

Color Schemes: Psychology and Science

Color is a universal communicator. It influences human thought processes, emotions and physical reactions. Adding color to your document or publication helps deliver your message with more punch and meaning.

Branding 7-Up: A Case Study

We all know 7-Up as *The Uncola*. It was dubbed that because it was the world's first clear cola — until it was marketed, all sodas except club soda had color.

7-Up offered a tangy, refreshing taste with the sparkle of carbonation. The packaging had to set up the expectation of something different and unique. Here is how the color palette — white, green and a spot of red — conveyed the message:

- The color *white* connotes purity, clarity and cleanliness.
- The color *green* is the color of nature.
- The color *red* is energetic and dynamic, and is also complementary to the color green, producing a tension between the two.

Putting these colors together painted a picture of what to expect when the beverage was poured from its container — a liquid as pure, clear and clean as the very best water, but with an unexpected taste tang. And the product delivers exactly as the color palette promised.

Using Color To Sell

As the 7-Up case study demonstrates, colors evoke specific reactions in people. Knowing what emotions are activated by colors will help you select colors based on the response you wish to generate.

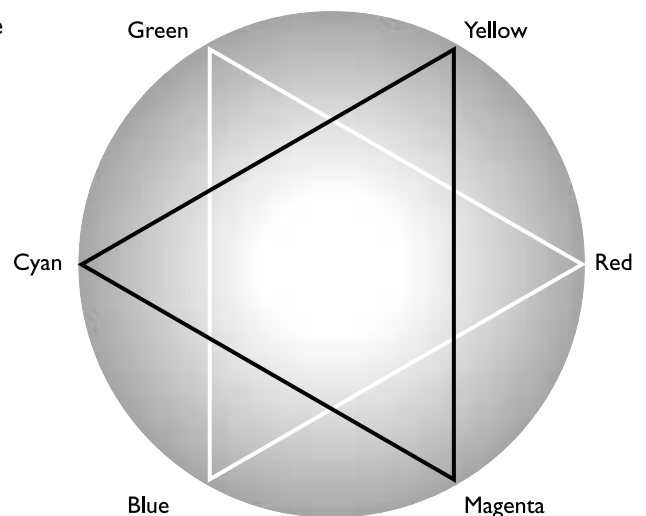
Warm colors are red, orange, yellow and brown. Red reminds people of heat, danger, power, passion, strength, blood and war. Used as an accent color, it can stimulate people to make quick decisions and increase expectations. Orange is the color of warmth and reminds people of autumn. Yellow is a vibrant color that is associated with a sunny summer day. Brown creates neutrality and communicates credibility and stability.

Cool colors are green, blue and purple. Green signifies nature, life, new growth, energy, faith and money.

Blue is deemed therapeutic to the mind and body. Purple symbolizes royalty, richness, power and sensitivity. It is also the color of passion and love.

Combining Colors In A Document

There is a predictable way that colors react when appearing together. To understand this, first picture a *color wheel*. A color wheel is a representation of the primary and secondary colors of visible light. On a color wheel, the primary colors — red, blue and green — appear at 3 o'clock, 7 o'clock and 11 o'clock respectively. The secondary colors — cyan, magenta and yellow — appear between them.



On the color wheel, colors are either *analogous* or *complementary*. Analogous colors are those that appear next to each other and share the same undertones. Red, red-orange and orange are examples of analogous colors. *Complementary* colors appear across from each other; red and green are complementary colors.

Analogous colors are used to calm; complementary colors are used to excite. When you want to create high contrast, select complementary colors. Some complementary colors (such as red and green) can even appear to vibrate when placed next to each other. On the other hand, use analogous colors when you want to create unity and harmony.

Why Matching Colors Sometimes Don't

When you have carefully selected colors for your document or publication, you want the colors in the printed piece to match as closely as possible to the color you saw on your computer monitor or color printer. So do we! To help us both achieve that objective, let us explain a bit about the science of color.

RGB: The Colors of Television and Computer Monitors

RGB stands for red, green and blue – the primary colors of visible light. On your television or computer monitor the absence of color is black. By generating electrons that bounce against thousands of red, green and blue phosphor dots within the monitor's screen, color is created. Illuminate all the phosphors simultaneously and you get white. Mix the phosphors in different combinations and at different intensities and you produce all the

colors you see on the screen with more or less saturation. Turn off all the phosphors and you get black.

CMYK: The Colors of Process Printing

CMYK stands for cyan, magenta, yellow and black. Three of these – cyan, magenta and yellow – are the secondary colors of visible light. Black (abbreviated K) is used to darken hues created by the other three colors.

Unlike the phosphors in televisions and computer monitors that combine or *add* to produce light, process printing inks use pigments and dyes that absorb light. Each ink color absorbs or *subtracts* a different portion of white light. And because printing inks are transparent, the paper reflects back unabsorbed light, creating color to the observer.

PMS: The Colors of One-, Two- and Three-Color Printing

PMS stands for Pantone Matching System, a system used by printers around the world to select, specify, match and control ink colors. The Pantone Matching System formula guide is a book of printing ink formulas and samples on coated, uncoated and matte coated stock in a fan format. The PMS book is what we use when helping you select color for your project.

Whereas cyan, magenta and yellow are combined in various percentages to produce a specific color, a PMS or *spot color* ink is one single hue. In addition, the inks used for spot color are opaque rather than translucent and so do not allow light to pass through or unabsorbed light to be reflected back to the observer.

Why RGB Colors Don't Always Reproduce as CMYK or Spot Color

Perhaps you have been disappointed that the color on your printed piece looks somewhat different than it did on your computer monitor. There is a scientific reason for this – the RGB phosphors are capable of producing many more colors than the process or PMS printing inks. And the process printing inks, when combined, cannot always match exactly the single hue of a PMS spot color.

To put it more simply – the range of colors that the human eye can see is in the billions. The range of colors that an RGB monitor can reproduce is 16 million. The range of colors that photographic film can reproduce is 10-15 thousand. The range of colors that CMYK printing can produce is 5-6 thousand. And what's worse, the range of colors doesn't overlap perfectly. So some colors will convert from RGB to CMYK fairly well (because the color is in the CMYK *color gamut*) and others will convert poorly (when the RGB is outside the CMYK color gamut).

To illustrate, try this exercise. Using PageMaker, Quark XPress, PhotoShop, or CorelDraw, convert RGB blue to CMYK. Watch what happens to the color. Does it turn to purple? Now reduce the percentage of magenta by 50% and watch it turn back to blue.

Trust Us

If you find all this very confusing, please turn to us for assistance. We will do our best to guide you through the steps needed to make sure the color you select is the right one for the job. Call us at (212) 349-1233 and we'll help clear up the mystery.

Stock Photography

Tired of using clip art in your document or publication? Would your company brochure benefit from full color photographs? Stock photos may be the answer.

Stock photos are photographs that have been taken by professional photographers and assembled into a collection, usually on a specific topic. For example, a stock photo collection of nature might include outdoor scenery, close-ups of flowers, and photos depicting scenes of spring, summer, fall and winter. Once purchased, the individual images or collections are royalty-free.

Stock photo images cover a wide range of subject matter from animals to business to travel. Collections are also available of textures, finishes and special effects. The collections are available on CDs and may also be downloaded from designated web sites. Best of all, they are already in electronic format, ready to drop into your document or publication.

A few of the most popular stock photo publishers include Corbis, Artville, Photo Disc and The Stock Market. You can visit their web sites to get a feel for the style of photos they offer, and you may be able to download low resolution images to place as FPO (for position only) in your document to see the effect before you make the actual purchase.

a vocabulary of the graphic arts

Analogous color: Colors that are next to each other on the color wheel, share the same undertones and harmonize when placed next to each other.

Chroma: Attribute of a color that determines its relative strength or saturation. In color space, the distance away from neutral.

Color calibration: Setting a device (digital camera, computer monitor, scanner, color printer or copier, imagesetter) to known color conditions, using mathematical expressions.

Color gamut: The total range of colors that can be formed by all combinations of a given set of light sources or pigments and dyes. A typical CMYK gamut is smaller than a typical RGB gamut.

Color model or space: A scheme for representing color as data; the 3-dimensional coordinate system used to numerically describe colors. Some models include red, green and blue (RGB); hue, lightness and saturation (HLS); cyan, magenta, yellow and black (CMYK) and Lightness, a, b (L^*a^*b)

Complementary color: Colors that are opposite each other on the color wheel and that contrast when placed next to each other.

Four-color process printing: The process of reproducing a full-color image by overprinting screened color separations for each of the three process colors (cyan, magenta, yellow) and black using process color inks. Also called full color printing.

Hue: Attribute of a color that describes its dominant wavelength (such as red, yellow, green, blue) and distinguishes it from other colors. In color space, hue is arrayed around the center axis.

Lightness: The luminous intensity of a color. Also called its value.

Spot color: A term used to designate a single hue printing ink. Spot color reproduction is assisted by the Pantone Matching System.

Tone: The lightness/darkness value of an image. The tonal range of an image is the transition from the light areas to the dark areas.

Excerpted from Basic Requirements for International Design & Graphic Solutions (BRIDGS).

Introduce Color Economically

Because color is so important in the documents and publications you create, we offer a few ways to introduce color economically.

- **Paper:** To add color, the first thing to consider is the paper. In addition to the colors you are familiar with from copier paper, there is a rainbow of hues available in sheets ranging from budget 20# bond to high-end writing papers. Paper manufacturers know the importance of color and are continually introducing new shades that

reflect current trends in color. If you haven't looked at paper swatches lately, please ask any of our representatives — to see some of the newest colors.

- **Tints and Screens:** A tint (sometimes called a screen) is a “special effect” that changes a solid image into small dots. The visual effect is to lighten the ink color being used into a different shade. You can see the effect of a screen in the ampersand of *Tricks & Tips*.
- **Inside and Outside Pages:** When

printing any document that folds, you can use an ink color on only one side of the sheet. If the sheet is folded in half (such as a newsletter), the color will be on the first and last page. Thus, the first impression is that the newsletter is printed in color. This technique is especially effective when using two colors on the outside and one on the inside, or four colors on the outside and two on the inside.

Q.

I understand the difference between spot and process color. When should I use each one?

A.

The decision to use spot color, process color or a combination of both depends on your budget, the purpose of your document or publication and the competition it will encounter. Here are a few simple guidelines for making the decision.

Use spot color when

- printing in 1, 2 or 3 colors and when photographs, if used, are not in full color
- reproducing logos or graphic elements that require the precise color matching of a PMS ink
- printing with special inks (metallic,

fluorescent or pearlescent)

Use process color when

- printing in more than 3 colors
- reproducing full color photographs
- reproducing clip art or stock photo images that contain more than 3 colors

In the case of some clip art (such as Word metafiles and images from the CorelDraw library), it may not be evident how many colors are involved in reproducing the image. Before you integrate what might be a full-color image into a spot color document, let us examine the image to be sure it will reproduce as you intend. Call us at (212) 349-1233 and we will be happy to assist you.