

COLOR THEORY: Week 4

“Instead of trying to reproduce exactly what I see before me, I make more arbitrary use of color to express myself more forcefully ... To express the love of two lovers by the marriage of two complementary colors ... To express the thought of a brow by the radiance of a light tone against a dark background. To express hope by some star. Someone’s passion by the radiance of the setting sun.”

— Vincent van Gogh

Notes, clarifications, and additional information

- The color wheel for additive color, i.e., color from lights (vs. paint, pigments, dyes, or ink), shifts complementary colors on the color wheel.

Johannes Itten, *The Elements of Color*

Itten’s identified seven types of color contrast:

1. Contrast of hue
2. Light-dark contrast
3. Cold-warm contrast
4. Complementary contrast
5. **Simultaneous contrast**
6. **Contrast of saturation**
7. Contrast of extension/proportion

This week, we will study the remaining two types of contrast.

Simultaneous contrast

Contrast of hue simply uses undiluted (saturated) colors. Art or design consisting of red, yellow, and blue are the most extreme example of contrast of hue.

Contrast of saturation

A single hue, for example, blue, when mixed with varying degrees of white (creating tints), will exhibit contrast from light to dark among the saturated blue and its tints.

Optical mixture

“Monet never mixed colors before applying them to his canvas. Instead, colors were mixed optically in his work. He either placed them side by side or he painted in layers, superimposing one color over another. Applying pure color side by side was a technique used by pointillists to create form and color blends. For example, red and blue placed side by side will visually merge and create purple.” From *Monet: Artist and Gardener* by Sonia Uyterhoeven, New York Botanical Garden’s Gardener for Education.

“Neo-Impressionism is a term applied to an avant-garde art movement that flourished principally in France from 1886 to 1906. Led by the example of Georges Seurat, artists of the Neo-Impressionist circle renounced the random spontaneity of [Impressionism](#) in favor of a measured painting technique grounded in science and the study of optics. Encouraged by contemporary writing on color theory—the treatises of Charles Henry, Eugène Chevreul, and Odgen Rood for example—Neo-Impressionists came to believe that separate touches of interwoven pigment result in a greater vibrancy of color in the observer’s eye than is achieved by the conventional mixing of pigments on the palette. Known as *mélange optique* (optical mixture), this meticulous paint application would, they felt, realize a pulsating shimmer of light on the canvas. In the words of the artist Paul Signac, Neo-Impressionism’s greatest propagandist, “the separated elements will be reconstituted into brilliantly colored lights.” The separation of color through individual strokes of pigment came to be known as Divisionism, while the application of precise dots of paint came to be called Pointillism.” From Georges Seurat and Neo-Impressionism by Dita Amory, Curator, The Metropolitan Museum of Art

Quantity

Last week, we reviewed Itten’s theory of the contrast of extension and Goethe’s theory regarding the harmonious proportions of one complementary color to another. Yet another factor plays a role when balancing colors. While Goethe’s proportions might create a pleasing composition, changing the quantity of one of two complementary colors, can make one of them “highly active,” or, in other words, make the one color “pop” against the other.

Bezold effect

In optical mixture, our eyes mix small amounts of color adjacent to each other creating another color(s). Wilhelm von Bezold discovered that adding certain strong colors (for example, black) throughout a design, affects perception of the overall design.

Weber Fechner Law

Developed by Ernst Heinrich Weber and Gustav Theodor Fechner, the law states that “the relationship between stimulus and perception is logarithmic,” not arithmetic.

Color constancy, Land Effect and Retinix theory

Human color perception is not solely dependent on light and the photoreceptors in our eyes. This has been proved through various experiments testing subjects’ color perception under various illumination conditions. This is commonly known as “color constancy.” Whether we look at a green apple mid-day in intense sunlight (white light) or at sunset (when the light is red), the green apple still looks green. Color constancy aids in our identifying objects.

Edward Land, the co-founder of the Polaroid Corporation, formulated the Retinex Theory. Combining “retina” and “cortex,” his theory suggests both the eye and the brain are involved in processing color. Research on color science and human color perception continues today.