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A review study of cognitive design research on colors from a visual psychological perspective

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Abstract: This review study aims to explore the relationship between color psychology and cognitive design in various environments, with a focus on human perception and visual comfort. By analysing existing literature, we identify gaps and weaknesses in the research and suggest ways to improve the design of spaces such as hospitals, public libraries, and colleges using color application. The study reveals that the use of colors can significantly affect users' emotions, stress levels, and visual discomfort, and can create aesthetically pleasing environments. We also suggest that more research is needed to better understand the impact of colorful and interesting environments on human psychology and well-being. Overall, this study highlights the importance of considering human psychology in color application design and offers insights into how to enhance the nature of existing spaces through the use of color.

Introduction

Color-in-context hypothesis, which is based on social development as well as biology, was developed by Elliot and Maier (2012). Some reactions to color stimuli are thought to result merely from the frequent association of a certain color with specific ideas, messages, and experiences (Agrawal et al., 2020; Cha et al., 2020; Dehaene et al., 2022). Others, however, are thought to be the result of a propensity that is ingrained in biology and that is strengthened and modified by social learning. Through social learning, color associations can be expanded to include objects that are close to the body in addition to normal physical functions (such blood flow modulations).

In this review study, we aim to think about human cognitive psychology perception through color application design. We find some interface with design in every aspect of our lives, and today, the creative industry (creative economy), which includes the fields of industrial design, arts and crafts, architecture, fashion, advertising, music, etc., can be recognized as one of the augmenting sectors in the world (Mohr et al., 2018; Ko, 2019; Rahimi-Mehr, 2021). For example, a well-designed product that meets the real needs of the user, aimed at a people-centred approach to problem-solving, only design can play an important role in solving contemporary global challenges (Griffin, 2017; Darma and Ningsih, 2019; Jonauskaite et al., 2020; Steiger et al., 2021).

The purpose of this review study is to explore how color can influence people's cognitive and psychological perception when it comes to design. Variety is an important aspect of color in the planning of spaces. We feel that a well-organized space can be made better by using 'suitable' colors. The use of colors in spaces is a complex matter that requires creativity and judgment and often comes with experience (Elliot and Maier, 2014; Kim and Lee, 2022). However, organized methodology and advanced color schemes can lead to the successful practice of colors. An understanding of the effects of different standards of colors also leads to belief in the use of variety practically speaking.

Methods

We reviewed fifty different publications that were all connected to this field of study. Using keywords like "cognitive design," "colors," and "visual psychological

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perspective," a search was carried out in the electronic databases provided by Google Scholar to look for previously published articles.

Cognitive Design

Cognitive design theory has numerous possible advantages for mental testing, assuming the hypothesis is adequately evolved. To start with, Cognitive theory permits the legitimacy of developments to be connected to the cycles that are associated with exploratory arrangements. The hypothesis expounds what the exploratory upgrade means for the handling necessities of the experimental task, which thus permits the test designer to impact the development portrayal (Newell and Simon, 1961). Second, the mental hypothesis additionally permits the relationships of grades to be perceived and controlled. In this manner, control of the exploratory boosts ought to influence the ostensible length of the preliminary also formation of portrayal (Newell and Simon, 1961). Third, object improvement turns into a logical cycle instead of an imaginative interaction. Tests are created to address clear details that influence handling. The exploratory designer turns into an experimenter who plans undertakings to reflect explicit parts of a guideline in the work. For certain assignments, the determinations have become clear to the point of involving man-made consciousness in trial fabricating. Fourth, cognitive design can work on the proficiency of test improvement. Better quality experiments with additional definitively designated hardships can be anticipated. Developing tests by conclusions from speculation should yield better isolating things in light of the fact that the thing helps that influence irrelevant cycles can be cleared out. In this way, precise try outs should achieve less thing wearing out (Embretson and Gorin, 2001). Further, the specific try-outs need integrate only things with the ideal difficulty levels in light of the fact that the conclusions also yield assumptions for thing inconvenience levels. Despite these couple of advantages, in any case, test designer have been postponed to apply mental arrangement to testing. One tangle to applications may be the shortfall of appropriate test improvement models. That is, exploratory designer who have used standard psychometric principles may not know how mental arrangement guidelines can be coordinated into testing strategies (Zhou et al., 2013; Wu et al., 2018).

Cognitive design is a subspace of the intelligent or logical discipline ergonomics or human components planning or designing. Cognitive design focuses on mental or cognitive cycles, for instance, knowledge, memory, and information dealing with, thinking and engine response, as they impact associations among individuals and various parts of a system (Hollnagel, 1997). features the targets of cognitive design are to depict. What undertaking means for the psyche, as well as, what the psyche means for a task. While playing out an undertaking, the nature of work relies upon the people's grasp of the circumstance (objectives, means, and requirements). Thusly, the plan of a working framework relies upon the mental model of the user, specialist figures out the errand to a specific undertaking setting. Cognitive design likewise centers on the unwavering quality of execution and specifically the dependability of perception.

Materialness of information on cognitive design in various spaces of the human-focused plans is conceivable. Setup-related fields in which usages of cognitive design are huge consolidate accommodation planning of structures, user experience plan or design, human-computer interaction design (HCI), cooperation plan past HCI, mechanical technology and man-made reasoning plan, work framework, task configuration, signage design, purchaser item or product design, close to home item configuration, fashion and style design, visual correspondence design, visual marketing, bundle or packaging design, etc (Zhou et al., 2013) as shown table 1.

To understand how the human mind processes information, it is important to be aware of the various stages and events involved in the cognitive process. These include attention, sensation, perception, memory encoding and retrieval, reasoning, and cognition (Faw, 2003; Tantanatewin, and Inkarojrit, 2018; Thorstenson et al., 2018). These are all key elements in the way that the human brain interprets and responds to information. Understanding these stages can help us design interfaces and systems that are more user-friendly and efficient for human interaction.

Attention

To deal with or oversee mass measures of data coming from climate, individuals require a specific concentration (regard for attention) of a certain measure of data. The transient store of memory is confined to a human. Thusly, consideration is basic to picking information of interest and for regulating monstrous proportions of information. By and large, attention is ordinarily examined concerning visual and hear-able faculties (Torres et al., 2022) arranged consideration into three classifications: specific consideration, centred consideration, and partitioned consideration.

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Table 1. Lists different domains or areas of application for cognitive design, which include user experience design, interaction design, robotics and artificial intelligence, and others, each with its own unique focus and set of techniques and methodologies for designing products, systems, and experiences that are optimized for human cognitive capabilities and needs

Cognitive design	
User Experience Design	Work System and Task Design
Interaction Design	Fashion Design
Signage Design	Usability Engineering
Robotics Artificial Intelligence	Visual Communication
Retail Design	Consumer Product Design
Package Design	Emotional Product Design
Human-computer interaction (HCI)	Interior Design

Source: Hollnagel, 1997

Table 2. Lists the five senses and their corresponding sensory organs or receptors. The senses allow humans to perceive and interpret the world around them, and the corresponding sensors detect and transmit information to the brain, which then processes and interprets the sensory input. Understanding the relationship between senses and their sensors is essential for developing technologies and designs that optimize human sensory experiences.

Senses	Sensors
Vision	Retina
Audition	Cochlea
Smell	Olfactory bulb
Taste	Taste buds
Touch	Skin

Sensation

Sensation refers to the process of converting physical stimuli that we receive from our environment, such as light or sound, into mental impulses that our brain can perceive and comprehend. This conversion process is called transduction and occurs through specialized receptors in our body such as those in our eyes, ears, nose, tongue, and skin. Our body has five main senses - vision, hearing, smell, taste, and touch - each of which uses unique receptors to convert physical stimuli into mental signals that our brain can interpret. The process through which our body converts physical energy from our environment into mental messages that we can understand is fundamentally known as sensation (Faw, 2003) (Table 2).

Cognition is the arrangement of mental interaction which happens between sensation, discernment consciousness of sensation, and example, acknowledgement and reaction. As such, cognition is the psychological process fundamental to our capacity to see the world, recall, discuss and gain from our encounters, and change our way of behaving as needs are. Thusly, each cognition interaction is utilized to change, decrease, elaborate, store, recuperate, and utilization of tactile information (Bailey, 1996). The idea and implications of insight might be expressed according to viewpoints: Grasping about objects or occasions or general climate, Discernment and resulting acknowledgment of the significance of objects, Thought or Thinking process, Thinking or reasoning, and understanding, Initiator of emotions.

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Memory

Memory is the capacity to hold data as mental impressions in the cerebrum. Current ideas of memory account for four various types of recollections: brief, restricted, unpredictable transient memory, and extremely durable long-haul recollections (Barnes and Olson, 1985) indicated, memory doesn't go about as a unitary entire, it is a progression of three separate elements: tangible register, transient memory, and long haul memory. Short-term sensory memory fills in as a passing assortment of tangible information. As indicated by assumption, a person has practically zero influence over tactile memory but focuses better on an environmental channel. Short-term memory is poor for monitoring data and is more delicate or unpredictable than long-haul memory. Individuals have some control over STM and can keep up with data by gathering data, making things unmistakable, and practicing (Barnes and Olson, 1985) gives details about long-term memory which stores information in semantic, visual, auditory, and unique forms. It has a vast capacity and is relatively permanent. To effectively manage long-term memory, humans encode information with rich meanings, make connections between pieces of information, and pay close attention to details that may otherwise go unnoticed.

Reasoning

Reasoning can be characterized as the act of revelation or plan through the activity of intelligent ideas. Comprehension of human Reasoning design is critical to making the framework plan more consistent and user-focused. Laid-out models of thinking or independent direction have been created using rationale. The reasoning is additionally critical to cause impact connections. For instance, if users or consumers select a specific item with specific plan credits, creators might presume that plan highlights are the justification for determining that item. A short portrayal and illustration of four various types of reasoning will make sense of how humans put intelligent ideas into their practice (Faw, 2003).

Deduction

Deduction is a logical process that involves drawing a conclusion from given premises. If the premises are true and the deduction process is valid, the conclusion must also be true. Therefore, deduction provides decisive proof of the truth of its conclusion, given the truth of its premises (Kennedy and Thornberg, 2018).

Induction

Induction is the most common way of making an inferential determination from perceptions ordinarily, of the structure that every one of them noticed individuals from a class characterized by having property A have property B. The exemplary model is that of establishing that since all swans one has noticed are white that hence, all swans are white (Kennedy and Thornberg, 2018).

Abduction

Abduction is a relatively recent form of reasoning that involves inferring a likely explanation for a given observation or phenomenon. Charles Sanders Peirce coined the term "abduction" to describe the process of forming a hypothesis based on the goal of the observed phenomenon. For example, if one observes wet grass, they may abduce the hypothesis that it rained recently, as this is a likely explanation for the wetness of the grass (Kennedy and Thornberg, 2018).

Innoduction

Innoduction involves making logical connections between different categories or groups of things, such as general properties or laws, in order to make predictions about how new devices or products will behave. This is particularly important for designers who need to understand which product features will be useful to users before incorporating them into the final product (Kennedy and Thornberg, 2018).

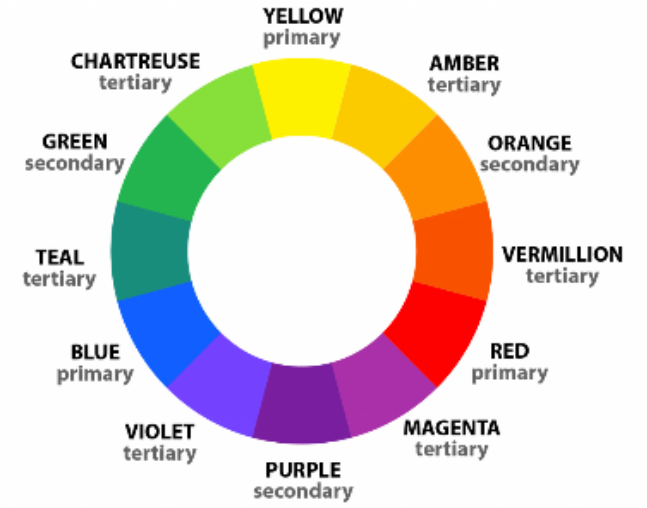

Figure 1. The color wheel is a circular chart that illustrates the relationships between primary, secondary, and tertiary colors. It is commonly used in design, art, and other creative fields to create harmonious color schemes, and to help identify complementary and analogous color combinations (Adapted from Alfenas et al., 2019)

Color

Color is the primary characteristic of visible light that allows humans to distinguish between different types of light. It is a subjective property, and cannot be determined solely by measuring a specific physical property of the light. Colors have always had a significant

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impact on human emotions, moods, perceptions, sensations, and cognition since they were recognized by ancient civilizations such as the Indians, Chinese, and Egyptians as a therapeutic substance.

Understanding Primary, Secondary, and Tertiary Colors in Color Theory

From the figure 2 below, we can understand the primary, secondary and tertiary colors.

Figure 2. The primary colors are red, blue, and yellow. These colors are considered primary because they cannot be created by mixing other colors together. They are the building blocks of all other colors (Adapted from Shah, 2021)

Color theory and color wheel

A color wheel, which includes the colors red, yellow, and blue, is commonly used in art and design. Sir Isaac Newton first created a circular diagram of colors in 1666. Since then, experts and designers have studied and arranged different colors and shades of this concept. There are varying opinions on the accuracy of one arrangement over another, leading to on-going discussion (Parkhurst and Feller, 1982). In reality, any color wheel that presents a well-organized progression of pure tones and hues has value, as can be seen in Figure 1.

Primary Colors

Blue, red, and yellow, in standard color theory, Primary colors are the three colors that can't be mixed or outlined by any blend of various colors. Any excess colors are gotten from these three shades (Shah, 2021).

Secondary Colors

These are color blends made by the equivalent combination of two essential colors. As per the customary color wheel, red and yellow become orange, red and blue become purple, and blue and yellow become green. On the color wheel, optional colors are situated between essential colors (Shah, 2021).

Tertiary Colors

The mix of primary and secondary colors become tertiary or moderate colors, because of their compound nature. Blue-violet, blue-green, red-violet, red-orange, yellow-green, and yellow-orange are color blends we can make from color blending (Shah, 2021).

Color Harmony

Color harmony in visual experiences refers to a pleasing arrangement of elements that creates a sense of balance and appeal to the viewer. This can include using color, shape, and composition to create a cohesive and visually satisfying image. When there is a lack of harmony, the result can be uninteresting, confusing, disorganized, and overwhelming to the viewer. The human brain seeks out and responds positively to visual experiences that are well-organized and easy to understand while rejecting those that are confusing or overwhelming. To create a visually pleasing experience, it is important to consider using color, composition, and other elements to create a sense of harmony and visual interest (Odabaşıoğlu and Olguntürk, 2020).

Six types of color harmonies are given below:

Complementary colors

Complementary colors are pairs of colors that are located opposite each other on the color wheel. These colors can be employed by artists and designers to produce a composition that is both visually appealing and well-balanced. When complementary colors are combined, they can make each other appear more vibrant and can be mixed to create a neutral color that is pleasing to the eye (Pridmore, 2021), as shown in figure 3.

Split-complementary

Split-complementary is a color conspire in which one essential color and two optional colors are utilized. Rather than utilizing a reciprocal color, two colors put evenly around it on the color wheel are utilized. The main

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color is the primary one and should be used as the foundation, while additional colors can be used for highlighting specific features or accents. This is illustrated in figure 4.

Figure 3. Complementary colors are pairs of colors that are opposite each other on the color wheel, such as red and green, blue and orange, or yellow and purple. When used together, complementary colors create high contrast and can make each other appear more vibrant (Adapted from Pridmore, 2021)

Figure 4. Split-complementary colors are a variation of complementary colors that use a base color and the two colors adjacent to its complement. For example, if the base color is blue, the split-complementary colors would be yellow-orange and red-orange (Adapted from Pridmore, 2021)

Figure 5. Analogous colors are colors that are next to each other on the color wheel, such as red, orange, and yellow or blue, green, and yellow-green. Analogous color schemes create a sense of harmony and can be pleasing to the eye (Adapted from Pridmore, 2021)

Analogous colors

Analogous colors are gatherings of three colors that are close to one another on the colors wheel tertiary. For example, green, green/blue, blue, and blue/violet, as given below in Figure 5. The word adjust means to be undifferentiated from, or to adjust to, something specific. This one-color uniform design makes a rich, monochromatic impact.

lively color palette regardless of which particular colors are used. For example, blue, yellow, and red which are shown below in the figure 6. Harmony of these colors has the tenacity to look vibrant. To be effective, this trick color harmony proves to be well-balanced for an artist and a designer (Hu et al., 2014)

Tetradic color

Tetradic color harmony is a set of complementary colors where we get to see the use of a combination of four colors, which are complementary colors, these colors form a rectangular shape on the color wheel. It has one base color and three other colors, which are equal to the base color. For citation, their colors are purple, yellow, red-orange and blue-green (Hu et al., 2014), shown in figure 7.

Figure 6. Triadic color: Refers to a color scheme that uses three colors that are evenly spaced on the color wheel, creating a vibrant and balanced contrast between them (Adapted from Hu et al., 2014)

Figure 7. Tetradic color: Refers to a color scheme that uses four colors, consisting of two complementary pairs, creating a high-contrast and complex composition (Adapted from Hu et al., 2014)

Figure 8. Monochromatic color harmony: Refers to a color scheme that uses different shades, tints, and tones of the same color, creating a harmonious and serene effect (Adapted from Hu et al., 2014)

Figure 9. Hue: Refers to a property of color that distinguishes one color from another, based on its position on the color wheel, ranging from red to violet, with all hues having a different wavelength and saturation (Adapted from Hu et al., 2014)

Triadic color

One dominant color, with the other two evenly spaced colors serving as accents termed as triadic color. Triadic colors stand out from one another and make for a vibrant,

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Monochromatic color harmony

Monochromatic color harmony colors use shades, shades, and tones of the same color. It can be other colors and shades derived from the same color family. The colors for the example as shown in figure 8. Monochromatic color harmony involves integrating colors, tones and shades of a similar color family with greys, whites as well as blacks to add depth and variation (Hu et al., 2014).

Figure 10. Tint is a color that has been lightened by adding white to it, resulting in a pastel-like hue that is less saturated than the original color (Adapted from Kholmuratovich et al., 2020)

Hue

Hue an equivalent word for color. Red, for instance, is a different shade in comparison to blue, yellow, orange, and so on (Hu et al., 2014), as shown in figure 9.

Tint

Color is a combination of a color with white, which increments softness, while a shade is a blend with dark, which increments haziness (Kholmuratovich et al., 2020) as shown in figure 10.

Figure 12. Depicts a color's tone or brightness level, which is an essential aspect of color theory (Adaptad from Sakai and Nayatani, 2007)

Shade

Color is a combination of a any color with white, which increments gentility, while a shade is a blend with dark, which increments dimness or darkness. The two cycles influence the subsequent color combination's relative saturation or immersion (Kholmuratovich et al., 2020) as shown in figure 11.

Tone

Tone is a shade or combination of unadulterated colors to which just unadulterated grey is added (equivalent measures of highly contrasting). Adding grey to a color will make the power a lot duller. Be careful with blending an excess of grey into a shade as it can become over-dulled and, for all intents and purposes, difficult to reestablish the splendor (Sakai and Nayatani, 2007) as shown in figure 12.

Full Chroma

The most outrageous tones are found on the outside edge or edge of the color wheel (Sakai and Nayatani, 2007) as shown in figure 13.

Chroma

Figure 11. Shade is a color that has been darkened by adding black to it, resulting in a deeper, more muted tone that is less vibrant than the original color (Adapted from Kholmuratovich et al., 2020)

Chroma refers to the purity or saturation of a color. It is a measure of how distinct a color is compared to its closest neighbor on the color wheel. Chroma can also be referred to as immersion or color intensity (Guilford, 1934), as shown in figure 14.

Complementary Colors

Colors that converse with each other on the color wheel. Blending two correlative colors produce tones. An equivalent combination of two full chroma supplements produces centre grey (Guilford, 1934), as shown in figure 15.

Figure 13. Illustrates the full chroma or saturation of a color, which refers to its intensity or purity (Sakai and Nayatani, 2007)

Value

The value, likewise called delicacy or radiance of a color is a proportion of how light or dim a color is while its shade is held steady. The gentility of an item relies upon the reflectance of that object (Meier et al., 2004) as shown in figure 16.

Saturation

Saturation is the property that recognizes red from pink. It is said to depict the “purity” of the color (Meier et al., 2004) as shown in figure 17.

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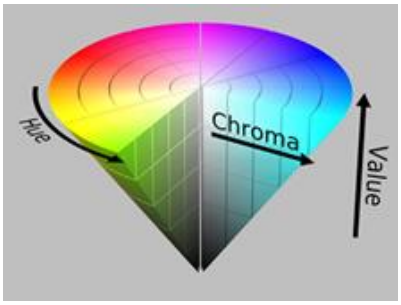

Figure 14. Chroma refers to the intensity, purity, or saturation of a color. In color theory, a color's chroma can be altered by adding white, black, gray, or another hue (Adapted from Guilford, 1934)

Figure 16. Likely displays a range of colors arranged by their values from lightest to darkest. In color theory, value refers to the relative lightness or darkness of a color, with white being the lightest value and black being the darkest value (Adapted from Manav, B. 2007)

Figure 18. Halation is a visual phenomenon that occurs when a bright color seems to bleed or glow around its edges, causing it to appear larger or more diffuse than it actually is (Adapted from Plutino et al., 2022)

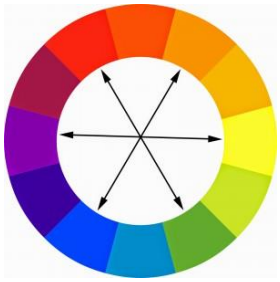

Figure 15. Complementary colors are pairs of colors that are opposite each other on the color wheel. When placed together, they create a high-contrast, vibrant effect, and can be used to create visual interest and balance in a composition (Adapted from Guilford, 1934)

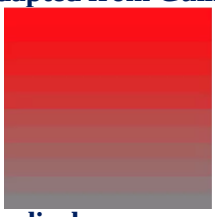

Figure 17. May display a range of colors with varying levels of saturation, with highly saturated colors on one end and desaturated colors on the other. Saturation, on the other hand, refers to the intensity or purity of a color, with highly saturated colors appearing bright and vivid, and desaturated colors appearing more muted (Adapted from Manav, B. 2007)

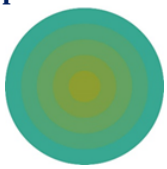

Figure 19. Vanishing, also known as desaturation, is the gradual fading of a color towards a neutral gray, eventually disappearing altogether as it approaches absolute black or white (Adapted from Plutino et al., 2022)

Halation

A visual deception of color or potential esteem radiances is delivered when a combination of two values or colors is set between and nearby its folks (Plutino et al., 2022) as shown in figure 18.

Vanishing

The vanishing limit portrays the visual peculiarity where two colors of equivalent value and comparative tone are viewed as solitary when seen from a predefined distance. This third tone colors up more iridescent than both of the tints in another unique circumstance (Plutino et al., 2022) as shown in figure 19.

Color psychology is the study of how colors affect human behavior and emotions. It is closely related to cognitive design, which uses psychological and neuroscientific principles in the design of technology, environments, user interface and products. Together, color psychology and cognitive design can be used to create effective and engaging user experiences. Popular opinion abounds on the nature of colors, their affiliations, and their perceived effects on our emotions, aesthetic judgments, and beyond. A lot of logical examination has been finished on numerous parts of color. Still, surprisingly, there is no nearly powerful, advanced study on the final products of color discernment on psychological working or functioning in people (Elliot and Maier, 2014). To understand how the effects of color work on human psychology, we can see in figure 20 that when a colored light or light reflects on a colored surface or object and falls on our eyes after our brain generates some emotions and feelings about that colour how color psychology.

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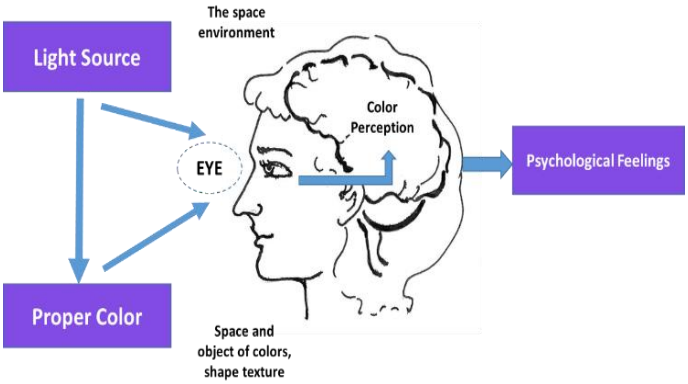

Figure 20. Color psychology showing light source, psychological perception, and proper color (Adapted from Li and Shi, 2014)

(a) Blue: Transmits a sense of positivity, confidence, calm, and security. It is often used in commercial and trade, such as financial organizations and workplaces. **(b) Yellow:** It is often utilized in business spots or eateries to draw the consideration of pedestrians as portends optimism, curiosity, enlightenment, sunshine, and creativity. **(c) Red Color:** This color represents energy, enthusiasm, and impulsiveness. Hence, it is routinely utilized in business places, such as stores or fast food outlets, as it depicts a certain imperative and desire of the consumer **(d) Orange:** The consequence of a blend of yellow and red, orange oozes a thought of force, innovativeness, excitement, and warmth. It is often utilized in imaginative conditions, like workplaces, studios, and schools. When used with the color blue, it conveys impulsiveness and the ability to believe and is thus adopted by banking organizations and workplaces. The application of color in space to human psychology evolved from the health theory of ancient India, which could invigorate the body's inward energy by utilizing color to accomplish the motivation behind changing and keeping a good overall arrangement.

Particularly if the use of interior and exterior paint in the medical field can create positive psychological feelings when patients enter hospitals, which help to reduce discomfort in the space (Li et al., 2014). The consequences of present-day scientific exploration show that the psychological framework is shaped mostly by the view of an outside picture by the visual perception arrangement of individuals. As everybody knows, color has three essential components: purity, hue, and lightness (Li et al., 2014). These three elements have different effects on psychology, so which color components affect the mental feelings of individuals in the public sphere, which needs to be studied properly. Patients are often more stressed out in public spaces than in medical spaces, so colors that demonstrate exhausting and negative responsiveness are normal to numerous public are not satisfactory to utilize. For instance, albeit a lighter shade of white might achieve a spotless inclination in individuals, it can make a feeling of misery when the clinical field takes on white to apply to a bigger region of the clinical field). However, organized methodology and advanced color schemes can lead to the successful use of colors (Takahashi and Kawabata, 2018; Takei and Imaizumi, 2022) argues that just as one would not begin building construction without construction drawings and plans, similarly, one should not begin working on colors in spaces without careful planning.

Discussion

This study has observed that the relationship between color and instinctive place and the psychological understanding of people in coping with many life challenges has not been properly studied. It shows that very few authors have expressed the techniques being promoted for "fitness of the mind and feeling comfortable in the environment". But research between color psychology and visual comfort, providing an aesthetically pleasing environment for users using colors in public spaces, has not been studied as per the requirement of present days. It has also been observed that colorful and interesting environments reduce negative emotions and stress levels and increase visual comfort not studied in detail at the level of Men, Women, and Children of different places /groups. A study also needs to show the use of colors and environments to treat human behavioral disturbances, feelings of anxiety, and restlessness in the space environment. This study was made with the view of the following four points:

- The relationship between color and instinctive place and the psychological understanding of people in coping with many life challenges
- The techniques being promoted for "fitness of the mind and feeling comfortable in the environment".
- Colorful and interesting environments work to reduce negative emotions and stress levels and increase visual comfort at the level of Men, Women, and Children of different places /groups.
- The use of colors and environments to treat human behavioral disturbances, feelings of anxiety, and restlessness in the space environment.

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Conclusions

The relationship between color and instinctive place and the psychological understanding of people in coping with many life challenges has not been properly studied. It is thus necessary to triangulate the evidence to uncover the relationship between behavioral components from color applications in existing space. Several techniques are being promoted for the fitness of the mind and feeling comfortable in the environment. Although there are gaps and weaknesses in the research between color psychology and visual comfort, it is possible to provide an aesthetically pleasing environment for users by using colors in places such as hospitals, public libraries, colleges, etc. By planning the color application design in this way, we can reduce people's restlessness, behaviour stress, anxiety, and visual discomfort. Children know less about structures, yet they comprehend all the colored objects more without any problem. This implies that establishing conditions with fitting colors in children's healthcare or schools environment is particularly significant. Such an environment shouldn't simply be fascinating to the children yet ought to likewise be made on their scale as children frequently experience dread and fatigue in many spots. Colorful and fascinating environments work to diminish pessimistic feelings and anxiety and increment visual solace which is yet to be appropriately considered. Numerous literature reviews indicate that drugs and psychotherapy have been used to treat human behavioral disturbances, feelings of anxiety, and restlessness in the space environment. But the use of colors has less to do with non-pharmacological practices that benefit people with stress-related behaviors and who feel uncomfortable in environments because of the visual effects. Therefore, there is a need to enhance the nature of the environment through color application in the existing space.

Conflict of interest

None

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