material (6) Paintings	
Psychological Effect	• Paintings are the most commonly used materials in houses. They have various textures, colors, and finishes; thus, they can evolve most of the space psychology effects required.
Environmental Effect	• Paints have a negative impact on the environment during their manufacturing and on human health during their use. • According to published research, there is a strong link between the use of household paint and leukemia. • Additionally, styrene was classified as possibly carcinogenic to humans. • Eco paints are the best option since they have low levels of potentially harmful fumes, while others ensure natural ingredients, recyclable materials, low-waste processes, or a low carbon footprint.
Function/ Economical Effect	• Painting is used in the ceiling and walls of most of the spaces in the residential unit. • The cost of paintings varies according to their type.
Sanitization	• Some paintings can be cleaned without getting ruined and thus can be sanitized.

Material (7) Wallpaper	
Psychological Effect	• Wallpapers have various textures, colors, and finishes; thus, they can evolve many of the space psychology effects required.
Environmental Effect	• Some wallpaper adhesives are toxic. • Various types of certificates can help select low-pollutant or pollutant-free wallpaper.
Function/ Economical Effect	• Wallpaper can be used on the walls of most of the spaces in the residential unit. • The cost of wallpaper varies.
Sanitization	• Some wallpaper can be cleaned and sanitized without being ruined.

Material (8) Textile & Fabrics	
Psychological Effect	• They are flexible materials that can control the natural light if used as curtains.

	• They are also used in the manufacture of furniture. • They have a wide range of psychological effects depending on their color and texture.
Environmental Effect	It is hard to exactly determine the environmental effect of textiles and fabrics due to their large variations. For example: • **Cotton:** although it is a natural material, it is considered problematic due to the huge quantities of water, land, fertilizers, and pesticides it requires. • **Bio Cotton:** It uses less water and pollutes thus much better. • **Polyester:** Although it is made of fossil fuels, it has a lower water footprint than cotton, and it can be recycled. • **Polyester (biosynthetic):** It is made from renewable resources. • In general, fabrics do not reflect sound.
Function/ Economical Effect	• Natural fabrics, such as linen, hemp fabrics, leather, and wool, are used in curtains, furniture, towels, bedding, and cushions, among other things. • Sisal, jute, and wool are materials used in rugs and carpets. • Fabric prices vary.
Sanitization	• **Natural Materials:** Linen, hemp fabrics, leather, wool, sisal, and jute are naturally antibacterial. • **Manufactured Fabrics:** They can be treated with antibacterial agents during manufacturing.

As illustrated in table 1, various materials categorizations are used in the interior of residential units. When analyzing their psychological effects again it various, they can provide feelings of connection with the earth or nature, coolness, natural beauty, warm lived-in feeling, a sense of modernity, transparency, light, and clarity. Psychological effects generated are not limited to these but most materials can evolve most of the space psychology effects required depending on the materials' textures, colors, and finishes. Thus, users can have their desired sense of aesthetics and materials of their preferences while achieving the required psychological effects and functions, in addition to enhancing the indoor environment but with two probable constraints; local availability and costs. As for sanitization, it is available in all eight material categorizations relative to the types used varying from easy to hard depending on the function and costs.

4.2. Second Element; Colors

Colors are the second element that is crucial to the interior design process and are one of the main elements of space psychology as well since they can alter a person's mood. They can evoke feelings of anger, happiness, indifference, sadness, etc. [26]. Additionally, colors can make a tiny room look larger or a spacious one feel more intimate, in addition to many other psychological effects. Previously, most people didn't consider the effects of color in their homes [10] & [26]. They only thought about their preferences, neglecting that

subconsciously the colors used triggered responses and created physical limitations for them [9]. However, now, in the age of pandemics and getting quarantined at home, colors must be used to promote internal peace and support mental and physical well-being [6]. Thus, designers and homeowners should apply colors to create the intended feeling from each space, besides reflecting their tastes [26]. Putting into consideration that colors, shades, and hues can greatly affect the responses they develop in humans. This section will thus discuss the basic colors with the most commonly used hues in interior design, with various classifications as shown in Table 2. This is to investigate their psychological effects on residential building design as thoroughly as possible.

Table 2. Colors in residential buildings' interior design [4], [8], [9], [17], [26], [27], [28], [29], [30], [31], [32], [33], & [34]

Color / Pictures	Psychological Effect	Suitability in Homes
Primary Colors (Red, Yellow & Blue)	**Red:** It creates feelings of energy, danger, anger, power, passion, and also love. It is believed that it increases circulation, metabolism, blood pressure, and appetite. Despite its calming and warming effect, it can make people feel anxious or unsettled in their homes. In Feng Shui, red indicates good fortune. It must be used for a specific purpose. And a more muted red, such as terracotta, can be peaceful. **Yellow:** It is associated with relaxation, joy, happiness, innocence, and energy. It creates a relaxing effect when used with neutrals; however, people can lose their temper in a totally yellow interior. **Blue:** It soothes pain and is associated with serenity, trust, sadness, loyalty, confidence, and heaven. It can slow down the metabolism and create a calming effect.	**Red:** It is best used in kitchens or dining spaces. **Yellow:** It is best used in kitchens, dining rooms, children's rooms, and bathrooms. **Blue:** It is best used in bathrooms. And light blue can be used in living rooms.
Secondary Colors (Orange, Green, & Purple, or Violet)	**Orange:** This color can increase energy and is associated with sports, joy, creativity, success, and sunshine. It is thought to heal the lungs. It is rarely used as a main color in home design; however, it can act as a cheerful mood lifter. **Green:** It is the color of nature; thus, it is a soothing, calming color that is the most restful for the eye. It also transcends a sense of security and makes humans feel emotionally safe. However, saturated greens can make a room look dark. **Purple:** It gives a sense of depth, luxury, specialness, and creativity. However, using too much purple can create a sense of irritation and arrogance in people.	**Orange:** It is best used in the kitchen and exercise room. **Green:** It is suitable for every room in the house. **Purple:** It is best used in the family room.

| Non-Colors Or Neutral Colors (Black & White) & (shades of Greys, Beiges, & Browns) | Black and white are non-colors. Neutrals are also known as no-colors. They give the designer the freedom to experiment with decoration and textiles using vivid colors. They are also appealing because they're calming and fresh. **Black:** It is a powerful and elegant color that is associated with death, seriousness, unhappiness, sophistication, and mystery. The right application of it in a room can create a calming, harmonized, and balanced sense, or powerful, dramatic, or important feelings in the room and serve as a grounding color to balance the lighter-colored space, or it can add contrast. **White:** It reflects light, making the space feel brighter, more spacious, and larger, giving a sense of elegance, cleanliness, goodness, purity, and innocence. It can also open up a space with strategic color-pop accents. However, painting the whole space white creates a clinical atmosphere. It is best to go for a warmer, creamy color or a yellow-based white. **Bright Neutrals:** They give the room a more clean, open, and breezy look. **Mute or Dark Neutrals:** They give a room a cozier but streamlined feeling. **Greys:** They are associated with depression and loss, but they can create a sense of neutrality and balance. **Beiges:** They are considered to be calming and relaxing hues that don't demand attention since they are not a loud, bright, or flashy color. **Browns:** They are associated, in the mind, with wood, strength, dependability, organics, security, stability, reliability, and safety. However, using a lot of brown makes the room feel heavy, dull, or sleepy. Thus, it is better to add some brighter colors to the space, whether in the art, rugs, or pillows used. | **Black:** It is not preferred as a dominant color in any space except a home theater. It is best used in moderation in decorations and furniture, or in a very specific amount mixed with other colors as neutrals. **White:** It is a popular color for ceilings and walls throughout all rooms. It can make the walls of a small room feel larger. However, it shows any and all dirt, so it is not preferred in rooms with children. **Neutrals:** They are versatile for many uses. But they are best used as a background on the walls of all rooms, depending on the hue selected. They also look great on furniture. |
| Warm Colors (Shades of Red, Orange & Yellow & Neutral colors; Brown and Tan) | Warm colors tend to create an upbeat and welcoming feeling in a room. And as previously explained, red, orange and yellow are associated with happiness and make the spaces more welcoming and inviting. However, red is an emotionally stimulating color that increases the heart and respiration rates and raises blood pressure, thus making it a stress-inducing color. | **Warm Colors:** They energize people and increase appetite; thus, they are mostly best used in entertaining spaces and in the |

	And too much yellow can cause anger. An incandescent light is used to bring them out. **Warm Beige:** It is considered to be from the orange family, is subtle enough to use on all four walls, and evokes positive vibes. **Alabaster:** It is a perfect, warm, creamy white color that is best used for a north-facing view. **Red Delicious:** It is a deep shade of red that is bold and stimulating for an accent wall and best fits with white trim. **Pink:** It stimulates happiness, compassion, love, peace, and nurturing while making a room feel playful, warm, and feminine. It is a great calming alternative for fans of red. It can also enhance a bohemian style and is best mixed with white fabrics.	dining room or kitchen. **Pink:** It can be used in a bedroom to add glamour, especially in children's bedrooms. or to develop comfort in a dining room.
Cool Colors (Shades of Green, Blue, Purple & Gray)	Cool colors are used to relax the mind and are believed to decrease appetite. Using fluorescent light can emphasize them. **Blue:** As explained, it can evolve confidence, openness, and stability. While living rooms use light blue for its calming effect, darker blues are avoided as they can invoke sadness. **Dusty Chalky Blue:** It is a cool color that is used as a neutral color as well. **Blue-green:** It is not a very dark or heavy color which makes spaces feel more relaxing and soothing. **Purple:** It creates feelings of ambition, luxury, creativity, and wealth. This is a very versatile color shade.	**Cool Colors:** They generally work best in bedrooms and work or office spaces, creating a calming energy. **Dusty Chalky Blue:** It is best used in kitchens, bathrooms, and bedrooms with white colors. **Purple:** It can be used for almost any space or purpose.
Light Colors	Light colors can give a spacious feeling to the room. And they can reflect light and require less lighting to adequately light a space, thus conserving energy. **Alaskan Husky:** It is a perfect neutral shade of gray. **Hygge is Whiskers:** It is a soft greige that inspires comfort. This color is perfect for making a room feel like a cozy retreat. **Lavender:** It is a calming color that induces a sense of serenity, making people feel uplifted and creative. **Gold:** It is a complicated color that reflects spirituality, wisdom, energy, enlightenment, and wealth. This golden shade of the sun can enliven	**Light Colors:** They are suitable for almost every space, depending on the shade. **Alaskan Husky**: It works beautifully in front entryways and guest bedrooms. **Lavender:** It can add a restful quality to a bedroom. **Gold:** It is best used in decoration and furniture.

	any decoration, making it reflect luxury and aristocracy. Warm gold is not preferred in small and cluttered rooms since it can visually reduce the space.	
Dark Colors	Dark colors can make the spaces feel smaller since the dark walls seem to close the space, especially with little natural light available. They absorb light and reflect less light into the space. **Card Room Green:** It is a dark green color that gives a sense of balance, which is calming and relaxing. It can be used with shades of gray, mustard, and pebble. **Gentleman's Gray:** It is a dark blue that gives any space a lot of character. This deep, blue-gray shade gives off a serene and comforting vibe. **Poised Taupe:** It is a gorgeous neutral color that is easy to live with. It harmonizes with a palette of blues. **Black/Charcoal:** Painting the entire room black will make it feel dark and gloomy, creating stressful and oppressive feelings. Charcoal is better since it is cozy and deep.	**Dark colors:** They work best in small doses, where there is a contrast between the walls and the furniture and decorations. **Gentleman's Gray:** It is most suitable for a bedroom.
Contrasted Colors (Complementary Color Scheme)	This is the simplest color scheme, which involves two shades such as blue and orange, yellow and purple, or red and green. They create strong energy in the room due to the high contrast, so they must be used in small doses to draw attention, with plenty of neutrals for balance and resting the eye.	**Contrasted colors:** They can be used in any room of the house.
Harmonized Colors (Analogous Color Scheme)	It involves three colors adjacent to each other on the color wheel, such as red, purple, and blue, or red, orange, and yellow, etc., thus proportions are crucial to creating balance using the 60/30/10 rule.	**Harmonized Colors:** They can be used in all home spaces.

As demonstrated in table 2, colors are the most dominant factor in space psychology. Using the right color with the right shade should no longer be only an answer to the client's needs and sense of aesthetics, it must also be related to the space function and targeted long-term psychological effects. This will ensure the sustainability of interior materials while enhancing indoor environmental quality, through living in a balanced space. It is also obvious that homes do not need to go with neutral colors only. On the contrary, a balanced application

of warm and cool, light and dark, or contrasted and harmonized colors is required depending on space dimensions, function, and users' preferences while focusing on the desired psychological effect.

4.3. Third Element; Natural Light

Natural lighting is an important factor for humans' physical and psychological health. Both natural and artificial lighting can increase the aesthetics of the materials and colors, give a good psychological effect, and achieve function. Furthermore, natural daylighting has been shown to improve human health and performance while conserving energy [17]. And in the COVID-19 era, where it became essential to discuss sanitization and antibacterial materials and surfaces [1], natural lighting, with its sanitizing power, became crucial. Table 3 will illustrate its importance in relation to psychology, environment, economics, and sanitization.

Table 3. Natural Lighting Various Effects [4]

Fields	Psychological Effect	Environmental / Economical Effect	Sanitization
Natural Lighting	Natural light has been shown to boost mood and relieve depression. It energizes and motivates humans at home, even if it is through a window, while a continuous lack of sunlight causes sadness and enhances anxiety. Additionally, working with only artificial light can develop a lack of vitality and cause signs of poor sleep.	Increasing natural light in the rooms can decrease the energy needed for artificial lighting. Simultaneously, increasing the use of natural light in the rooms reduces electricity costs.	The best disinfectant known to man is sunlight.

5. The Egyptian Society

5.1. Overview

Previous research conducted to assess the new functions and needs evolving during and after the COVID-19 period in Egyptian society ranked space psychology last among eight other items. In that study, the importance of space psychology and aesthetics was weighed against the need for having an office room area, a homeschooling or studying area, greenery, exercising, relaxing, or doing nothing areas, a quarantine area, privacy, healthier spaces, and private outdoor spaces [35]. This result comes as a shock. It is understandable that space psychology won't rank as the first need, but ranking it last is also unacceptable. It shows that there is still a huge ignorance of its value and importance to the quality and sustainability of the indoor environment in residential units. Especially since all of the participants in the study have a bachelor's degree, and more than 70% have a master's or Ph.D. The same study sample, with a total of 104 people, participated in answering the following part of the research, which is related to materials and colors in correlation with space psychology.

5.2. Study Sample Basic Information

An electronic questionnaire was conducted in January 2022 based on voluntary participation. Table 4 will demonstrate the study sample's basic information analyses and classification. It is shown that there is a healthy variation in the data for the target group [36]. The research focused on assessing Egypt's middle and upper classes. Additionally, the study focused on the residences of Cairo and Giza, the two major cities in Egypt. The study looked at about one out of every 42,000 people, for a total of 104 people.

Table 4. Study Sample Basic Information Classification

	Percentage / Options				
Nationality	100%	Egyptians			
Residence	99%	In Egypt			
Gender	42.3%	Male	57.7%	Female	
Marital State	36.5%	Single	63.5%	Married	
Age Range	0%	18-24	52.9%	25-40	47.1%	Over 40
Working Status	1%	Student	94.2%	Working	4.8%	Unemployed
Accommodation Type /Area	14.4% Flat (under 120 m^2)	59.6% Flat (120 m^2 – 200 m^2)	13.5% Flat (over 200 m^2)	3.8% Twin House/ Villa (under 250 m^2)	4.8% Twin House/ Villa (250 m^2 – 400 m^2)	3.8% Twin House/ Villa (over 400 m^2)

The study sample was asked to identify the materials previously discussed in the research and specify where they were used in their houses. As illustrated in Table 5, it was found that, surprisingly, every material mentioned was used in every usage questioned. Additionally, according to the study sample preferences, it was found that the material to be used the most in home finishing is ceramic and porcelain 97.12%, with the majority using it on floors (58.65%) and bathrooms (48.08%). The second most commonly used material was discovered to be wood or timber (96.15%), with the majority of it being used in furniture (50%) and the least in walls and ceilings (5.77%). While the least used material was found to be engineered stones, with 56.73% of the sample not using them in their homes, it was followed by wallpaper with 47.12%. Moreover, when analyzing every material separately, it was found that:

• Natural stone was most commonly used in kitchens (37.50%), with the least amount used in ceilings (1.92%).
• Engineered stone was most commonly used in decoration (11.54%), with the least amount used in furniture (1.92%).
• Wood was most commonly used in furniture (50.00%), with the least amount used on walls and ceilings (5.77%).
• Metal was most commonly used in openings (43.27%), with the least amount used in floors (1.92%).
• Glass was most commonly used in openings (69.23%), with the least amount used in ceilings (0.96%).

•   Textiles and fabrics were most commonly used in furniture (59.62%), with the least amount used on walls, ceilings, and kitchens (2.88%).

•   Ceramic and porcelain were most commonly used on floors (58.65%), with the least amount used in furniture (0.96%).

•   Painting was most commonly used on walls (72.12%), with the least amount used in openings and furniture (3.8%).

•   Wallpaper was most commonly used on walls (39.42%), with the least amount used in furniture (0.96%).

Table 5. Identifying some materials used in the study sample houses

Materials / Usage	Walls	Ceiling	Floors	Decoration	Kitchen	Bathroom	Openings (Windows/Doors)	Furniture	Other	Not used
Natural Stone (Granite and Marble)	19.23%	1.92%	26.92%	13.46%	37.50%	17.31%	2.88%	4.81%	5.77%	21.15%
Engineered Stone (Silestone, Caesarstone, Essa stone, quantum quartz, and Smart stone)	10.58%	7.69%	7.69%	11.54%	3.85%	3.85%	4.81%	1.92%	3.85%	56.73%
Wood / Timber	5.77%	5.77%	38.46%	25.00%	25.96%	6.73%	25.96%	50.00%	5.77%	3.85%
Metal (Such as copper aluminum, stainless steel, and iron)	4.81%	3.85%	1.92%	18.27%	28.85%	17.31%	43.27%	14.42%	11.54%	15.38%
Glass	10.58%	0.96%	3.85%	23.08%	21.15%	27.88%	69.23%	22.12%	8.65%	4.81%
Textile & Fabrics (Such as Cotton, Linen, leather, wool, and Polyester)	2.88%	2.88%	6.73%	20.19%	2.88%	3.85%	4.81%	59.62%	15.38%	6.73%
Ceramic/ Porcelain	19.23%	7.69%	58.65%	1.92%	32.69%	48.08%	1.92%	0.96%	3.85%	2.88%
Painting	72.12%	45.19%	8.65%	17.31%	7.69%	5.77%	3.85%	3.85%	5.77%	4.81%
Wallpaper	39.42%	2.88%	2.88%	9.62%	3.85%	2.88%	3.85%	0.96%	1.92%	47.12%

5.3.2.   Materials in relation to Psychology Analysis

The study sample was asked again to identify the psychological effect of their homes' materials on them during the quarantine period. As illustrated in Table 6, it was found that when used in the home's interiors, natural stone, wood, glass, textiles and fabrics, paintings, and finally wallpaper evolved positive feelings in the residents more than negative ones. The

majority of respondents, on the other hand, agreed that engineered stones, metals, ceramics, and porcelain elicited adequate feelings. That is a disappointing result concerning ceramic and porcelain. Since, as previously mentioned, that is the material that was mostly used in the study samples' houses. However, it is a promising result from a sustainable point of view since ceramic is considered an unfriendly environmental material. Additionally, when analyzing the overall ranking of the residents' satisfaction in relation to the number of participants' responses and multiplying it by 5 for positive, 3 for adequate, and 1 for negative, it was found that painting ranked first, followed by wood, while wallpaper, followed by engineered stone, ranked in the last positions, which is totally understandable.

However, when analyzed for relative ranking in relation to the positive, adequate, and negative response percentages only, and after excluding the "depends on the place" and "not available at my home" percentages, and using the same weighing system as abovementioned, it was found that natural stones ranked first, followed by glass, which is also comprehendible. However, again, as shocking as it is, ceramic and porcelain ranked before last place, followed by metal in last place, as demonstrated in Figure 1. This requires further investigation into why people tend to use a lot of things they deem uncomfortable. Finally, there was a slightly higher variation in the answers between "the not used response" in Table 5 and the "not available at my home response" in Table 6, with an average of 23.35%, but this was deemed acceptable by the research.

Table 6. Materials Satisfaction Levels

| Materials / Options	Positive	Adequate	Negative	Depends on the place	Not available at my home	Overall Ranking (Points)
Natural Stone	39.42%	21.15%	1.92%	17.31%	20.19%	(6) 273
Engineered Stone	11.54%	24.04%	0.96%	14.42%	49.04%	(9) 136
Wood / Timber	50.96%	24.04%	5.77%	13.46%	5.77%	(2) 346
Metals	13.46%	36.54%	16.35%	21.15%	12.50%	(7) 201
Glass	46.15%	28.85%	0.96%	16.35%	7.69%	(3) 331
Textile & Fabrics	43.27%	25.96%	6.73%	15.38%	8.65%	(4) 313
Ceramic/ Porcelain	29.81%	39.42%	8.65%	16.35%	5.77%	(5) 287
Painting	48.08%	30.77%	1.92%	15.38%	3.85%	(1) 348
Wallpaper	25.96%	20.19%	0.96%	10.58%	42.31%	(8) 199
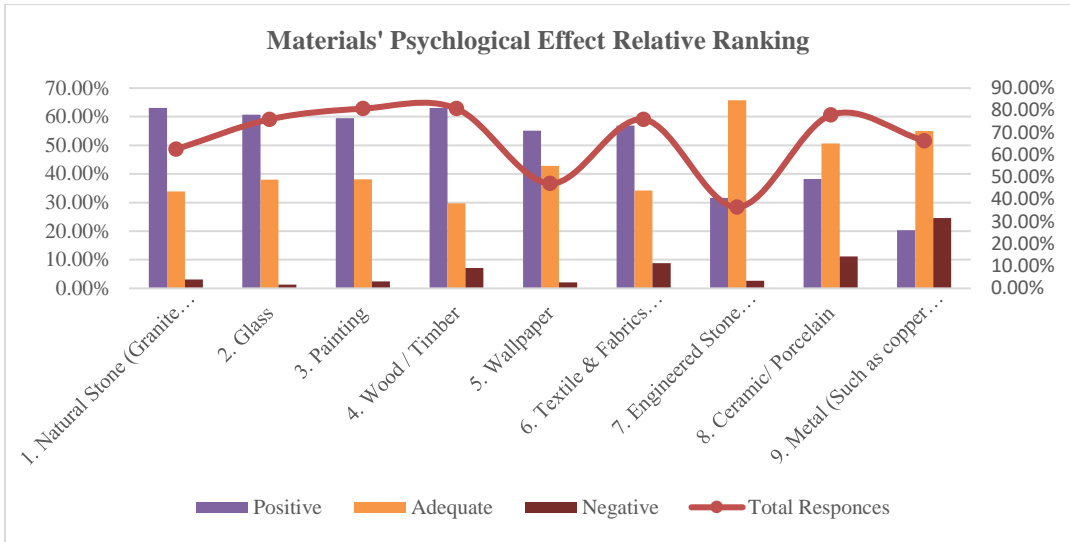
Fig. 1. Materials' psychological effect relative ranking during the covid-19 period

In this part, the study sample, which represents the middle class in Egyptian society, was requested to express their opinions on the costs of the materials in January 2022. The majority saw that both natural and engineered stones are expensive, while the rest of the materials are adequate and none of them are cheap. In terms of ranking, both the overall and relative rankings revealed that, once again, natural and engineered stones are the most expensive, while paintings are the least expensive, as shown in Figure 2. Thus, the study analyzed the actual range of the prices of these materials at the end of 2022 to give an exact view of what was deemed by a middle-class sample to be either expensive or adequate, as illustrated in Table 7.

Table 7. Materials' costs analysis

Materials / Options	Expensive	Adequate	Cheap	Depends on its Type & use	Overall Ranking (Points)	Relative Ranking (Percentage)	Actual Costs 2022 (L.E.)
Natural Stone	64.42%	13.46%	0.96%	21.15%	(1) 378	(1) 460.98%	Granite: 330 - 670m² Marble: 200-2000m²
Engineered Stone	44.23%	26.92%	0.96%	27.88%	(2) 315	(2) 420.00%	750 – 4500 m²
Wood / Timber	25.96%	48.08%	6.73%	19.23%	(3) 292	(4) 347.62%	4000 -7000 m³
Metals	21.15%	46.15%	3.85%	28.85%	(5) 258	(3) 348.65%	Alu.:1600-4000 m² Iron: 1500-2500 m²
Glass	12.50%	50.00%	19.23%	18.27%	(6) 241	(8) 283.53%	Depend on Type
Textile & Fabrics	12.50%	48.08%	15.38%	24.04%	(8) 231	(7) 292.41%	Depend on Type

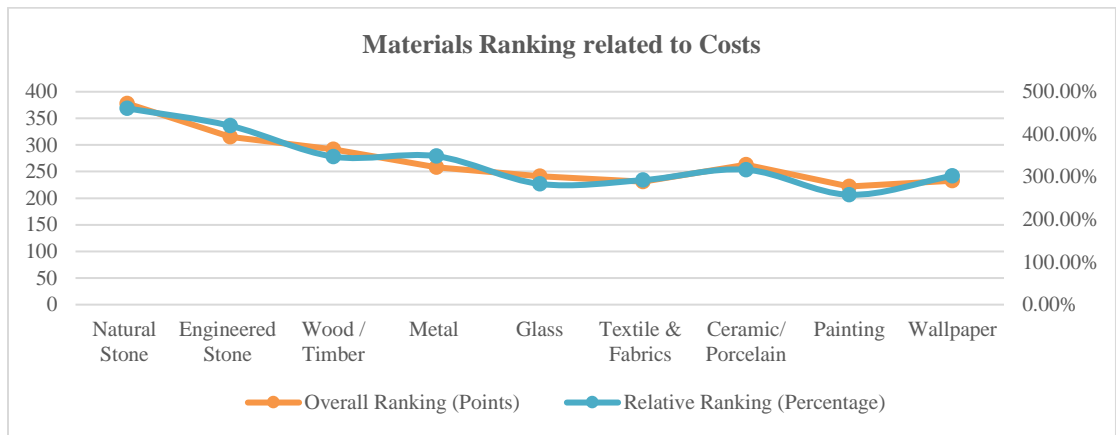|							
Ceramic/ Porcelain	20.19%	46.15%	13.46%	20.19%	(4) 263	(5) 316.87%	Ceramic: 150 -750m^2 Porcelain: 350-1500 m^2
Painting	9.62%	46.15%	26.92%	17.31%	(9) 222	(9) 258.14%	Painting: 150 -2000m^2
Wallpaper	15.38%	44.23%	14.42%	25.96%	(7) 233	(6) 302.60%	650 – 4500 (Roll-10m)

Fig. 2. Materials' ranking in relation to costs

5.3.4. Materials and Sanitization Analysis

During COVID-19, sanitization became a crucial factor in material selection. According to the study sample majority, natural stone, metals, glass, ceramic, and porcelain were the easiest materials to sanitize, while paintings were hard to sanitize, as demonstrated in Table 8. On the other hand, engineered stones, wood, and wallpaper were classified by them as having a medium level of sanitization. As for textiles and fabrics, the participants' majority was equally divided between them being medium and hard to sanitize. This is understandable given the wide variety of textiles and fabrics available, as well as the varying experiences each participant has with their availability and applicability in their homes. As for the ranking, as demonstrated in Figure 3, both the overall and relative ranking demonstrated that glass was the easiest material to sanitize, while the hardest material in the overall ranking was engineered stones, and in the relative ranking, it was textiles and fabrics.

Table 8. Materials' Sanitization Analysis

Materials / Options	Easy	Medium	Hard	Depend on Place	Not Available at my Home	Overall Ranking (Points)	Relative Ranking (Percentage)
Natural Stone	38.46%	18.27%	9.62%	14.42%	19.23%	4 (267)	3 (386.96%)
Engineered Stone	16.35%	20.19%	10.58%	8.65%	44.23%	9 (159)	5 (324.49%)
Wood / Timber	24.04%	31.73%	24.04%	15.38%	4.81%	5 (249)	6 (300.00%)

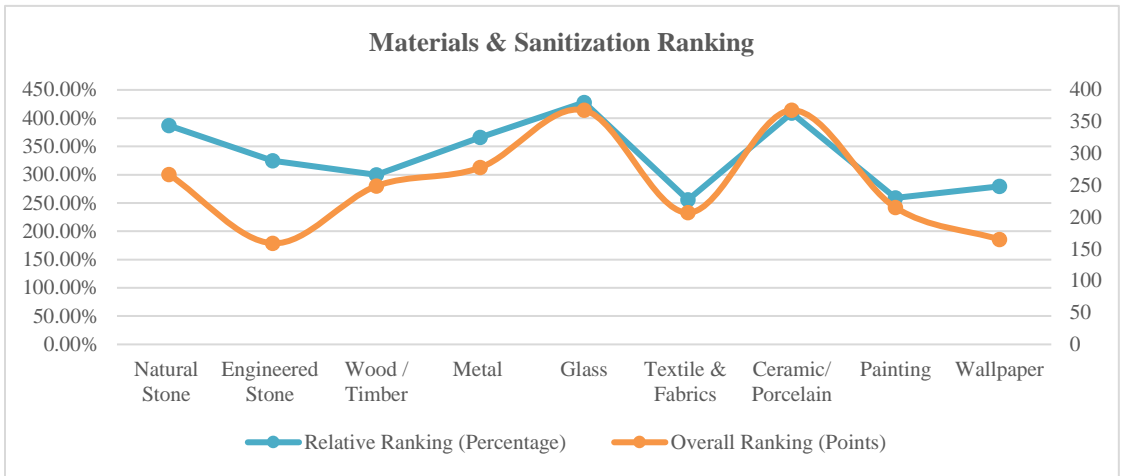|							
Metals	34.62%	27.88%	10.58%	16.35%	10.58%	3 (278)	4 (365.79%)
Glass	59.62%	16.35%	6.73%	10.58%	6.73%	1 (368)	1 (427.91%)
Textile & Fabrics	14.42%	31.73%	31.73%	19.23%	2.88%	7 (207)	9 (255.56%)
Ceramic/ Porcelain	55.77%	22.12%	8.65%	10.58%	2.88%	2 (368)	2 (408.89%)
Painting	16.35%	30.77%	32.69%	17.31%	2.88%	6 (215)	8 (259.04%)
Wallpaper	14.42%	22.12%	20.19%	12.50%	30.77%	8 (165)	7 (279.66%)

Fig. 3. Materials' ranking in relation to sanitization

5.3.5. Materials' Preferences Analysis for Floors

The survey participants were requested to state the recommended material for the floor they wanted to have in every area of their houses, which would have made them feel happy, safe, and comfortable during their quarantine time and after. As demonstrated in Table 9, it was found that wood was preferred in working and schooling, dining, living, exercising and relaxing, bedrooms, and quarantine areas. This could be greatly related to the need to be connected to nature and its brown color, which is associated with security, stability, reliability, and safety—feelings mostly needed in these spaces, especially with the long hours spent in them during the quarantine. As for marble, it was preferred in the reception area and ceramic in the kitchen and bathroom, which is a clear interpretation of the economical factor, function, and ease of sanitization. The least preferred material in most of the spaces was engineered stone, which reflects greatly the lack of awareness of the users about its value, functions, and availability.

Table 9. Materials' preferences analysis for floors

Area/ Colors	Marble	Granite	Engineered Stone	Wood / Timber	Ceramic	Porcelain
Reception Area	1 (36)	5 (14)	6 (6)	3 (29)	4 (15)	2 (32)
Working & Schooling Area	5 (12)	4 (14)	6 (4)	1 (53)	2 (18)	3 (17)
Dining Area	4 (22)	5 (12)	6 (5)	1 (40)	3 (24)	2 (25)
Living Area	4 (17)	6 (5)	5 (6)	1 (57)	3 (20)	2 (21)
Exercising &Relaxing Area	5 (9)	4 (10)	6 (9)	1 (66)	2 (16)	3 (10)
Bedrooms	5 (4)	6 (3)	4 (8)	1 (69)	2 (17)	3 (17)
Kitchen	3 (14)	5 (9)	6 (3)	4 (12)	1 (65)	2 (21)
Bathroom	3 (14)	4 (11)	6 (3)	5 (6)	1 (68)	2 (23)
Quarantine Area	4 (9)	5 (6)	6 (6)	1 (42)	2 (36)	3 (27)

5.3.6. Materials' Preferences Analysis for Walls

The survey participants were again requested to state the recommended material for the walls they wanted to be in every area of their homes and that would have made them feel happy, safe, and comfortable during the quarantine and after. As illustrated in Table 10, it was discovered that painting was preferred by the majority in all spaces except in the kitchen and bathroom areas, where ceramic was the most preferred. This could be greatly related to the economic side of the materials in addition to their function in relation to sanitization. Ceramics, porcelain, wallpaper, and engineered stone were the least preferred materials according to the study sample. This result could be a direct interpretation of the society's culture based on the use of the materials.

Table 10. Materials' preferences analysis for walls

Area/ Colors	Marble	Granite	Engineered Stone	Wood / Timber	Ceramic	Porcelain	Wallpaper	Painting
Reception Area	3 (18)	6 (9)	5 (11)	4 (13)	8 (1)	7 (8)	2 (22)	1 (58)
Working & Schooling Area	5 (5)	4 (7)	6 (5)	3 (17)	8 (2)	7 (4)	2 (21)	1 (63)
Dining Area	4 (10)	6 (7)	5 (9)	3 (16)	7 (5)	8 (4)	2 (22)	1 (63)

Area								
Living Area	5 (6)	6 (4)	4 (10)	2 (23)	8 (4)	7 (4)	3 (22)	1 (68)
Exercising &Relaxing Area	6 (5)	5 (6)	4 (9)	2 (20)	8 (3)	7 (3)	3 (19)	1 (63)
Bedrooms	7 (5)	6 (5)	4 (8)	3 (16)	5 (8)	8 (4)	2 (25)	1 (62)
Kitchen	4 (11)	5 (9)	6 (7)	7 (6)	1 (50)	3 (14)	8 (5)	2 (28)
Bathroom	3 (15)	5 (9)	6 (6)	7 (6)	1 (54)	4 (14)	8 (3)	2 (22)
Quarantine Area	6 (5)	7 (5)	8 (4)	3 (18)	4 (11)	5 (7)	2 (21)	1 (58)

5.3.7. Colors' General Preferences Analysis

Again, the survey participants were asked to state the recommended colors they want in every area of their homes (walls and furniture) that would have made them feel happy, safe, and comfortable during the quarantine and after. As shown in Table 11, the majority of the sample chose to use light colors in almost every room of their houses. Only in the reception area and the kitchen did they request a mix of light and dark colors. As demonstrated in Figure 4, there is a wide gap between the percentage wanting the light colors and the dark colors, with the mix preference being in between. This preference is totally understandable since, as previously mentioned, light colors give a spacious feeling to the space in addition to reflecting the light, which adequately lights a space with less energy [18]. Additionally, from a space psychology point of view, light colors evolve a sense of calmness, relaxation, and cleanness, which were greatly needed, especially during the COVID-19 period. However, it is critical to strike the required balance, especially in the long hours of the quarantine, to avoid being dull and monotonous in addition to giving a clinical sense. Finally, again, this preference is related to a society's need to make its home spaces look larger and more spacious.

Table 11. Colors analyses during and post COVID-19

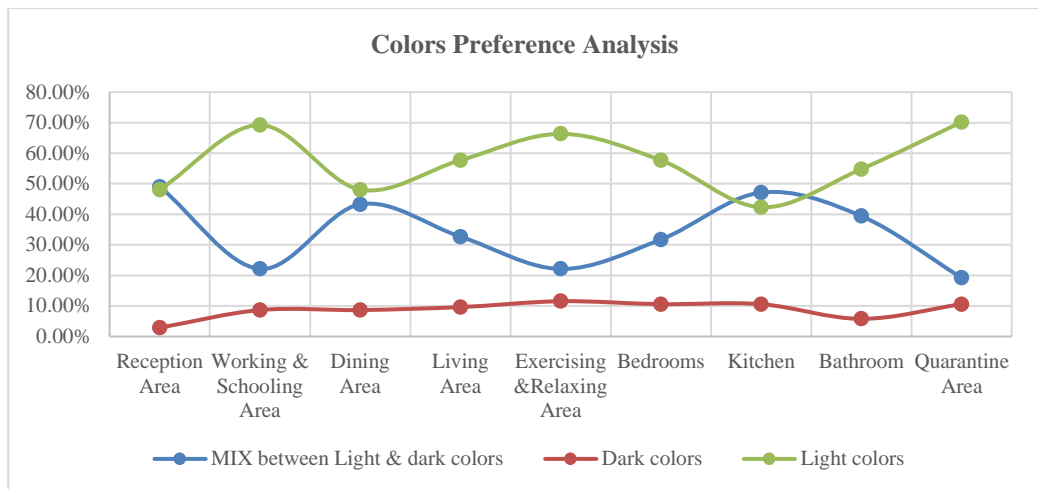| Area/ Colors	MIX between Light & dark colors	Dark colors	Light colors
Reception Area	49.04%	2.88%	48.08%
Working & Schooling Area	22.12%	8.65%	69.23%
Dining Area	43.27%	8.65%	48.08%
Living Area	32.69%	9.62%	57.69%
Exercising &Relaxing Area	22.12%	11.54%	66.35%
Bedrooms	31.73%	10.58%	57.69%
Kitchen	47.12%	10.58%	42.31%
Bathroom	39.42%	5.77%	54.81%
Quarantine Area	19.23%	10.58%	70.19%

Fig. 4. Colors chart analyses during and post COVID-19 in relation to participants' preferences

5.3.8. Colors Specified Preferences Analysis

The survey participants were finally asked to state the main color they wanted to be dominant in every area of their home, which would have made them feel happy, safe, and comfortable during the quarantine and after. Although the study sample was given the chance to choose more than one color, white was the color of choice for every space in the house, with quite a difference between the other colors in most of the spaces. While the beige color came in second place again in every space apart from the kitchen, where the brown color was more preferred, as demonstrated in table 12. In terms of space psychology, white is a calming and fresh neutral color, and beige is also a calming and relaxing color that doesn't demand attention, allowing for more freedom in experimenting with decoration and textiles [9] & [27]. However, using them in almost every space of the house, as demonstrated by the research sample, during the quarantine period will not only have a cleanliness effect but will also create a sense of boredom and tediousness, as previously mentioned, and can also lead to discomfort.

On the other hand, red was the least preferred color for use in almost every zone in the house; only in the bedroom and quarantine area did black come last, and in the kitchen, it was purple, while finally, orange was the least preferred color in the bathroom. Not preferring black in bedrooms and quarantine areas is comprehensible since it is linked to death and unhappiness. Additionally, according to space psychology, red can develop feelings of danger and anger in addition to making people feel anxious or unsettled, in spite of its positive effect on increasing metabolism and appetite [4], [8], & [26]. As for the color orange, it is associated with sports, joy, and sunshine; thus, it is understood why it is not preferred in the bathroom [4] & [26]. Finally, although purple creates feelings of ambition, luxury, creativity, and wealth and can be used for almost any space or purpose, it is not totally clear why it is the least preferred color in kitchens. It may be due to the sense of irritation it can create in people [4] & [8].

Table 12. Colors ranking/points analyses during and post-COVID-19

Area/ Colors	White	Black	Gray	Brown	Red	Yellow	Blue	Green	Orange	Purple	Beige
Reception Area	1 (48)	7 (5)	4 (11)	3 (18)	11 (1)	6 (6)	5 (10)	10 (2)	8 (3)	9 (2)	2 (37)
Working & Schooling Area	1 (44)	5 (8)	4 (14)	6 (6)	11 (1)	9 (4)	3 (17)	7 (5)	8 (5)	10 (4)	2 (23)
Dining Area	1 (32)	6 (6)	5 (11)	3 (28)	11 (0)	10 (3)	7 (6)	4 (11)	9 (3)	8 (6)	2 (30)
Living Area	1 (37)	10 (3)	3 (19)	4 (17)	11 (1)	8 (7)	6 (8)	5 (14)	9 (4)	7 (8)	2 (25)
Exercising &Relaxing Area	1 (43)	7 (7)	4 (12)	6 (9)	11 (3)	8 (7)	5 (11)	3 (14)	9 (4)	10 (4)	2 (19)
Bedrooms	1 (44)	11 (1)	3 (15)	6 (10)	9 (3)	8 (3)	4 (15)	7 (4)	10 (2)	5 (10)	2 (27)
Kitchen	1 (37)	7 (6)	4 (18)	2 (25)	10 (4)	9 (4)	6 (6)	8 (5)	5 (8)	11 (0)	3 (23)
Bathroom	1 (41)	6 (9)	5 (13)	4 (17)	10 (2)	9 (4)	3 (19)	8 (7)	11 (0)	7 (8)	2 (20)
Quarantine Area	1 (55)	11 (1)	5 (9)	6 (7)	10 (2)	7 (6)	3 (12)	4 (10)	8 (4)	9 (3)	2 (22)

Lastly, when analyzing the third-best choice in a space's colors to further understand Egyptian society's preferences, as illustrated in Figure 5, grey was preferred in both bedrooms and living areas, which are family areas. Although this could seem like a strange choice since greys are associated with depression and loss, they can create a sense of neutrality and balance that may have been sought in the long hours of quarantine [4]. Additionally, greys with the right hues can create a sense of coziness, and again, this might be reflected a lot in the selection of the furniture [31]. While brown, as a neutral color, was selected for reception and dining areas, which could be greatly related to the furniture and maybe flooring choices, it evolves senses of dependability, reliability, and safety [4]. Those feelings might be needed in those spaces. Blue was preferred in three spaces: working and schooling, bathrooms, and quarantine areas since it is associated with serenity and confidence while creating a calming effect [26]. As for green, it was chosen for the exercise and relaxation area due to its soothing and calming effect. Finally, beige was selected for the kitchen since it is subtle enough to use on all four walls [33].
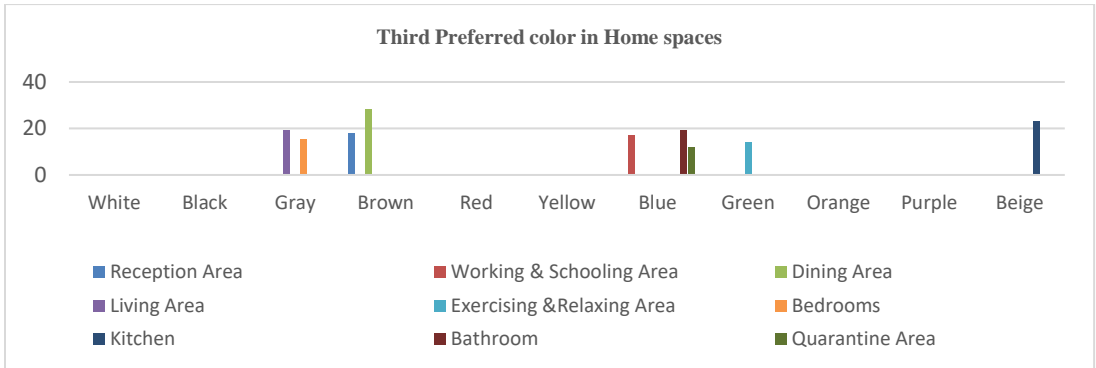
Fig. 5. Colors chart analyses preferences in home design

6. Conclusion

Sustainability is a grand concept that should be sought after in every aspect of people's lives and the natural environment. Limiting it to just resources is belittling a great term that can make a difference to the world and humanity's future. The research strived to explore a new dimension in the residential sector, which is the sustainability of homes' interiors through the application of space psychology. Thus, it studied in detail the three main elements of space psychology in a residential unit, which are materials, colors, and natural lighting. They were discussed not only in relation to their psychological effects but also their environmental, economic, functional, and sanitization effects. It was found that most materials used in residential spaces have various physiological effects depending on where and how they are used, in addition to their texture and colors, in order to give the required positive emotions. While color is a major player in achieving the needed effects with the help of good lighting. As for sanitization, most materials were found to have types that can be sanitized at different levels. It was also found that what could be problematic is the environmental, economic, and availability in local society factors.

Furthermore, although experts were optimistic about the role that space psychology would play after the world was struck by the COVID-19 pandemic when examined in Egyptian society, throughout conducting a survey, it did not appear to take the place that was expected. Costs, function, and personal preferences are still the dominant factors in users' selection of materials and colors. Yes, sanitization was a new factor, but space psychology did not take its proper place unless it coincided with societal preferences. Furthermore, people relate to it when it subconsciously affects them without real knowledge or understanding.

When the first element, the material, was examined, whenever there were contradictions, costs, and societal norms prevailed in the users' preferences. For example, ceramic is considered an environmentally unfriendly material; additionally, it caused discomfort to most of the study sample during the pandemic period and was described as adequate in its psychological effect on them. However, it came as a top choice when they selected a material to use on the floors of the kitchen and bathroom, as shown in Table 13. This preference is believed to be related to its low costs, which are adequate for the study sample, the society's preference in material selection, and its ease of sanitization. Additionally,

paintings, which are another environmentally unfriendly material unless eco-friendly paintings are used, came in as a top choice in wall materials for almost every space in the houses of the study sample, although it was hard for them to sanitize. This selection is related to the subconscious level due to the positive effect it had on the study sample; however, the main reasons are their costs being adequate and the local social norm. Finally, a material such as marble, which is environmentally friendly, evolves positive psychological feelings, and is easy to sanitize, was preferred for usage in only one place, which is the reception area, because the study sample considered it expensive.

Table 13. A comprehensive analysis of materials used in home floors and walls

Home Areas	Floor Materials Analysis				Walls Materials Analysis			
	Material Preference	Material Psychological Analysis (1)	Sanitization level	Costs	Material Preference	Material Psychological Analysis (2)	Sanitization level	Costs
Reception Area	Marble	Positive	Easy	Expensive	Painting	Positive	Hard	Adequate
Working & Schooling Area	Wood	Positive	Medium	Adequate	Painting	Positive	Hard	Adequate
Dining Area	Wood	Positive	Medium	Adequate	Painting	Positive	Hard	Adequate
Living Area	Wood	Positive	Medium	Adequate	Painting	Positive	Hard	Adequate
Exercising &Relaxing Area	Wood	Positive	Medium	Adequate	Painting	Positive	Hard	Adequate
Bedrooms	Wood	Positive	Medium	Adequate	Painting	Positive	Hard	Adequate
Kitchen	Ceramic	Adequate	Easy	Adequate	Ceramic	Adequate	Easy	Adequate
Bathroom	Ceramic	Adequate	Easy	Adequate	Ceramic	Adequate	Easy	Adequate
Quarantine Area	Wood	Positive	Medium	Adequate	Painting	Positive	Hard	Adequate

As for colors, the study sample's first choice was the white color to dominate every space in their homes, as demonstrated in Table 14, followed by the beige color. Although the use of white on that scale creates a clinical atmosphere and shows any and all dirt, this preference can be related to the sizes of the apartments, where white is preferred to give a sense of spaciousness to the areas and make rooms seem larger. Additionally, it gives a sense of cleanliness to the room. Thus, it was best to go for a warmer, creamier color, a yellow-based white, or the second choice, which was beige. When analyzing the study sample's third choice in relation to space psychology choices, as shown in Table 14, some of the answerers were harmonizing, while others need further study in future studies.

Table 14. Colors comprehensive analysis in relation to Egyptians and space psychology preferences

Home Areas	Color Analysis			
	First Choice	Second Choice	Third Choice	Space Psychology Choice
Reception Area	White	Beige	Brown	White/ Green/ Neutrals

Working & Schooling Area	White	Beige	Blue	White/ Green/ Neutrals
Dining Area	White	Beige	Brown	White/ Green/ Neutrals/ Red/ Yellow/ Pink
Living Area	White	Beige	Gray	White/ Green/ Neutrals/ Blue/ Purple
Exercising &Relaxing Area	White	Beige	Green	White/ Green/ Neutrals/ Orange
Bedrooms	White	Beige	Gray	White/ Green/ Neutrals/ Yellow/ Pink
Kitchen	White	Brown	Beige	White/ Green/ Neutrals/ Red/ Yellow/ Orange
Bathroom	White	Beige	Blue	White/ Green/ Neutrals/ Yellow/ Blue
Quarantine Area	White	Beige	Blue	White/ Green/ Neutrals

Finally, this inconsistency of the Egyptians' preferences with the psychology of space is viewed as the main reason why a lot of the Egyptians want to redesign and redecorate their homes after a short while of usage, which is a waste of time, money, and resources. Or they have to live discomfortably in their homes with poor indoor psychological quality, which is, in total, against the values of sustainability.

7. Recommendations

It is recommended to:

• Conduct additional research with a larger study sample to assess the various needs and preferences of residential sector users in relation to space psychology.
• Educating clients, architects, and designers on the value and importance of applying space psychology in their designs.
• Creating all-ready samples that integrate both materials and colors and relating them to the residential unit size.

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