



## Psychological Color and Texture in Marketing and Textile Printing Design

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### Abstract

Since the beginning of the 21st century, there has been a surge in interest in color research (and in sensory marketing in general). In addition to discussing emerging color research contained in this special issue, this article also provides a discussion of theoretical frameworks for understanding color and provides technical guidelines for creating color stimuli. This research focuses on the importance of colors and their impact on design and marketing in general and the design of textile printing in particular so that we increase customers' appetite for the product and study colors, tines, tones, shades, and wheel colors. We will not forget the role of texture in the design as it adds an aesthetic value to the design and upgrades it.

**Keywords:** Psychological Color, Texture, Marketing, and Textile Printing

### Introduction

Interest in color's effect on consumer behavior has soared over the last two decades. While important theoretical and empirical advances have been made, arguably, we still have a very elementary understanding of color's role in marketing. Furthermore, given the complexity of color perception, researchers in this area should be cautious of potential challenges and pitfalls when developing color stimuli and conducting subsequent research. To these points, this article provides a brief overview of color theories related to marketing and psychology and discusses the complexities of conducting rigorous color research, including issues of measurement and stimuli development.

### Color Types

#### Primary Colors

The basic colors are red, yellow, and blue, such as those you usually see in children's toys. These colors are the basis of all other colors and are found in the basic elements around man: fire, water, and sun.

Red is directly linked to strong feelings, stimulates mobility, and can also lead to emotional and psychological changes and affect customers' decisions.

Yellow is the color of happiness, brightness, and opportunity, and can send determination and attention, prompting customers to buy.

Blue is the color of peace. Customers usually trust products that use blue as it suggests credibility and maturity. [1, 2]



#### Secondary Colors

The secondary colors are orange, green, and violet. Orange is a combination of red and yellow,

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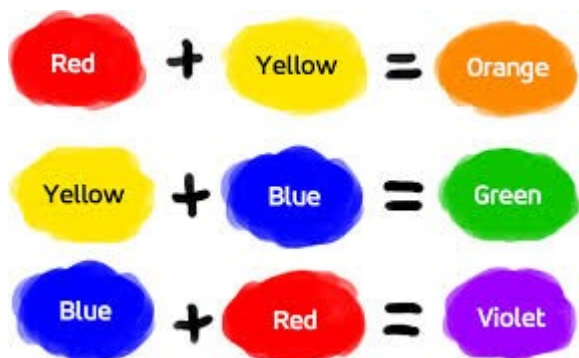
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combining red enthusiasm with yellow optimism; To eventually create a sense of courage and positive feelings. What everyone is looking for as they build brands in any field?

Green is a blend of blue and yellow, which is nature's color. Green is fresh and comfortable in nature and is known as the color of growth, simplicity, and good luck.

Customers may get a sense of generosity and recovery from green when they see it in the propaganda logo and visual identity, and even in the brand's location.

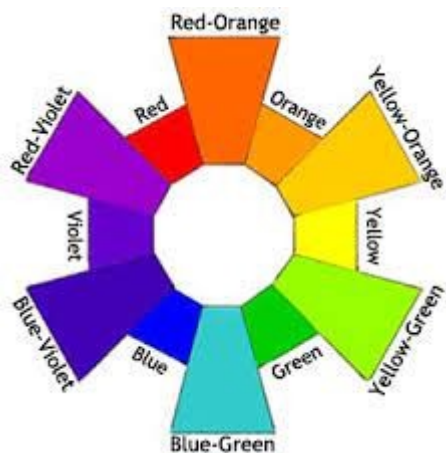
Finally, the psychological color is a combination of red and blue. Violet is known in the world of color the color of magic and luxury. It creates elegance, imagination, and wisdom, and airs in the same customer a sense of the brand's ability to fulfill its promise and deliver its highest quality exhibits. [1, 2]



**Tertiary Colors**

Over-secondary colors are an equal mix of basic and secondary colors.

For example, watercolor, or what is known as Aqua is a combination of green and blue. Purple is a combination of violet and red, and amber is a combination of orange and yellow.



The value of this type of color in marketing is to give the brand a deeper and more diverse category

while maintaining the harmony and coherence of its visual identity. [1, 2]

**Color connotations**

Its meaning is that there is another color classification based on its connotations and meanings, which is divided into

1. Warm colors and cool colors Holmes, Kevin J., and Terry Regier. "Categorical perception beyond the basic level: The case of warm and cool colors." *Cognitive science* 41.4 (2017): 1135-1147.



**Warm Colors**

Warm colors include the following colors: red, orange, yellow, and shades, as these are the colors of fire, autumn leaves, sunset, and sunrise, which are generally colors that indicate activism, emotion, positivity, happiness, and enthusiasm. Warm colors are the result of mixing warm colors with a few. Red and yellow are basic colors. When combined, they produce orange, which means warm colors originate from warm colors only, and cannot be obtained by blending warm and cold colors. [2]

**Colors Cold**

Cold colors include the following colors: green, blue, and violet, and these colors are often more subdued than warm colors, as these colors express night, water, and nature, and generally indicate calm and relaxation.

It should be noted that blue is the only basic color in cold colors, which means that other colors are created by combining blue with warm colors. For example, green produces blue and yellow mixing, while violet produces blue and red mixing; So green gains some features of yellow, and violet takes some features of red. [2, 3]

**Tints & Shades & Tones**

These three are the result of adding white, black, or grey; to create additional options and more diverse supplements to the brand identity.

- Tints: It is the result of adding white color to colors, creating a lighter color and thus reducing the darkness, intensity of colors, and the feeling it sends.
- Shades: Shades are the result of adding black color to color; to create a darker color and thus reduce glitter and increase density.
- Tones: Tones are the result of the addition of grey color to ma color, which is originally a mix of black and white. This increases or reduces the brightness and intensity of colors based on the ratio of black to the ratio of white color in the grey used. [4]

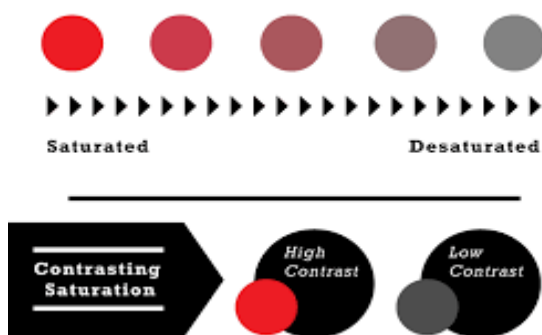


**Colors with high or low contrast**

Many aspects of color theory are associated with the issue of color variation. Contrast is the difference that can be observed in converging colors.

Using variation in brand building and marketing will enable you to distinguish and highlight your company from competitors, and make it more noticeable and visible for all those looking for others.

Many companies use this kind of color variation, headed by FedEx. There are not many who dare to use orange and violet in a single design space. But this combination was, like, very effective for this company. [5]



**The connection of colors to our lives**

greatly affects our psychology and how we feel s tendencies and desires, and may also be used in treatment for example, people who are depressed are advised to focus on wearing light colors, The dark colors avoided a significant effect on mood modification. On the other hand, colors are closely

related to the home design process, some colors are preferred to be used in bedrooms as red; Because it symbolizes vitality and love, there are colors suitable for schools and work offices such as blue; Because blue may encourage creative thinking, creativity, and other colors, as relied upon in TV ads to attract the viewer's attention, one example is that product owners use violet to promote their new goods; Because it signifies change, weirdness and excellence. The connection of colors to our lives greatly affects our psychology and how we feel s tendencies and desires, and may also be used in treatment For example, people who are depressed are advised to focus on wearing light colors, The dark colors avoided having a significant effect on mood modification and the other hand colors are closely related to the home design process, some colors are preferred to be used in bedrooms as red; Because it symbolizes vitality and love, there are colors suitable for schools and work offices such as blue; Because blue may encourage creative thinking, creativity, and other colors, as relied upon in TV ads to attract the viewer's attention, one example is that product owners use violet to promote their new goods; Because it signifies change and weirdness and excellence. [6]

**Technical Guidelines For Color Research**

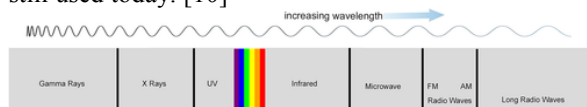
In general, color research is complex because of challenges in accurate measurement and stimuli development, in addition to some conceptual confusion. There are multiple standards for conceptualizing and creating color because there are different ways to produce color. Having a conceptual and technical understanding of color is essential for researchers both conducting and evaluating color research. This includes understanding and controlling for the three dimensions of color (hue, saturation, and value), as well as understanding color models (red, green, blue [RGB] vs. cyan, magenta, yellow, and key [CMYK]), and gamut, which will be discussed next in this article. [7]

**The three dimensions of color: Hue, saturation, and value**

Understanding color's three dimensions (hue, saturation, and value) is key to conducting rigorous color research. Many researchers new to this area tend to focus on hue without considering the two other dimensions of color, saturation, and value. Yet both of these dimensions are just as important, if not more so, than hue, [8] Moreover, when research lacks experimental controls for these dimensions the results become questionable and replication becomes nearly impossible.

Hue is what most people think of when using the term "color" (red, orange, yellow, green, blue, violet). Hue is the spectral wavelength composition of color; each color of the rainbow corresponds to a

different visible wavelength of the electromagnetic spectrum. Violet has the shortest wavelength, at around 380 nm, and red has the longest wavelength, at around 700 nm. [9]. During an experiment in 1665, Sir Isaac Newton used a prism to bend the visible light spectrum, revealing that colors refract at a slightly different angle depending on the wavelength of the color. This experiment laid the foundation for the color wheel, a visual representation of spectral colors and their relationships to one another (primary, secondary, complementary, and analogous) that is still used today. [10]



The visible spectrum within the electromagnetic spectrum

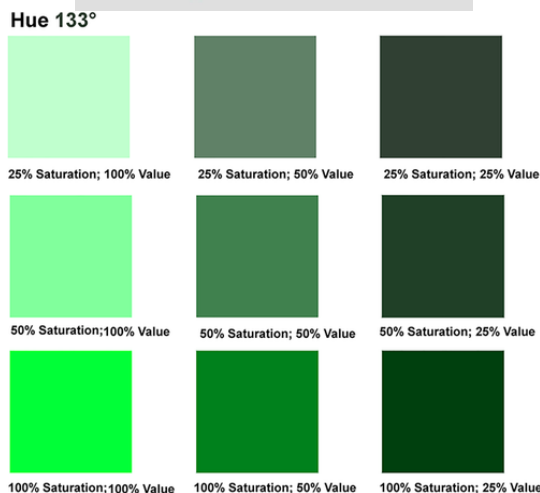
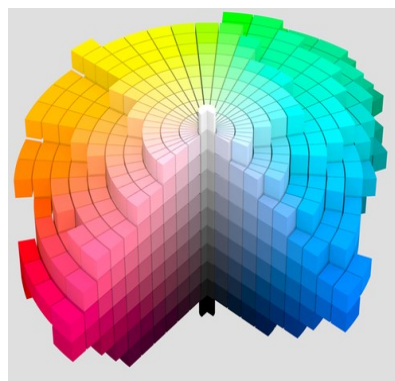
Value refers to the relative lightness or darkness of a color. Lightness, brightness, and luminosity are other commonly used terms used to describe this dimension, although some terms differ slightly in their conceptualization. In simple terms, value can be described as the amount of white (vs. black) appearing in a color.

Saturation corresponds to the degree of intensity, richness, strength, or purity of a color. Chroma is another commonly used term to describe this dimension, although these terms are technically different, but are related. [10] It should be noted that different hues vary in terms of their maximum saturation; that is, some hues have a higher upper limit saturation than others. This difference is shown visibly in the Munsell color system. In simple terms, as a color's saturation increases, its appearance becomes more pure or intense; as the saturation decreases, the color's appearance begins to look pale or washed out. [11]

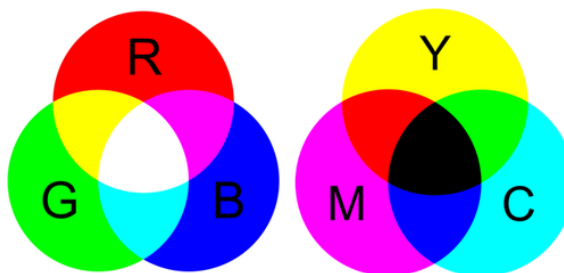
To effectively specify and produce color, marketers also need to understand the differences between additive and subtractive color models. Color models are determined by the medium; the additive model is used in digital mediums (television, computer screens), while the subtractive model is used in non-digital mediums (paint, print). [11]

Additive color models involve mixing light emitted directly from a source (e.g., television, computer monitors, projectors) and creating colors through a process that adds one set of wavelengths to another set of wavelengths. Red, green, and blue are the primary colors in additive color models; secondary colors are created by mixing various amounts of these three primary colors to produce other colors; combining all three primary colors produces white. For example, computer monitors contain pixels to project color light; each pixel on a screen starts as black and when all three phosphors (red, green, blue) of a pixel are illuminated

simultaneously then that pixel becomes white. When conducting research using computer screens, researchers are using an additive color model, RGB. Therefore, when conducting this type of research, color stimuli should be designed in an RGB color space and the associated RGB color values should be reported. [12]



Additive versus subtractive color models

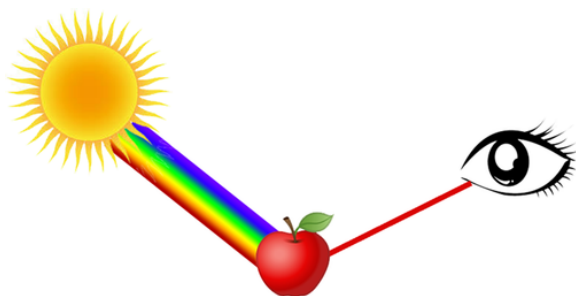


CMYK = cyan, magenta, yellow, and key (black);  
 RGB = red, green, blue [Color figure can be

Subtractive color models create color by absorbing (subtracting) certain wavelengths of color while reflecting other wavelengths to the viewer. The color we perceived from printed media (e.g., photographs, magazines) and natural objects is created through the subtractive color model. For example, a red apple absorbs all other wavelengths of light except for red. The red wavelength is not absorbed and therefore is reflected from the apple to



our eyes which sends signals to the brain to process the color. If an object absorbs (subtracts) all the light illuminating it then no light is reflected to the viewer and the object appears black. Color printing processes, paints, and dyes all use the subtractive process to reproduce color. Researchers conducting research with printed stimuli are using a subtractive color model. When conducting this type of research, color stimuli should be designed in CMYK color space and associated CMYK color values should be reported. [13]



### What is color psychology?

Color psychology is a scientific field that studies the impact of colors on humans and how to influence them. This science is interested in researching the impact that colors have on the external and internal sensations of man, as well as their influence on mood and behavior. [14]

Colors have a great impact on human beings, which leads to colors being important in several areas, such as design, publicity, and media. The psychology of colors is widely used in the design of the view and products, and in the identification of the colors of the latest products to encourage their purchase.

For example, color psychology considers that blue indicates safety, and that green refers to health and nature. Thus, blue is usually used in professional ocean design quiet, and green indicates health in kitchens or on farms.

### Concept of color psychology

Color psychology: a division of psychology and commerce that studies the impact of colors on human beings and consumer experience. Researchers in this field analyze the relationship between colors based on human vision, feeling, health, and their impact on design and marketing. [15]

Colors affect human beings on various stamps, whether in social and psychological feelings or health. Bright and vital colors, such as green and blue, can affect positivity and radiation, while dark and sad colors, such as black and grey, can lead to negative moods.

Therefore, color psychology plays an important role in the design of products and services, both in the healthy food industry and natural products, and in

the industry of brands, advertising, electronic pages, and media.

### Color Marketing

Colors in marketing are used to influence consumer behavior and determine the proven effect on product feeling. If colors are correctly selected, it can lead to increased interest and notification of the product and increase its positivity. [16]

In addition, colors can be used in marketing for active and distinctive brand identification. For example, some major companies have colors representing their brand that form part of the business identity and impact.

Color science or psychology is a field of psychology and design that studies the effect of colors on psychology and sensations. This effect is different from one person to another and depends on many factors, such as background, experience, culture, and the surroundings of the person around it.

Study the science of colors and their different theories and how color affects a person and how colors can be better used to influence a person. Color science also includes studying the psychological and background effects of colors and how they can be modified.

It is used in many fields, such as design, marketing, media, radiological media, industry, health, and economy. In addition, colorology is used to familiarize itself with landscapes and civics and how color affects people's emotions and feelings of view

We can say that colors have a great impact on the world of marketing and can give an identity to a brand or be influenced by people's feelings and claims. Therefore, companies must be aware of the impact of colors and determine the correct colors for their brand identity. [17]

Colors play a prominent role in the marketing world and can affect perceptions and feelings that people have about brands. Companies use colors extensively to identify their brand identity and determine the ticket in people.

Colors have an important role to play in brands. Colors are a source of talk and reference to a particular brand and can refer to trademark characteristics or services.

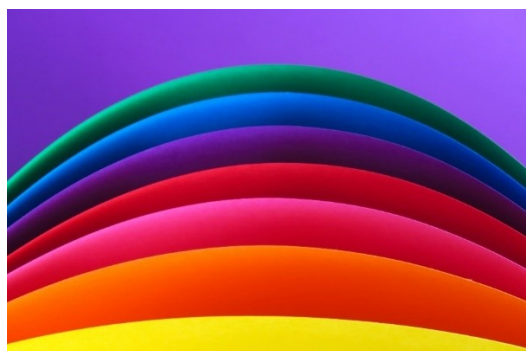
It should also be of necessary importance to ensure that colors used for a brand are different from those used by other companies in the same field, to ensure that the label is not similar, and to ascertain the identity of the label.

### The best color to attract customers

There is no single color that makes all customers affected by it only. The most influential colors on customers depend on several factors such as sex, age, culture, ethics, past marketing options, and others. [18]

However, some consider that some common colors make a global impact on customers:

1. Red: influences enthusiasm and excitement and is ideal for companies related to the food and media industries.
2. Blue: expresses safety and confidence and is ideal for medical and technological companies.
3. Green: expresses health and nature and is ideal for health and natural food companies.
4. Black: Expresses classicism and is ideal for companies related to fashion and international trade.
5. Yellow: It expresses security and creativity and is ideal for companies related to design, media, and consulting services. It also affects activity and vitality and increases excitement and construction.



Companies should make sure that the color they choose suits their customers' audiences and corresponds to their mission and business identity.

**The importance of colors in advertising**

Colors are a key element in creating an impact on customers and attracting their attention in advertising. Colors can indicate the self and inner spirit of the product or service, and affect the customer's external feelings and claims.

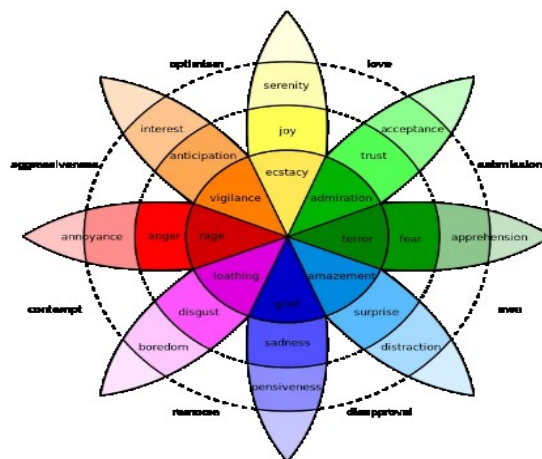
Some colors such as green express health and nature, and are suitable for health and sports companies. Blue expresses security and confidence and is suitable for companies related to financial services. Red expresses enthusiasm and excitement and is suitable for media and entertainment companies. [19]

**Color connotations in marketing (color psychology)**

When talking about the psychology of color in marketing and advertising, the first thing that comes to mind is green color, green color indicates harmony as well as balance, making that customer decide to buy as quickly as possible. [20]

**Summary of color theory in Design**

It is worth noting that color theory is very broad, and it needs a lot of study and depth. Masterful designers often study the psychology of color and its impact on feelings and blending in depth before starting to design their products. But in today's article, we gave you pen heads about the connotations of color in design and its meanings, which can be summarized below:



- Red: Danger, passion, excitement, and energy.
- Pink: femininity, emotions, romance, and enthusiasm.
- Orange: freshness, youth, creativity, adventure spirit.
- Yellow: optimism, happiness, fun.
- Green: nature, life, elegance, and wealth.
- Blue: communication, trust, calm, and depression (darker grades than blue).
- Violet: nobility, majesty, spirituality, and mystery.
- Brown: organic products, integration, simplicity, and honesty.
- White: purity, simplicity, innocence.
- Black: complexity, formal, uplifting, grief, or mourning.
- Multiple colors: union, openness difference, and diversity.

### The choice of colors in the design

varies viewers' response to the painting or design based on the strong effect of the colors used in it, which may vary from person to person, but the designer must be aware and knowledgeable; To use them correctly and effectively, there are special studies in psychology that demonstrate the impact of colors on one's feelings and their ability to drive one's emotions. Making it inclined to a specific design or color based on its own culture, personality, interests, and way of growing up which may cause a different effect from one person to another, but it does not deny that each color has a specific meaning symbolizing something. It promotes a special feeling that influences and enhances its responsiveness and acceptance of the design, And some important tips that help one choose the appropriate colors and prepare a distinctive design or art painting, namely choose the designer's palette or a range of colors that may notify, prefer and feel inspired and need to be used spontaneously or automatically. Identify the message to be delivered and translated through this design, and its main purpose, which guides the designer and helps him choose colors.

Take into account the design target category, which will be viewed, evaluated, or desired to be used; Each color has a special connotation as mentioned earlier, but these connotations differ in their response and impact based on personal preferences for the public, for example, as their culture, so that color may symbolize a specific emotion or feeling that varies in meaning and connotation in other peoples and races. The design is based on the color wheel that helps and facilitates color mixing and combining consistently, based on the color theory that explains the meaning of each color and shows it smoothly. Accept the idea of helping or receiving inspiration and support from another more experienced artist or designer, and take advantage of its efficiency and excellence for a more attractive and elegant design. Some dedicated design websites can also be used to help and do the job. [18]

### Texture (Visual Arts)

In the visual arts, texture is the realized surface quality of an artwork. It is an element of two-dimensional and three-dimensional design and has its perceived visual and physical properties. The use of texture, along with other design elements, can convey a variety of messages and emotions. [21]

### Natural texture

The bumpy texture of tactile paving.

Natural texture (also known as actual texture) are patterns of variations on a solid surface. This can include - but is not limited to - fur, wood grain, sand, soft surfaces for bats, metal, glass, and leather.

The natural texture itself differs from the visible texture by having a physical property that can be felt

by touching the textured surface. Specific use of fabric can affect the smoothness of artwork. For example, the use of coarse surfaces can be a visually effective factor, while smooth surfaces can be visually comfortable. Using both surfaces it is possible to personalize the design, or they are used to achieve concentration, rhythm, contrast, etc.

Light is an important factor in determining the physical fabric because it can affect the shape of the surface. Strong lights on a smooth surface can obscure the drawing ability or photograph, while they can create strong discrepancies in a highly mounted surface such as river rocks, sand, etc. [22]



### Visual texture

The visual texture or implicit fabric is the illusion of having a natural texture. Each material and each visible surface has its texture and must be taken into account before creating a configuration. As such, materials such as burlap and watercolor paper are much harsher than photo paper for a high-quality computer. They may not be more suitable for creating flat and smooth fabric. Photography, graphics, and visual contact paintings are used to represent their themes realistically as well as illustrate them. The fabric in these media is generally created by repeating the shape and line. Another example of visual texture is terrazzo or an image in the mirror. [22]





### Decorative texture

Ornate fabric "decorates the surface." Fabric is added to decorate the surface.



### Spontaneous texture

This focuses more on the process of visual creativity; Texture marks also work on creating shapes. These are often "accidental" shapes that create texture.



### Mechanical texture

It is the texture that is created by special mechanical means. Photography is an example. The granules and/or touches on the screen that are often found in printing create a touch on the surface. This

is also reflected by designs in printing and computer graphics. [23]



### hypertexture

Hypertrophic texture can be defined as "the real-life simulated surface fabric produced by adding small abnormalities across the body surface and as a way to describe the morphological nature of the liquid in the fabric of cyber graphics and the pathetic work created in the visual arts. [23]



### Texture Properties

- 1) The texture is directly related to the color and the example that the color itself can appear differently when it is moisturized, dry, soft, or rough, and the purpose of the texture is to give a real physical sense to used ores.
- 2) The texture of the design is realized by its diversity in the investment of various raw materials in its contours to find new artistic theses in its handling of the design surface. The designer-artist controls the calculation of its area, location, and color in the photographic space as required by his imagination and artistic vision.
- 3) The texture is varied only by functional connotation limits and is formed within the composition by mental formulations subject to practical logic. Color is also associated with the texture and visual characteristics of the material, and opaque and transparent or half-transparent contacts are different. Transparent glass is different in its texture than other semi-transparent glass.



- 4) The texture in the two-dimensional arts is related to visual perception and is not related to the sense of touch and we realize it as a result of the different surfaces of each other in terms of optical properties.
- 5) The texture in the design is not only related to the physical significance of the shape, it is also a means of expression of content and adds moral value to the design. [24]

### Importance of texture

The texture in the artwork may be of actual significance to a particular raw or may be a tradition of the desired material texture.

In two-dimensional designs, the texture is related to visual perception and is not linked to the sense of touch, and we understand it as a result of the different surfaces of each other's optical properties.

In 3D designs such as sculpture and architecture in 3D software, for example, the sense of visual perception is stronger and clearer than in 2D contacts.

It is clear to us that the texture of technical work is not only related to its material significance in form but also a means of expressing substance that adds moral value to technical work. [25]

### Future directions

The articles contained within this special issue offer advancement to our understanding of how color can impact consumers. Despite the increase in attention to color effects, there remain many opportunities for future researchers to explore. For instance, scant research has explored the cross-cultural effects of color; this remains an area that is ripe for research. Research on color and pricing effects can be expanded to explore how the different ways to display prices and discounts in conjunction with colors may impact consumer perceptions and choices. Additionally, research on the effects of color combinations explored by two papers in this special issue focus on hue effects, future research can explore similar versus complementary color combinations in terms of saturation and value.

Finally, the two articles that explore the use of color combinations bring up a phenomenon referred to as "Simultaneous Contrast," which may be an interesting avenue to explore. Simultaneous contrast refers to the way that colors can affect one another. This concept, which was first described by the French Chemist Chevreul, [26] is the basis for many color optical illusions and is still taught in modern color theory classes. Simultaneous Contrast describes how the same color may be perceived differently when placed adjacent to another color. That is, the colors interact and alter the perceptions of one another. For instance, placing a color next to a highly saturated color will reduce the perceived saturation of the color; while placing a color next to a low saturated color will increase the perceived saturation. The next

pic. provides an example of this phenomenon. In this figure, the interior green squares are the same color, but they appear to be different because of the background colors' saturation levels. These interactive effects of color are quite intriguing and offer another interesting avenue for future research.



### Conflicts of interest

There are no conflicts to declare

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There is no fund to declare

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## اللون النفسي والملمس في التسويق وتصميم طباعة المنسوجات

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### الملخص

منذ بداية القرن 21، كان هناك زيادة في الاهتمام بأبحاث الألوان (والتسويق الحسي بشكل عام). بالإضافة إلى مناقشة أبحاث الألوان الناشئة الواردة في هذا العدد الخاص ، تقدم هذه المقالة أيضا مناقشة للأطر النظرية لفهم اللون وتوفر إرشادات فنية لإنشاء محفزات اللون. يركز هذا البحث على أهمية الألوان وتأثيرها على التصميم والتسويق بشكل عام وتصميم طباعة المنسوجات بشكل خاص بحيث تزيد من إقبال العملاء على المنتج وندرس الألوان والأسنان والنغمات والظلال وألوان العجلات. لن ننسى دور الملمس في التصميم لأنه يضيف قيمة جمالية للتصميم ويقوم بتثقيته.

الكلمات الرئيسية: اللون النفسي والملمس والتسويق وطباعة المنسوجات