

# 25 Color and Cylinders

Wednesday, March 17, 2021 9:51 PM

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Today:

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Pantone <https://en.wikipedia.org/wiki/Pantone>

Additive/subtractive physics

Upright and Horizontal Cylinder sketching

## Summary

Both black and white signal timeless, high value, classy products

White effects: White = good, light. Timeless, high-value

Black effects: Black = serious, aggressive, threatening. Timeless, high-value

Red effects

Increases attractiveness of humans, but suppresses high level cognition.

Only wear red on weekends, unless negotiating.

## Universal Principles of Design

Where have you seen these effects? In small groups, list two examples for each of

### Black

Tech

Dark mode in UX

Cars

Easier on the eyes than white

### White

Plant pots in minimalist design

Use of limestone and marble in architecture

cars

### Red

Cars

Food

Stores: sale, lower prices Sales bargain fascists

Why does walmart go with blue?

Friendly? Symbiosis? Disarming? Unobjectionable, natural.

# Color

Color is used in design to attract attention, group elements, indicate meaning, and enhance aesthetics.

Color can **make designs more visually interesting and aesthetic**, and can reinforce the organization and meaning of elements in a design. **If applied improperly**, however, **color can seriously harm** the form and function of a design. The following guidelines address common issues regarding the use of color.<sup>1</sup>

## Number of Colors

Use color conservatively. Limit the palette to what the eye can process at one glance (about **five colors** depending on the complexity of the design). Do not use color as the only means to impart information since a significant portion of the population has limited color vision.

## Color Combinations

Achieve aesthetic color combinations by using **adjacent colors** on the color wheel (analogous), opposing colors on the color wheel (**complementary**), colors at the corners of a symmetrical polygon circumscribed in the color wheel (**triadic and quadratic**), or color combinations found in nature. Use **warmer colors for foreground** elements, and **cooler colors for background** elements. Light gray is a safe color to use for grouping elements without competing with other colors.

## Saturation

Use saturated colors (pure hues) when attracting attention is the priority. Use desaturated colors when performance and efficiency are the priority. Generally, desaturated, bright colors are perceived as friendly and professional; desaturated, dark colors are perceived as serious and professional; and saturated colors are perceived as more exciting and dynamic. Exercise caution when combining **saturated colors, as they can visually interfere with one another and increase eye fatigue.**

## Symbolism

There is **no substantive evidence supporting general effects of color on emotion or mood**. Similarly, there is **no universal symbolism for different colors**—different cultures attach different meanings to colors. Therefore, verify the meaning of colors and color combinations for a particular **target audience** prior to use.<sup>2</sup>

See also Expectation Effect, Highlighting, Interference Effects, Similarity, and Uniform Connectedness.

<sup>1</sup> A nice treatment of color theory is *Interaction of Color* by Josef Albers, Yale University Press, 1963. For a more applied treatment, see *The Art of Color: The Subjective Experience and Objective Rationale of Color* by Johannes Itten, John Wiley & Sons, 1997; and *Human-Computer Interaction* by Jenny Preece, et al., Addison Wesley, 1994.

<sup>2</sup> It is reasonable to assume that dark colors will make people sleepy, light colors will make people lively, and irritating colors will make people irritated. Otherwise, the only observable influence of color on behavior is its ability to lead people to repaint walls unnecessarily. For those determined to try to calm drunks and win football games through the application of color, see *The Power of Color* by Morton Walker, Avery Publishing, 1991.

According to the [Howard Hughes Medical Institute](#), about 3.7% or 12 million Americans are colorblind (7 percent of males, and 0.4 percent of females).

From <https://www.colorblindguide.com/post/colorblind-people-population-live-counter>

Girl-Boy Pink-Blue preferences are from cultural training. Pink used to be boy color before 1930s; from diluted blood (red was male color)

**Analogous**  
Analogous color combinations use colors that are next to each other on the color wheel.

**Triadic**  
Triadic color combinations use colors at the corners of an equilateral triangle circumscribed in the color wheel.

**Complementary**  
Complementary color combinations use two colors that are directly across from each other on the color wheel.

**Quadratic**  
Quadratic color combinations use colors at that corners of a square or rectangle circumscribed in the color wheel.

Hues from yellow to red-violet on the color wheel are warm. Hues from violet to green-yellow are cool.

Saturation refers to the amount of gray added to a hue. As saturation increases, the amount of gray decreases. Brightness refers to the amount of white added to a hue—as brightness increases, the amount of white increases.

*Handwritten notes:* + White, HUE, Black GRAY, Saturation (+), NO GRAY

⇒ HSB color space or Lightness

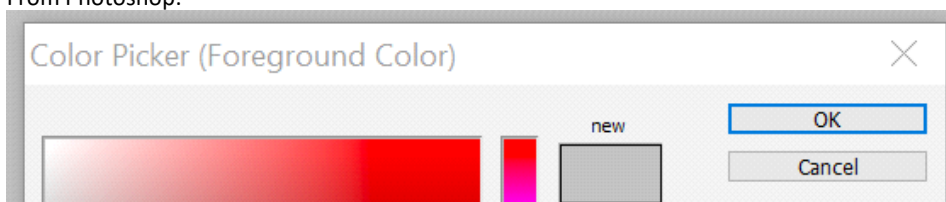
Hue  
saturation  
brightness

SRGB

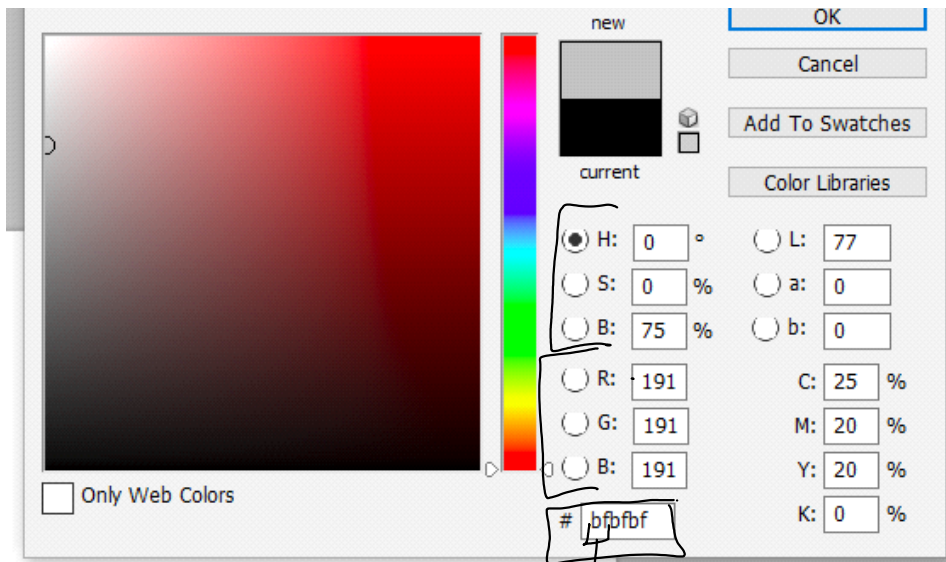
Color 49

**Color Nomenclature**

- Color space = method of defining a specific color.
- Gamut = Range of colors that can be produced by a technology
- Matching across devices, technologies = color management
- From Photoshop:



4 color spaces



4 color spaces: HSB, RGB, LAB, CMYK

L = black to white  
a = red to green  
b = blue to yellow

Printing  
Cyan  
Magenta  
Yellow  
black

R G B  
FF FFF F  
White

RGB in hexadecimal

2 bytes per 4 color spaces  
0 -> ABCDEF

00 FF  
dark - 255 Fully turned on

<http://colorizer.org/>

Shows conversion between many color spaces. Also shows complementary, triad, square etc. pairings

Another site for choosing palettes, from Olivia: <https://colors.co/>

Adobe Color - similar

Pantone <https://en.wikipedia.org/wiki/Pantone>

Another color nomenclature and color management system. Common in design world.

There are competing companies: Behr

Color of the Year

Since 2000,<sup>[18]</sup> the Pantone Color Institute declares a particular color "Color of the Year". Twice a year the company hosts, in a European capital, a secret meeting of representatives from various nations' color standards groups. After two days of presentations and debate, they choose a color for the following year; for example, the color for summer 2013 was chosen in London in the spring of 2012.<sup>[19]</sup> The color purportedly connects with the *zeitgeist*; for example, the press release declaring Honeysuckle the color of 2011 said "In times of stress, we need something to lift our spirits. Honeysuckle is a captivating, stimulating color that gets the adrenaline going – perfect to ward off the blues."<sup>[20]</sup> The results of the meeting are published in *Pantone View* (\$750), which fashion designers, florists, and many other consumer-oriented companies purchase to help guide their designs and planning for future products.

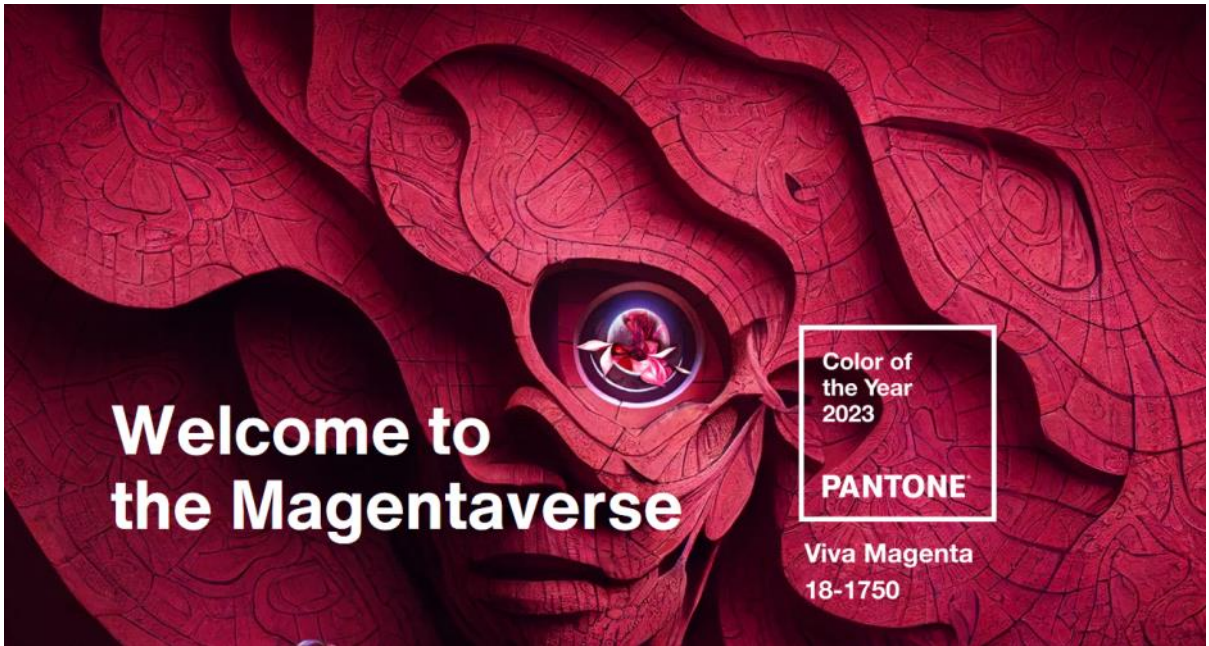
From <[https://en.wikipedia.org/wiki/Pantone#Pantone\\_Goe\\_System](https://en.wikipedia.org/wiki/Pantone#Pantone_Goe_System)>

Dye manufacturers prepare to sell quantities of the Color of the Year in advance, so products (plastics, textiles) are ready to sell.

<https://www.npr.org/2022/12/02/1140310663/pantone-color-year-viva-magenta>

"Three years deep into a pandemic, facing a war, an unstable economy, social unrest, supply chain breakdowns, and mounting climate change, we need to heal," it adds. "And still, we need to find the motivation to continue. Here, Viva Magenta cloaks us in both power and grace, and sends us out into the world with the verve we've yearned for."

From <<https://www.npr.org/2022/12/02/1140310663/pantone-color-year-viva-magenta>>



Accompanying palette



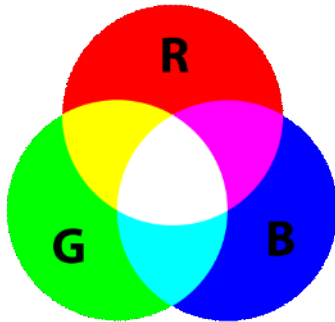
Prior years



In 2013 Subaru started offering a tangerine colored Crosstrek. No coincidence.

## Additive/subtractive color

Additive color = light.

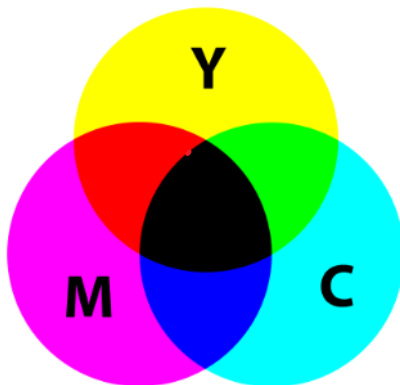


Computer screens, other light emitting sources

your eyes

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Subtractive color = surfaces; dyes, pigments, inks. All wavelengths are absorbed except the scattered ones.



WHITE LIGHT

BLUE

CMYK

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## Perception of Color

Classic text: Albers, Josef, and Nicholas Fox Weber. *Interaction of Color: 50th Anniversary Edition*. -50th Anniversary ed. edition. New Haven Connecticut: Yale University Press, 2013. First edition 1963. \$12 paperback

Much has been learned about the physiology of vision; active area of research.

Recommended: **Livingstone, Margaret, and David Hubel. *Vision and Art: The Biology of Seeing*. Reprint edition. Abrams, 2008. \$20 paperback.**

Topics:

- The eye and color vision
- Luminance and night vision
- Neural processing of color information
- Acuity and spatial resolution
- From 3-D to 2-D: Perspective, Shading and Chiaroscuro, Stereopsis

Illusions of motion  
Color mixing and color resolution  
Digital color

In the sun's spectrum, each color comes from photons of particular energy and wavelength.  
Humans only have sensors for a few colors; R,G,B, black and white. Yellow photons trigger our R and G receptors. Sensors are not narrow-band.

