It is universally accepted that colors affect us emotionally. Bright reds, oranges, and yellows tend to stimulate us, while blues and greens often make us feel more peaceful. Colors can therefore be used to express emotions and even to evoke them. Here again, however, we must beware of simplistic assumptions, for very slight differences in colors can produce quite different effects.

Warm and Cool Colors

We associate the colors of fire—reds, yellows, oranges—with warmth. This is not just an abstract notion, for physiological research indicates that under red lighting our bodies secrete more adrenalin, increasing our blood pressure and our rate of breathing, and actually raising our temperature slightly. Imagine how warm you would feel in the sitting room designed by David Hicks shown in Figure 4.2. Yellows and oranges have a similar effect, though they are not as warming as strong reds.

By contrast, feel the coolness of the greens and blues in the poolside area of a Los Angeles house designed by Luis Ortega (4.3). We associate blues and greens with the cooling qualities of water and trees, and physiological research shows that green or blue lights will slow our heartbeat, decrease our temperature, and relax our muscles.

Hues in the red area of the color wheel are therefore often referred to as “warm,” while those in the blue and green range are called “cool.” These terms are relative rather than absolute. Notice how the intensity of the red walls and floor in Figure 4.2 makes the oranges, yellows, and pinks of the painting over the sofa seem cool by contrast; the “hot” pinks in the easel painting on the left seem positively icy.

In addition to the influence of surroundings, it is possible to discern warmer and cooler variations on a single hue. As the value of a hue becomes lighter, it generally appears cooler. And the addition of a small amount of a cooler hue to a red or a warmer hue to a green will create what could be called a “cool red” or a “warm green.” In Figure 4.1, which compares colors mixed by printers’ ink formulas numbered according to the Pantone Mixing System (PMS), a single unit of yellow has been substituted for one of the eight units of Rubine Red in PMS 219 to create PMS 205. Does PMS 219 feel warmer or cooler to you than PMS 205? Surely PMS 217, which has only one part of Rubine Red to 31 parts of white, is cooler than either of the darker reds.
Physiological Effects

Mystics have long held that we emanate a colored glow, or aura. Some feel that its presence has been verified by Kirlian photography, a special process for capturing the usually invisible energies that radiate from plants and animals. The color of the aura, as seen by clairvoyants, is thought to reflect the state of a person’s health and spirituality. According to the mystic Corinne Heline, gold is the auric color of spiritual illumination, clear blue or lavender indicates a high spiritual development, orange a predominantly intellectual nature, clear green a sympathetic nature, and pure carmine or rose-red an unselfish, affectionate quality. Duller colors are associated with materialistic, fearful, or selfish qualities. A dark gray aura with brown and red in it accompanies depression.

According to physiological research with the effects of colored lights, red wavelengths stimulate the heart, the circulation, and the adrenal glands, increasing strength and stamina. Pink has a more gently stimulating quality and helps muscles to relax. Orange wavelengths stimulate the solar plexus, the immune system, the lungs, and the pancreas, and benefit the digestive system. Yellow light is stimulating for the brain and nervous system, bringing mental alertness and activating the nerves in the muscles. Green lights affect the heart, balance the circulation, and promote relaxation and healing of disorders such as colds, hay fever, and liver problems. Blue wavelengths affect the throat and thyroid gland, bring cooling and soothing effects, and lower blood pressure. Deep blue lessens pain. Blue-green light helps to decrease infections, soothe jangled nerves, and correct weakness in the immune system. Indigo light affects the brain, has purifying, antiseptic, and cooling effects, balances the metabolism, and seems to suppress hunger.

Given these apparent physiological effects of colored lights, there is a science of healing with colors, or chromotherapy. People are bathed with colored lights, placed in colored environments, or asked to meditate on specific colors thought to stimulate particular glands. This form of treatment dates back thousands of years to the “color halls” of the ancient Egyptians, Chinese, and Indians.

Although color healing has remained largely an occult science, chromotherapy is being taught in some nursing schools and alternative medical centers, and the medical
profession as a whole makes use of color in certain treatments. For example, premature babies with jaundice are cured by exposure to blue light.

A more prominent use of color therapy occurs in interior design. Psychological literature is full of attempts to determine how specific colors affect human health and behavior and how best to put the results into effect. Bright colors, particularly warm hues, seem conducive to activity and mental alertness and are therefore increasingly being used in schools. Cooler, duller hues, on the other hand, tend to sedate. Henner Ertel studied the effects of environmental color among schoolchildren in Munich. The interior design colors with the most positive intellectual effects in Ertel’s study were yellow, yellow-green, orange, and light blue. Surrounded by these colors, children’s IQ scores rose by up to 12 points. In white, brown, and black environments, IQ scores fell. In addition, Ertel found that an orange environment made the children more cheerful and sociable and less irritable and hostile.

In some institutional situations, a calming environment is beneficial. In a study conducted by Harry Wohlfarth and Catharine Sam of the University of Alberta, the color environment of 14 severely handicapped and behaviorally disordered eight-year-olds was radically altered. It was
changed from a white fluorescent-lit classroom with bright orange carpeting and orange, yellow, and white colored walls and shelves to one with full-spectrum fluorescent lighting and brown and blue walls and shelves. The children’s aggressive behavior diminished and their blood pressure dropped. As one nurse reported:

I found the children and myself considerably more relaxed in the new room. The afternoons seemed less hectic and instead of running out of time for our activity, we ran out of activities.

I also found at lunch I was more relaxed and was able to eat something without feeling sick…. The noise level really went down in the Phase II room, which seemed to keep everyone from getting upset as the day went on.¹

When the environment was then experimentally changed back to the way it had been before, aggressive behavior and blood pressure returned to their previous levels.

Interestingly, the same effects were found in both blind and sighted children in Wohlfarth and Sam’s study, suggesting that we are affected by color energies in ways that transcend seeing. One hypothesis is that neurotransmitters in the eye transmit information about light to the brain even in the absence of sight, and that this information releases a hormone in the hypothalamus that has numerous effects on our moods, mental clarity, and energy level. In what Wohlfarth calls the science of “color-psychodynamics,” colors that seem to increase blood pressure and pulse and respiration rates are, in order of increasing effect, red, orange, and yellow. Those decreasing these physiological measures are green (minimal effect), blue (medium effect), and black (maximum effect).

The legendary Notre Dame football coach Knute Rockne attempted to use awareness of the physiological effects of colors competitively. To stir up his own players, he painted their locker room red. He had the visiting team’s locker room painted in blue-greens, thus sedating them both before the game and when they returned to relax at half-time. Similarly, the influence of environmental color was demonstrated in one factory where workers were complaining about feeling cold. Rather than raise the thermostat, management decided to paint the blue-green walls coral. The complaints stopped.

Lest we hasten to repaint everything in attempts at behavior modification, we should note that physiological color responses are complex. The precise variation of a hue has a major impact, but one that is rarely addressed by psychological research. One shade of pink may be calming, while another may be stimulating. Although mystics find certain blue-violets conducive to a very high spiritual state, a group of college students said that a blue-violet they were shown tended to make them feel sad and tired. These same students found that a color described by the researchers as “cool green” made them feel angry and confused.

Furthermore, initial responses to a color environment may be reversed over time as our body adjusts to the new stimulus. It is known that some time after blood pressure
raised by red light it drops below the normal level; after blood pressure is lowered by blue light, it eventually rises to a higher-than-normal level.

Color Symbolism

Our responses to colors are not just biological. They are also influenced by color associations from our culture. In societies where most adults drive cars and are familiar with stop lights, there is an automatic association of red with “stop” and green with “go.” In cultures where cars are rare this clear-cut association does not exist.

In Western industrial cultures, black is associated with death; mourners wear dark clothes and the body is transported in a black limousine. In ancient Egypt, however, statues of Osiris were painted black to indicate the period of gestation when seeds are sprouting beneath the earth; black was associated with preparation for rebirth rather than with an ending of earthly life. People in the West Indies use bright colors to commemorate deaths, in celebration of the soul’s departure for a happier existence. In China and India the color used for mourning is white—because of the humility of wearing undyed cloth and the association of white with peace and coolness. In some Native American tribes, black is associated with introspection; white is seen as the color of winter, of purification and renewal.

Despite regional differences, red is associated with vigorous life in many cultures, probably because it is the color of blood (4.4). The earliest humans were buried with red ochre pigments. Maybe it was hoped that the color would help the deceased to live on in another plane. Highly saturated blood reds are often linked with women’s sexuality or fertility, while light values of red-pinks may be used to express affection and sweetness. The exaggerated dark pink skin of Andy Warhol’s Marilyn (4.5) suggests sweetness and sensuality at the same time.

Variations on the same hue may have different symbolic associations. In Catholic religious art, the blue of a clear sky is often used to symbolize heaven. The Virgin Mary’s robe is usually a blue, often a more saturated version of the color, symbolizing the quiet power of her serenity. If she is dressed in a darker blue-black, this color may be interpreted as an expression of her sorrow over the death of her son.

Personal Color Preferences

Not only have we inherited cultural associations, but we also respond to colors in individual ways. Imagine that you are standing in Larry Bell’s neon-lit installation piece (4.6). How do these particular blues affect you personally? If you compare your responses with those of other people, you may find some significant differences.

Psychological research has revealed some variables that help explain individual differences in color responses. To wit: We are most responsive to the pleasure of sheer color as children. From early infancy, babies respond to brightly colored objects. Among adolescents, the sensation-seeking prefer red, while the more reserved prefer blue. Elderly people have a significant preference for light over dark
colors, but yellow is the color they like least. People with certain mental illnesses—particularly schizophrenia—show a preference for nonchromatic, neutral colors (white, black, brown, gray) while “normal” people and manic-depressives generally prefer chromatic hues. Extroverts tend to prefer warm hues; introverts like cool hues. However, people may be drawn toward colors representing qualities they lack, for balance. Red, for instance, is usually the preference of vibrant, outgoing, impulsive people, but timid people may also be drawn to it. Those who are feeling frustrated or angry may be repelled by red.

Individual color preferences are so distinctive that they have been used for purposes such as personnel selection, treatment of the elderly, medical diagnosis, and therapy since the middle of the twentieth century, when the Swiss psychologist Dr. Max Luscher developed his Luscher Color Test. He proposed that a person’s selections and rejections of specific colors reveal information about his or her psychological characteristics. In the Luscher Color Test, subjects are given colored cards to line up from most to least favorite. The full test involves 73 color cards; the more commonly used version has dark blue, blue-green, green, orange-red, yellow, brown, black, and gray as choices. A person who prefers blue, according to Luscher’s conclusions, tends to be passive, sensitive, tender, and loving; a person who prefers orange-red tends to be active, aggressive, competitive, and lusty. Dr Luscher also proposes that a proper inner balance of the four “psychological primaries” red, green, blue, and yellow yields a happy, well-adjusted person (4.7). The samples used for Luscher testing are not always uniform in color, nor is there general agreement about the direct correlation of color preferences with personality traits, but color choices are nonetheless of interest to artists, particularly in applied design.

Not only personality but also geography may influence our color preferences. According to the work of the psychologist E. R. Jaensch, people from strongly sunlit countries tend to prefer warm, bright colors, while those from countries with less sunlight tend to prefer cooler, less intensely saturated colors. Jaensch speculated that in brighter environments, people’s eyes have adapted to protect them from sunlight so there is a physiological bias toward these warm colors. In areas where the sun is not so bright, people’s eyes are more accustomed to drawing ambient light from the sky and are thus biased toward cool colors. Scandinavians tested showed a preference for blue and green, while Mediterranean people preferred red.

Our own color preferences are important to us. A study of six- to eleven-year-olds wearing goggles with colored eyepieces while doing a pegboard test (imagine this situation!) showed that they completed the test much faster and more accurately when they were wearing goggles of their favorite color.

4.6 Larry Bell, Leaning Room II, 1970
Sheet rock, paint, and fluorescent light installation based on leaning room, artist’s studio, Venice. Collection of the artist.
Unconscious color prejudices are also sometimes apparent in artists’ works. However, to use a musical analogy, it is limiting to try to play everything on the violin when a whole orchestra of instruments is at one’s disposal. Artists can explore the entire range of hues, at all levels of value and saturation, in order to create any effect they desire.

Emotional Effects

Given their physiological effects, different hues seem to create different emotional responses in those who see, wear, or live with them. Although there are no hard and fast rules about the effects of different colors, color therapist Suzy Chiazzari specifies these associations between emotions and particular hues:

- **Red**: vitality, strength, warmth, sensuality, assertion, anger, impatience
- **Pink**: calmness, nurturance, kindness, unselfish love
- **Orange/peach**: joy, security, creativity, stimulation
- **Yellow**: happiness, mental stimulation, optimism, fear
- **Green**: harmony, relaxation, peace, calmness, sincerity, contentment, generosity
- **Turquoise**: mental calmness, concentration, confidence, refreshment
- **Blue**: peace, spaciousness, hope, faith, flexibility, acceptance
- **Indigo/violet**: spirituality, intuition, inspiration, contemplation, purification
- **White**: peace, purification, isolation, spaciousness
- **Black**: femininity, protection, restriction
- **Gray**: independence, separation, loneliness, self-criticism
- **Silver**: change, balance, femininity, sensitivity
- **Gold**: wisdom, abundance, idealism
- **Brown**: nurturance, earthiness, retreat, narrow-mindedness

Such associations are rather common, but on the other hand cannot be considered absolute. Consider the heated comments of color specialist Faber Birren about the seemingly innocuous color white:
A prominent decorator once told me that “white is the best thing for walls. It is neutral and it blends with everything!” This is preposterous. If you’ve read *Moby Dick*, you may remember the hair-raising description of white as the most portentous, desolate and heinous of all visual sensations.

White is terrible when you get too much of it. It hurts the eyes. Worse than this, it makes you feel sterile and naked and as vacant as shadow. Neutral? It puts restaurants out of business and hospitals out of patients.3

Although psychologists have conducted experiments to see how people respond to certain colors in isolation, in everyday life we see hundreds of thousands of colors in infinite combinations and unique contexts. The actual emotional effect of a specific color in an artwork depends partly on its surroundings and partly on the ideas expressed by the work as a whole. To be surrounded by blue, as in the Larry Bell installation (4.6), is quite different from seeing a small area of blue in a larger color context, such as the blue covers on the poolside chaises shown in Figure 4.3. And to illustrate the importance of thematic context, consider the use of yellow in Emil Nolde’s *Autumn Sea XVI* (4.8). This highly saturated yellow is often associated with happy, uplifting emotional effects, but Nolde has used it in such a way that it evokes feelings of terror and turmoil. For one thing, he has used it to fill the sky, broken by streaks of red-purple and black. No sunset ever looked like this. Spatially, the black regions seem to be advancing over our heads, getting darker and darker as they approach us. Nolde has placed our point of view almost down in the roiling water itself, as if we are drowning in it, with the sky pressing down menacingly above. Nolde (1867–1956) was a leader in the German Expressionist movement, using colors to express inner psychological states rather than outer realities.

### Local and Expressive Color

There are two opposite ways of using color in representational art. At one extreme is **local color**—the color that something appears from nearby when viewed under average lighting conditions. We think of the local color of a banana as yellow, for example. Thinking in terms of local
color can, however, be deceptive. Many colors can be perceived across the surface of a banana. In the realistic scene from the computer-generated film *Red’s Dream* (4.9), the artists have programmed the computer to take into account the light from five different light sources; two of them cast shadows that affect both value and hue in accurate local color.

At the other extreme is the **expressionistic** use of color, whereby artists use color to express an emotional rather than a visual truth. Human skin comes in many colors, but never in green. Nonetheless, George Segal has expressively used green for the faces as well as figures of men standing silently waiting for the dole during the Depression (4.10). If they had pink faces, we might think them drunk, but the green cast creates a sickly, depressing impression of their solitude, social embarrassment, and unaccustomed poverty.

Expressive use of color may dispense altogether with representational imagery, as in George Chaplin’s *Turner* (4.11). This is a painting which does not even look like a painting, for it is impossible to see how the colors were applied to the canvas, or which was applied first and which last. The colors just float there, sometimes in the background, sometimes in the foreground, ephemeral, unbounded presences that shift during the day with changes in natural lighting. Chaplin explains:

> Color is both the subject and object of my painting, and I celebrate it for its emotional and spiritual impact. Each work develops as an intuitive and sensory experience through subtle transitions of varying amounts of color. These combine to produce a kinetic illusion of light and space. I feel my way of working is directly aligned with the process of change in nature. A temporal analogy is the chromatic shifting of atmosphere apparent in the minutes of a sunrise.”