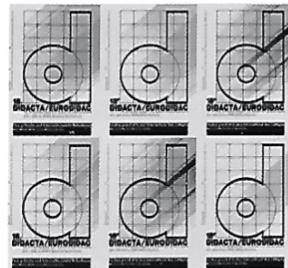


About This Chapter



This chapter discusses the types and basic properties of color and its ability to create meaning and identity.

Concepts and Terms in This Chapter

- Color
- Additive/Subtractive Color
- Primaries/Secondaries
- Complementary Colors
- Analogous/Discordant Colors
- Hue
- Value/Intensity
- Temperature
- Relativity
- Proportions
- Identity

4-1 (Previous page and above)

Color Studies, 1981

Wolfgang Weingart

Color alone can alter the appearance and meaning of a form. One letter from these studies was used in figure 4-2.

The Use of Color

Color as an Active Component

Similar to other visual components, color can help create meaning. But because color is a property of light, it has many additional and unique characteristics and interactions.

In the late 1600s, Sir Isaac Newton experimented with simple glass prisms and found that sunlight is made up of color. Without light there is no color, because objects have no color of their own. However, objects possess properties that absorb or reflect particular light waves, which become visible to our eyes. For example, we perceive the color red when light waves of a certain frequency strike or bounce off of a surface and are transmitted to our eyes.

Our understanding of a form's color is influenced by a number of variables, including the type and intensity of lighting on the object viewed, our distance away, learned color associations, and surrounding colors. Thus, the definition of color is relative to and dependent on cultural and physical context.

Color can be used to depict things as they are, as in the local color of green for grass. It can also be used without reference to observed objects to connect us to more abstract or symbolic ideas or meanings. Color can create the perception of volume and depth. It can be used to group elements and concepts, emphasize them, and enhance our understanding in ways that black and white may not. Similar to other components, color can stimulate a range of memories and expectations.

4-2
Poster for a Conference on Education, 1981
Wolfgang Weingart



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4-3

Additive Primaries:
Red-Orange, Green,
Blue-Violet

Defining Color

Types of Color

In each of the two types of color (described below) are basic colors called *primaries* from which all other colors are made. These primaries vary with the color's source.

ADDITIVE COLOR

Additive color is viewed directly as light, such as that emitted by a computer monitor. Its primaries are red-orange, green, and blue-violet (figure 4-3). When these primaries are positioned or added in equal amounts, white light—the source of all color—is created.



4-4

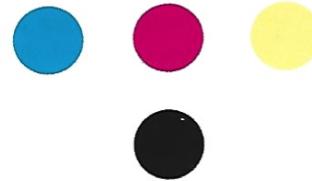
Subtractive Primaries:
Red, Yellow, Blue

Computer monitors create the illusion of a range of colors by activating dots (pixels) to red, green, or blue in varying levels of intensity (brightness/dullness). These are mixed optically by our eyes to create additional colors and forms. White is produced when pixels are at maximum intensity and appear to overlap.

SUBTRACTIVE COLOR

Subtractive color is viewed as a reflection off a surface. In subtractive color, all light waves except those containing the color we see are absorbed or subtracted by a surface. We see the color red when its corresponding wavelength is reflected to our eyes.

One type of subtractive color is created through pigments. Pigments have primary colors of red, yellow, and blue (figure 4-4).



4-5

Subtractive Primaries in
Offset Printing: Cyan,
Magenta, Process Yellow,
and Black

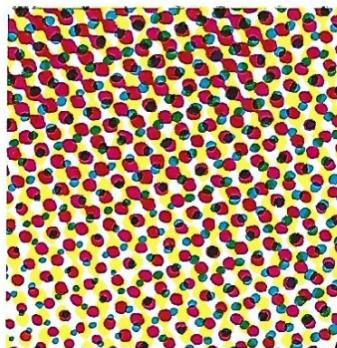
Another type of subtractive color occurs in offset printing, the most common printing method. The colors cyan, magenta, and yellow, in conjunction with black (CMYK), are used in varying dot sizes and numbers to create the appearance of other colors (figure 4-5, figure 4-6). Separate colored dots are not physically mixed but instead mixed by our eyes to create larger areas of color. In this book, violet is a combination of magenta and cyan dots.

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4-6

Detail of Figure 4-1

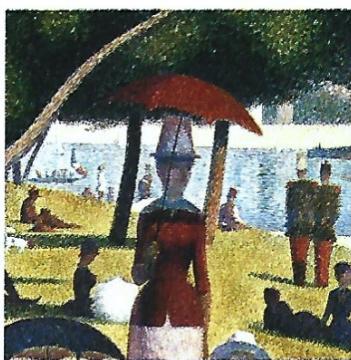
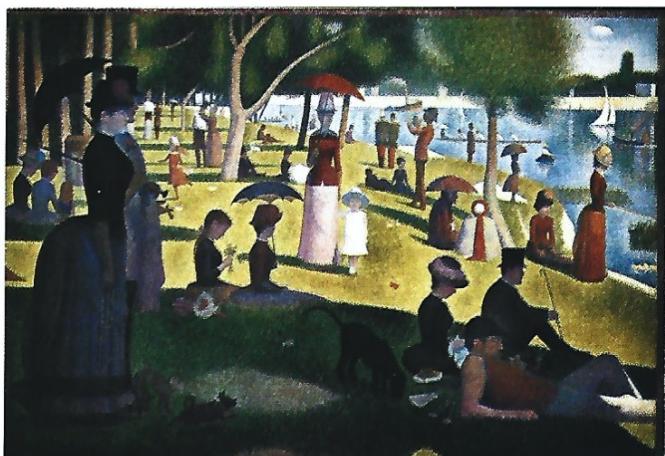
When an offset printed image is magnified the use of CMYK dots becomes more readily apparent.



4-7

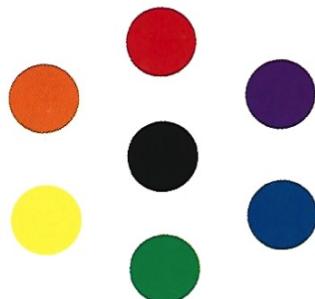
A Sunday Afternoon on the Island of La Grande Jatte, 1884–1886
Georges Seurat

Using a method similar to offset printing, small dots of color were applied to create larger color areas. This technique creates an impression rather than a literal depiction by allowing the eye to optically mix the separate dots of colors.



Presentations of Color Relationships

Organization



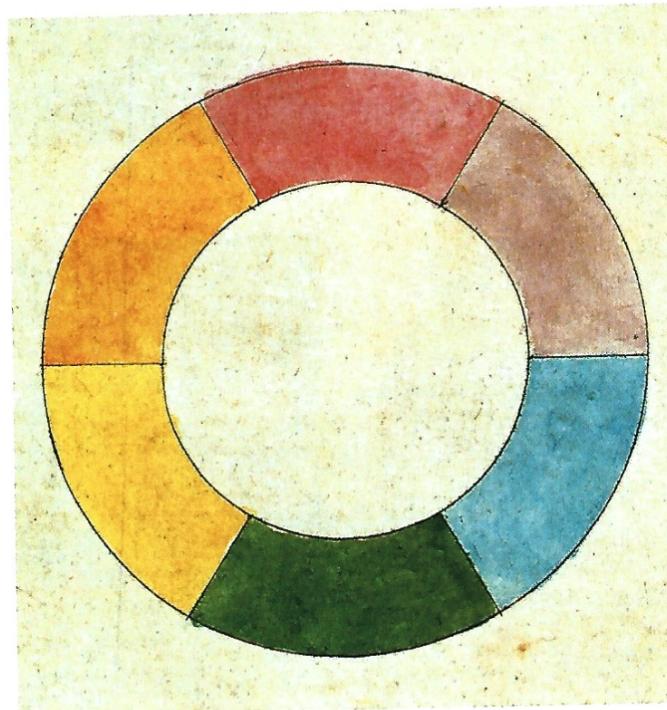
4-8
Subtractive Color Wheel

The relationship of primary colors to secondary colors is easily depicted through the form commonly called a *color wheel* (figures 4-8 and 4-9). Secondary colors are mixtures of two primaries. Some color wheels include tertiary and additional subgroupings. Because not all colors have the same strength (some primaries are inherently darker or lighter, brighter or duller, than others), mixtures to make secondaries may not be equal.

Numerous varieties of color wheels have been made throughout history. Other influential systems of color organization, including those by Johann Wolfgang Goethe, depict colors in different shapes or identify them by different names. What remains constant is the positioning of colors. For example, red is always between orange and violet, a relationship resulting from their natural properties.

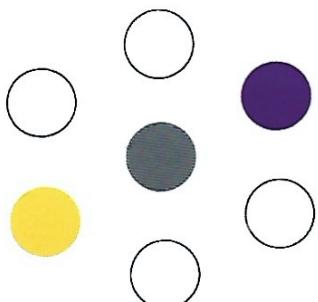
4-9
Color Study from Zür Farbenlehre, 1810
Johann Wolfgang Goethe

Early depiction of color relationships.



Color Strategies

Color Palettes

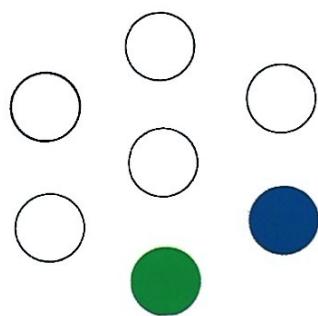


4-10
Complementary Colors

Color can be used as a part of a strategy to organize form, send messages, and create response. Compositions are commonly designed using specific color palettes or families to create harmony or discord appropriate to the message.

COMPLEMENTARY COLORS

Complementary colors are opposite from each other on the color wheel. In figure 4-10, violet and yellow are complements. When mixed, they create a neutral gray; when placed next to each other, their intensity is heightened (see figure 4-21).



4-11
Analogous Colors

ANALOGOUS AND DISCORDANT COLORS

Analogous colors are adjacent to each other on the color wheel (figure 4-11), while discordant colors are farther apart but not directly across from one another. Generally speaking, analogous colors tend to create harmony among elements (figure 4-12) and discordant colors create instability and movement. Either type of color combination is desirable depending on the situation.



4-12
Water Lilies, 1914–1915
Claude Monet

This work, based on analogous colors of green and blue, creates harmony among the elements.

The Basic Components of Color

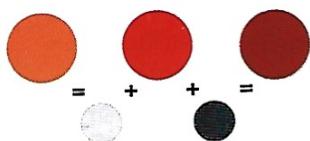
Hue, Value, Intensity, and Temperature



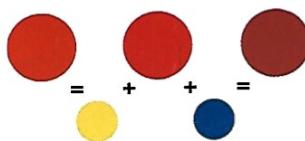
4-13
Hue



4-14
Value



4-15
Value and Intensity



4-16
Value, Intensity, and
Temperature

HUE

Hue refers to a pure color with no other colors, black, or white added to it. In figures 4-13, 4-15 and 4-16, the same hue appears in the center dot. Its appearance changes according to alterations in value, intensity, and temperature. The size of the smaller dots in the latter two figures only generalizes the amount of color needed to make the color of the larger dots.

VALUE

Value refers to the lightness or darkness of a color. You shade a hue by adding black and tint a hue by adding white. The term *achromatic* applies to mixtures of black and white only (figure 4-14), while *monochromatic* applies to mixtures based on shades and tints of a single hue (figure 4-15). The center gray dot (figure 4-14) has approximately the same amount of white as the center red dot directly below it (figure 4-15). In figures 4-15 and 4-16, the left dots are lighter in value and the right dots are darker in value.

INTENSITY

Intensity or *saturation* refers to the brightness or dullness of a color. A color is at full intensity or purity only when it is unmixed. Intensity and value are related because a color's intensity changes when black, white, or another color is added. In figures 4-15 and 4-16, the center red dot is more intense (brighter) than the dots on either side. When the center dot is mixed with a light gray or a light color such as yellow, it becomes less intense (duller) and lighter. When mixed with a dark gray or dark color such as blue, it becomes duller and darker.

TEMPERATURE

Temperature refers to the relative warmth or coolness of a color. We generally think of red, orange, and yellow as warm, and blue, green, and violet as cool. But any color, even red, can be warm or cool depending on the type and amount of other colors added. In figure 4-16, yellow is added to the center red dot to make it warm, and blue is added to make it cool.

4-17
*Late Re-
Homage
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Josef Al*

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4-17
**Late Reminder (from
Homage to the Square),
1953**
Josef Albers

Changes in hue, value, inten-
sity, and temperature in simple
proportions can create a sense
of depth and focus and alone
serve as subject matter.

Basler Theater

1968/9



4-18

**Poster for the Basle
Theater, 1968**
Armin Hofmann

A cool red (left side) and warm red (right) were used to suggest the contrast of work to be shown at the theater.

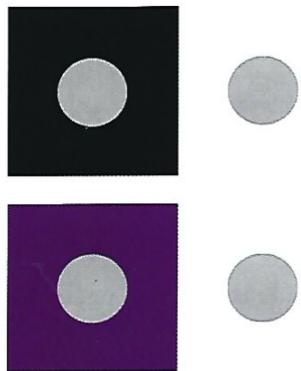
60 Introduction to Two-Dimensional Design

**4-19
Perceptual Illusions**

The perceptual system tends to perceive intensity, even size, and shape in terms of their surrounds.

**4-20
East Wind
Abbey, 1968**
Dorchester, Oxfordshire, England

The black and white pieces of varying brightness and size turn the mind's eye into a source of inference they can use.



**4-19
Perceptual Relativity**

The perception of hue, value, intensity, temperature, and even size are influenced by the surrounding color.

Color Interactions

Relativity

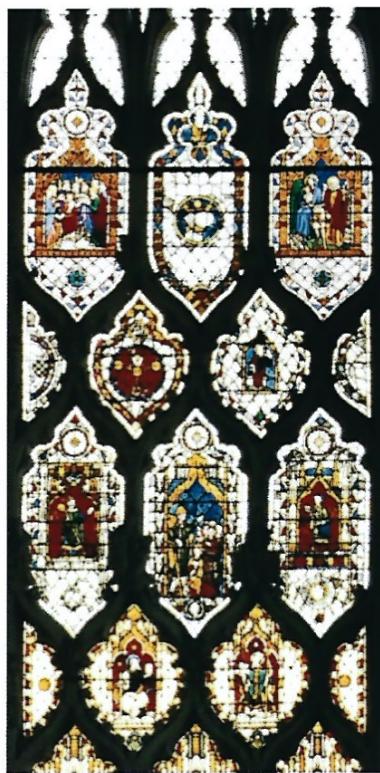
Perceptually, color is highly relative. Similar to other visual elements, such as size, we understand color in relation to its environment.

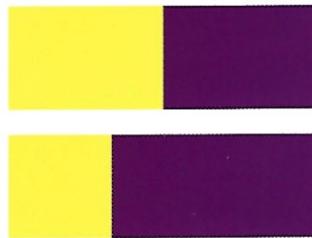
A color can be perceived differently depending on its surrounding colors. In figure 4-19, the mixture of the gray dot is constant, yet it appears lighter against the black background, darker and duller on the white background, and lighter and brighter on the violet background.

The violet background also makes the dot appear to contain yellow, the complement of violet. This phenomenon, known as *simultaneous contrast*, is a result of the physiological mechanics of our eyes. Being aware of this phenomenon may be useful when using certain color combinations to achieve desired ends.

**4-20
East Window of Dorchester Abbey, twelfth century**
Dorchester-on-Thames, Oxfordshire, England

The black leading between the pieces of glass heightens the brightness of the colors and in turn the message and experience they support.





4-21
Proportions

By changing the proportions of these complementary colors, the overall relationship is affected.

Proportions

Proportions in color are defined, in part, through size. They can also be created through the use of value, intensity, and temperature. Using these, numerous attempts have been made to assign size proportions to colors. For example, three units of yellow to one unit of violet, two units of orange to one unit of blue, and one unit of green to one unit of red have been deemed visually balanced and harmonious.¹ However, the appropriateness of these ratios relies on the context and the surroundings, and thus is open to debate.

The proportions of a color can greatly change the appearance of a color grouping (figure 4-21). Depending on the colors, a seemingly harmonious composition can move to a state of discord, and vice versa.

Proportions are an important consideration when seeking to create diversity through a limited palette. In figure 4-23, a basic palette was chosen and its colors used in varying proportions across a number of applications. This gives each application a unique identity while retaining a connection to the palette.

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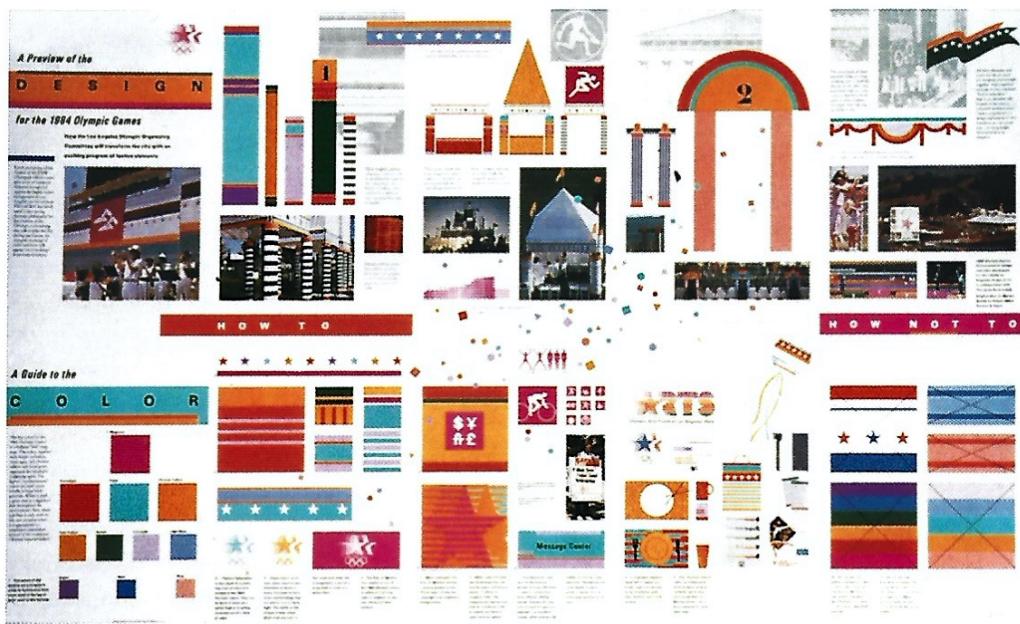
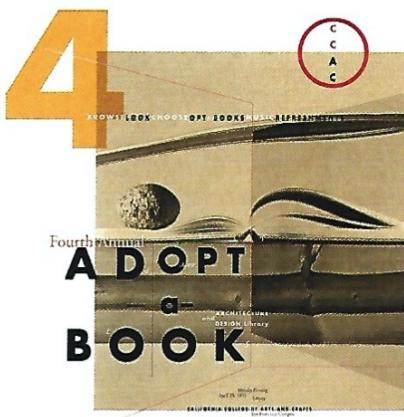
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4-22

**Poster for Library Campaign,
1992**

Lucille Tenazas

The thoughtful arrangement of a limited range of colors allows this composition to further its appearance and message.



4-23

**Color Palette for the Los
Angeles Olympiad, 1984**

Sussman/Prejza and Company

Color as Meaning

Forming Response and Identity

"Colors present themselves in continuous flux, constantly related to changing neighbors and changing conditions."²

Josef Albers

Although humans perceive color interactions similarly, we each have different interpretations of their meanings. Akin to other visual elements discussed earlier, most attributes of color are understood in relation to the environment in which they exist and are interpreted through the experiences of the designer and viewer (figure 4-24).

A color's perceptual interactions, discussed earlier, are easily seen and thus more objectively discussed than its connotations. To use color meaningfully and effectively, it is important to be aware that color carries connotations. This may lead you to research a work's audience, the current and historical uses of the colors, and the context in which the color will be used.

Some colors carry similar meanings across cultures. Red, for example, connotes danger in most cultures. Other colors are interpreted differently. Death and mourning, for example, are associated with the color black in the West but the color white in China.

We also associate color with our natural environment. We perceive red, orange, and yellow as warm perhaps because of their relationship to fire and sunlight. Violet, green, and blue are perceived as cool perhaps because of their relationship to sky and water. Such associations, as well as color preferences, have been shown in controlled studies to be influenced not only by culture but also age and gender, and the form or shape through which a color is experienced.³

Color can be used to convey information and relationships. In business, black indicates gain and red indicates loss. Color can place value on activities, such as a blue ribbon awarded for excellence. Color can also create a sense of identity and community, as evidenced by the common practice among organizations, corporations, and other entities to select, display, and market their own colors. In figure 4-25, the flag's colors symbolize the diversity of the gay and lesbian community with red, orange, yellow, green, indigo, and violet representing life, healing, sun, serenity with nature, harmony, and spirit respectively.⁴

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4-24
***Nulli Secundus*, 1963**
Hans Hofmann

The interplay among contrasting hues, values, intensities, and temperatures can create connotations and emotional responses.



4-25
The Rainbow Gay Flag, 1978
Gilbert Baker

Color can build a sense of community and identity.

