Color Me Training

By ELIZABETH LEAN, Associate Editor

I am six years old and perched tensely on the edge of my seat in the balcony of a darkened Boston movie theater. I am thrilled to have traveled the 30 miles to this vast picture palace that is so much grander than our hometown auditorium, and the movie we've come to see is powerfully affecting stuff for a sheltered six-year-old.

Imagine my state of excitement and wonder when the young screen heroine's eyes flutter open to see, not the dreary, black-and-white Kansas she last laid eyes on, but a fantastic, full-color world of scarlet, silver, aquamarine, tangerine and

jade, a world peopled by florid-faced inhabitants in vivid costume, citizens who step out from behind the gorgeous foliage that lines, of course, the yellow brick road.

That famous transition from the black-and-white world of everyday routine to the riotous, extravagant realm of color was a stroke of genius on the part of *The Wizard of Oz's* director, Victor Fleming, and one of the most memorable devices in movie history. In addition to the impact of the technical trick played on the audience, the sudden shift is an abrupt reminder of how powerful color is in our world and in our lives, as a source of interest, pleasure and meaning.

Color affects all of us who can see, even those who are "color blind," at all times, physically, psychologically and emotionally. Its presence or absence affects behavior, and it affects learning. The effectiveness of training and development is influenced by the colors of the learning environment, the use of color in instructional materials, even the color of the trainer's clothing. Color influenced the learning that occurred during the last training session you conducted, and it will influence the next. It is a force that the effective trainer harnesses and puts to use for the benefit of learning.

How do we see red?

The hows and whys of color remain hidden behind layers of conflicting explanations. A half-dozen credible sources can offer as many theories regarding the physical properties of light and color; the physiology of color vision; the best system for identifying and naming color; the way color acts on our minds and bodies. Still, there are some basic, largely undisputed approaches to the ways we receive and interpret color.

Color comes to us in four major stages: light, object, vision, consciousness. Light is the source of color. In the seventeenth century, Isaac Newton revolutionized the understanding of color when he discovered that an object's hue is not an indigenous property but the result of how the object's surface absorbs and reflects light.

Newton made his discovery when he directed a beam of light from a slit in a window shade through a darkened room and into a clear glass prism. Upon emerging from the opposite side of the prism,

the light was no longer a single, white beam but a fan-shaped spectrum of red, orange, yellow, green, blue, indigo and violet. (It is now popular to drop Newton's "indigo" from the spectrum.)

Centuries of subsequent research have taught us that varying light wavelengths are responsible for the different colors; the red end of the spectrum represents longer wavelengths, and violet wavelengths are short. The wavelengths that give color are a very small part of the entire spectrum of radiant energy; x-rays, infrared rays and radio waves are among the riot of electromagnetic waves that pass continually around and through us.

Scores of systems for identifying and naming color exist. The most widely accepted designates 24 basic hues—what we call colors—organized into primaries, secondaries, tertiaries and quaternaries (see sidebar). Color's three qualities are hue; value or tone (the hue's lightness or darkness); and chroma (the degree of purity, intensity or saturation). Color is affected by the source of light (sunlight versus fluorescent, for example) and by an object's shape and texture.

An interesting aside to this subject is the existence of "subjective" color, color that circumvents the sequence of light-object-vision-consciousness. This is color that does not result from the stimulation of light: colors seen in afterimages, those that appear in dreams, those created by pressure on the eyeball and colors generated by psychochemicals like LSD.[1] One can argue that the original source of subjective color is, in fact, light, and that our powerful color memory permits us to "see" color in the absence of the appropriate light.

How does the human eye receive and interpret reflected color wavelengths? The eye is often compared to a camera, but it is far more sophisticated; the eye not only "takes" the picture of the physical object (vision), but develops it as well (consciousness).[2]

When a human looks at an object, an image forms on the retina that is communicated to the brain via two sets of microscopic nerves called rods and cones. Rods register brightness, shape and movement, and cones register fine detail and color. Different kinds of cones are sensitive to different color wavelengths.

Rods and cones are energy transducers; they convert reflected light into nerve im-

pulses. In a widely accepted but not fully understood process, visual pigment molecules in the rods and cones absorb the light, with a puzzling effect. Upon exposure to the light the previously "colored" pigment molecules fly apart into colorless pieces; they are "bleached" by light. The bleaching process causes a drop in the receptor cell membrane potential, and this, in turn, elicits color impulses in associated nerve terminals in the brain. It seems almost miraculous that, through this convoluted process, the human eye can continually and relatively accurately receive and distinguish among 200 spectral hues.

The physio-psychology of color

A good deal of what is known about how color influences behavior is tied directly to the physical reactions triggered by certain colors. These are universal, reflexive responses not dependent upon a person's color preferences, culture or education.

Color perception is a function of both the "primitive" and "educated" parts of the brain. When the "primitive" cerebrum receives color information, it transmits a message to the pituitary gland, which responds with the appropriate hormonal reactions.

Thus, exposure to something red, or even just contemplating the color red, causes an increase in blood pressure, pulse and respiration. A red environment spurs faster muscle reactions, even faster growth in laboratory animals. Some manufacturers have tried painting their facilities' interior red based on this information. While workers were initially more active and quick, they tired more easily and had more accidents.[3] Red surroundings also step up appetite; hence the flaming decor in so many restaurants.

Exposure to blue has the reverse effect; it slows blood pressure, pulse and respiration. The continuum from exciting to inhibiting colors is believed to be red, orange, yellow, green, blue and violet, with non-colors white and black having neutral physiological effects.[4] Sophisticated health spas now lead exercisers from room to room, each area an appropriate color for the warm-up, intensive aerobic and cool-down stages.

Evolution may be responsible for these

The Washington Conference Center, a training facility owned and operated by the National Association of Realtors, has made color one of its most attractive and useful features. They chose a comprehensive color scheme of soft, light-to-deep tones of plum, mauve, gray and cream, for everything from wall and floor coverings to chair upholstery and a custom-designed purple podium. Pages 42-43: One of the center's training rooms features tall, plum-colored panels that slide back to reveal a 100-inch color TV monitor. Alternating cream and plum wall panels are suitable for pushpins. Above: Coffee breaks are held in a softly lit lobby area, where the center's color-coordinated Art Deco collection is on display. Left: Meals are served using custom-designed china, flatware and stemware.

45

physiological responses to warm and cool colors. For by far the greater part of humankind's existence, activity was controlled by the daily cycle of sunlight to darkness. Our automatic glandular gearing up at the sight of yellow, orange and red may be linked to our deeply imbedded association with our ancestors' anticipation, relief and heightened activity at the daily return of the sun. Our quieting, cautious responses to the dark, cool colors is our instinctive preparation for night.

Colors alter perceptions, too. Warm colors appear to advance on the viewer, cool colors to recede. In red light, lengths appear longer, weights feel heavier, time seems to pass more slowly and temperatures seem warmer. Under green light, the opposite effects occur.

Workers at a plant complained that their tool boxes were too heavy. After management collected the red-orange boxes and painted them light green, the employees were delighted with the same, "lighter-weight" tool boxes.[5]

One color therapist influences patients' behavior by having them contemplate the word *calm* written in green, *serenity* in dark blue and *courage* in red.[6] A blue environment has been prescribed to treat headaches, hypertension and insomnia. And for decades, hospital and prison administrators have manipulated their constituents' behavior with wall colors. The traditionally calming institutional mint green (remember your high school cafeteria?) has declined in favor of pale pinks and oranges that provide a cheerful look and a mild level of stimulation.

A color's appeal changes with its context, as advertising researchers know. Most claim little understanding of why a color is successful in packaging a certain product, but companies spend millions of dollars in testing to determine what colors will entice a shopper to take one box of sugar from the shelf, rather than another. (The correct sugar packaging

color is blue—"sweet," never green—"astringent.")[7]

Consumers testing identical laundry powders have complained that the detergent in a vibrating yellow and orange package is "too strong and apt to damage my clothing," while its lavender-packaged counterpart was "weak" and "might not get my clothes as clean as I like."[8]

That color is a powerful influence on perception was demonstrated in one large U.S. city's experience with its police cars. The bright red vehicles had been the objects of frequent sniper attacks. When they were painted blue, the incidents dropped off dramatically, apparently not merely because the cars were less visible. Citizens who were interviewed perceived the police as less hostile and meddlesome when they patrolled in the blue cars.[9]

We tend to see colors as we expect to, even when the color of a familiar object is modified or absent. For example, when the level of parking lot illumination is insufficient for seeing our car's color, but adequate for picking out form and shape, we still "see" the color. One circumstance in which color memory does not take charge is at mealtime. In thousands of tests, diners who claimed to be convinced of the normal quality of their food lost their appetite and even became nauseous when the food was subjected to lighting that made it look less than desirable.[10]

Opinion is divided on the origins and meaning of aesthetic color preference. Color expert Faber Birren claims that "color preferences are almost identical in human beings of both sexes and all nationalities and creeds." His "eternal and international ranking" for adults is, in order of popularity: blue, red, green, violet, orange and yellow."[11]

Others believe color preference has to do with class, culture, ethnicity and geography. Supporting theories abound, from those that attribute color preference to genetic differences in eye pigments (blonds like blue; brunettes like red)[12] to those that say a culture values a color according to its availability (a less civilized culture may use a lot of decorative yellow and red but prefer hard-to-produce purple).[13]

The Luscher Color Test, a personality analysis test based on color preference, would seem to refute completely the universal-preference claim. The work of Max Luscher, the test was first presented in 1947 at the International Congress of Psychologists in Switzerland and has

Citizens perceived the police as less hostile and meddlesome when they patrolled in blue cars.

What the Luscher Color Test Says About You

An abbreviated version of the Luscher Test asks the subject to arrange and rearrange eight colored cards—neutral gray, dark blue, blue-green, orange-red, bright yellow, violet, brown and black—in order of preference. While a trained administrator must organize the subject's choices using a strict set of formulas, and then interpret the data, it is possible to gain some quick and reliable insight from the subject's first-choice color.

The following are some key descriptors the Luscher Test has assigned to a first-choice placement of each color. The first-choice color represents characteristics to which the subject is attracted, not necessarily those he or she possesses.

Gray	Blue	Green	Red
Neither subject nor object; inner nor outer; tension nor relaxation	Calm	Elastic tension	Desire
Border; demilitarized zone	Relaxation	Tenacity	Appetite
Uncommitted	Recuperation	Firmness	Achievement
Insulated	Security	Consistency	Success
Participates by remote control	Loyalty	Resistance to change	Intensity of experience
Concealment	Depth of feeling	Self-awareness	Vitality
Unrecognized desire for what is represented by color in second position	Empathy	Possession	Power
	Meditation	Pride	Sport
	Femininity	Astringence	Competition
	Contentment	Self-control	Eroticism
	Fulfillment	Accuracy in detail	Enterprise
	Favored by the overweight	Clarity in presentation	The present

Yellow	Violet	Brown	Black
Suggestion	Identification, either erotic or intuitive	Senses	Nothingness
Non-substantial cheerfulness	Mystic union	Physical body	Extinction
Relaxation	Enchantment	Safety	No
Expansiveness	Wish fulfillment	Hearth and home	Renunciation
Dilation	Wavering	Gregariousness	Stubbornness
Release from burdens	Irresponsibility	Homogeneity	Protest
Piquancy	Immaturity	Familial security	Revolution against fate
Volatility	Pregnancy		
Fits and starts	Glandular malfunction		
Modern	Emotional insecurity		
Developing			
Unformed			
Hopefulness			

Building Color

3 Primaries
The colors from which all others are made.
Blue, red, yellow.

3 Secondaries
Combinations of any two primaries.
Violet (blue and red), orange (red and yellow), green (yellow and blue).

6 Tertiaries
Combinations of a secondary color with an additional quantity of one of its constituent primaries. Plum (blue violet), mulberry (red violet), russet (red orange), flame (yellow orange), citron (yellow green), slate (blue green).

12 Quaternaries
Combinations of a tertiary with either its constituent primary or secondary.
No standardized names for these intermediate hues that vary only slightly from their adjoining hues.

Each hue is subject to an infinite number of gradations toward both black and white. The human eye can distinguish 200 hues.

47

been used ever since as a diagnostic tool by psychiatrists, psychologists, placement officers, marriage counselors, even physicians, who use the test to evaluate a patient's risk of heart attack and gastrointestinal problems.

The test asks the subject to consider a number of colored patches and arrange them in descending order of preference. The full test uses seven panels of color containing, in all, 73 color patches consisting of 25 different hues and shades, requiring 43 selections. A shorter and less comprehensive, but still valuable, version uses eight basic colors. The subject is discouraged from associating the colors with any object, the goal being to identify "pure" preference.

The Luscher Test purports that it is a color's "structure" or meaning that is constant and universal, not its popularity.[14] In other words, dark blue means peace and quiet to everyone. It is

the "function" of the color, according to Luscher, a person's attraction, rejection or neutrality toward its meaning, that reveals the subject's personality. A trained interpreter uses the placement of each color and the relationship of one color to another to identify the subject's anxieties, compensations and conflicts and, presumably, happy facets of the personality as well (see box on page 47).

Strangely enough, a subject's color blindness is no obstacle to obtaining an accurate personality reading, according to Luscher. The color-blind person can distinguish tonal values and so, by identifying his or her preference for the light and dark qualities of the patches, accurately demonstrate attraction, repulsion or indifference to the patches, just as if he or she were reacting to the hues.

A word about color blindness. The most prevalent kind is the inability to distinguish between red and green; they

appear as light and dark shades of gray. This disability affects one man in 20 and one woman in 200. Few have defective blue/yellow vision, and seldom is a sighted person totally color blind.

How can the training and development professional apply a knowledge of color physiology and psychology to the learning experience? How can trainees be made relaxed yet stimulated, sympathetic yet respectful, with a heightened capacity to acquire and retain knowledge and skills. . .through the effective use of color? A good place to start is where it all happens: the training facility.

The importance of being earthtone

Nature has conditioned humans to feel most comfortable with a dark value beneath the feet, a medium value at eye level and a light value above, recalling the tones of the earth, foliage and sky.[15] This is a good rule to observe since one of the primary design objectives for the training facility is creating and reinforcing the trainee's sense of well-being.

Perhaps it has been an effort to support that sense of well-being that has led organizational classroom designers to earthtones for so many years. The Luscher Color Test, after all, associates brown with safety and a sense of being among family members, at home. In fact, the insistence on using every imaginable shade of brown in the training facility has been a good decision; earthtones are a

The color-correct trainer balances a serious, professional image with one of likeability and trustworthiness. This ensemble of camel blazer, brown slacks (or skirt), beige shirt and dark tie was recommended by a color consultant precisely to achieve that balance. Very dark, pinstripe suits carry a heavy power message and should be avoided by trainers in most situations.

psychologically sound, inoffensive and practical middle ground between the passions of red and the utter tranquility of blue.

Some new facilities, however, are finding alternatives to browns that fall in that same middle ground of "safe" hue, value and chroma. The Washington Conference Center, pictured on pages 42-43, has chosen shades of plum, mauve, gray and cream.

Some have suggested that different color facilities are needed for different activities. Kurt Goldstein found that ideas and actions emerge from red surroundings and that green is needed for meditation and task fulfillment.[16] Like the health clubs mentioned earlier, a series of rooms, or at least changeable wall coverings, could provide an environment to increase tension and stimulate the nervous system for tackling a challenging new skill, and one to relieve tension for review and questioning.

Because red light causes time to seem to pass more slowly, it must be used carefully in the classroom. Red should be avoided in rooms where testing is taking place; trainees' pulse and blood pressure are likely to be higher than normal already during a test. Warm colors are appropriate for welcoming areas and for break rooms where trainees relax and socialize.

Color can be used to alter an architecturally unsatisfactory room. More or less arousing colors and textures can, respectively, lower or raise the perceived level of a ceiling. Painting opposite walls of a narrow room darker and lighter shades of the same color makes the room appear wider.[17] And, as a rule of thumb, light colors create a feeling of spaciousness.

Getting dressed

When selecting a professional wardrobe, the trainer should observe many of the same rules that apply to classroom decor. Non-distracting colors that are neither too warm nor too cool work best.

The trainer should also choose colors according to the audience and the relationship he or she wants to establish with them. Brenda York, founder and president of the Association of Fashion and Image Consultants, says that in most cases trainers should balance a serious, professional color image with one of likeability and trustworthiness. The dark blue or black solid or pinstripe suit that comes so highly recommended nowadays carries too heavy a power message for the

trainer, unless he or she is working with a power group, of top managers for instance. A short man who believes his physical stature detracts from his authority, or a woman who would like to appear more powerful, may want an extra boost from a dark "power suit," according to York.

For a trainer's typical day York suggested a camel blazer, brown slacks or skirt, off-white shirt or blouse and a rust and camel paisley tie or scarf. Other non-threatening color combinations are a gray suit with pale blue shirt or blouse; beige suit with blue shirt or blouse; and blue suit with pale yellow shirt or blouse. A man should not wear a shirt that is darker than his suit; this look has gangsterish connotations. A bright, starched white shirt should be avoided, however, because it can create a harsh glare under artificial light.

Women can dress more colorfully than men, according to York, but they should not overdo it. If a woman needs to look more authoritative than friendly, she should avoid pastels and all shades of purple and stick with the standards of blue, brown and gray.

Training with color

Some instructional design researchers make a claim that may surprise the average trainer: that the use of color, in and of itself, does not improve learning. Only "if the color is relevant to the performance of some cognitive or psychomotor objective," should a medium able to display colors be chosen, wrote training media expert Ronald Anderson. And Robert Reiser and Robert Gagne, authors of *Selecting Media for Instruction*, cite several studies that indicate "the use of color in instructional materials will not result in increased learning unless color is directly relevant to what is being learned."[18]

It is generally agreed that color has a stronger affect on children's learning than adults'. Some have suggested that color is used in adult instructional materials because it is effective in marketing the materials, not in their actual application.[19]

Others believe color can be very useful in adult learning. Instructional media researchers Richard Lamberski and Francis Dwyer of the University of Pennsylvania point out that today's learners are continually assaulted by sensual stimuli, more and more of it loud, fast and colorful. "Since the human organism possesses a limited capacity for assimilating and pro-

cessing information, it is constantly selecting and rejecting—both consciously and unconsciously—incoming visual stimuli for subsequent retention."[20]

Lamberski and Dwyer emphasize that random color is not useful. However, they point to a number of studies, including one of their own, that find the use of color "in situations where color did not contribute to the message content but functioned only as a cueing device" facilitated learning of both paired associate and concept learning tasks.[21]

The study found that "a color code is an attention-getting strategy that can produce measurable effects on cognitive learning that cannot be accounted for purely by words or labels."[22] The researchers saw substantial evidence of learners' preference for color materials, and they concluded that "a learner's preference may affect learning by directly influencing attention or motivation."[23] This should be reassuring to most trainers, who love to use color in training media from flip charts to interactive video programs.

In many learning situations color-coded materials are necessary for making correct discriminations among complex systems, as in medical illustrations and electronics manuals. The keys to effective use of color are consistent and conservative treatment. As J.H. Kenner reports in his summary of several studies evaluating the effect of color coding on serial learning, "A consistent finding is that as the number of color coded items increases, the value of color as a cue for selecting important information decreases."[24]

Lamberski's and Dwyer's study, among others, found that, as an "integrated code strategy," color was especially effective in aiding structured, self-paced learning.[25] Learners who used color-coded instructional materials tested better than those who used black and white. Color-coded learners who were given black-and-white tests scored as well as those using both colored learning materials and tests, indicating that the learners "utilized an enhanced and rehearsed associative memory structure obtained through working through the color-coded self-paced instructional materials."[26]

While the color-coded learners' retention rate declined at about the same rate as the black-and-white learners', their initial higher level of learning was evident in their superior scores on retention tests.

Following are some ways to use color

49

Left: Venture Concepts Systems' Net Pro marketing and training materials are linked by color. They're aimed at people who want to assess their chances for entrepreneurial success; the bright colors are more inviting and optimistic than the black-and-white forms distributed by banks for the same purpose.

Center: Career Systems uses color-matched employee/manager materials to help the two parties stay on the same career planning track.
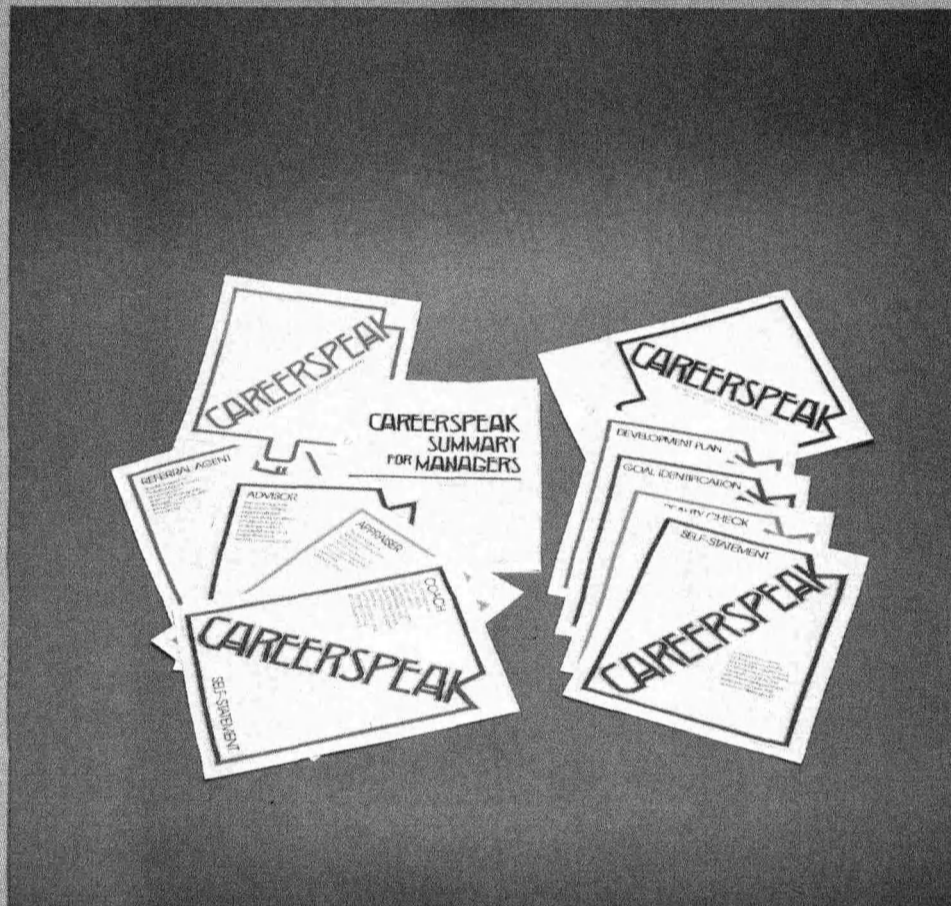
Bottom: Vugraphs' purposes are ideally suited for color use: providing at-a-glance information capsules and relieving the tension of concentrated learning. The "Patient Care" vugraph is from Cook/Cavanaugh Associates; the others are from Alice G. Sargent. All materials designed by Berns & Kay, Ltd. Washington, D.C.
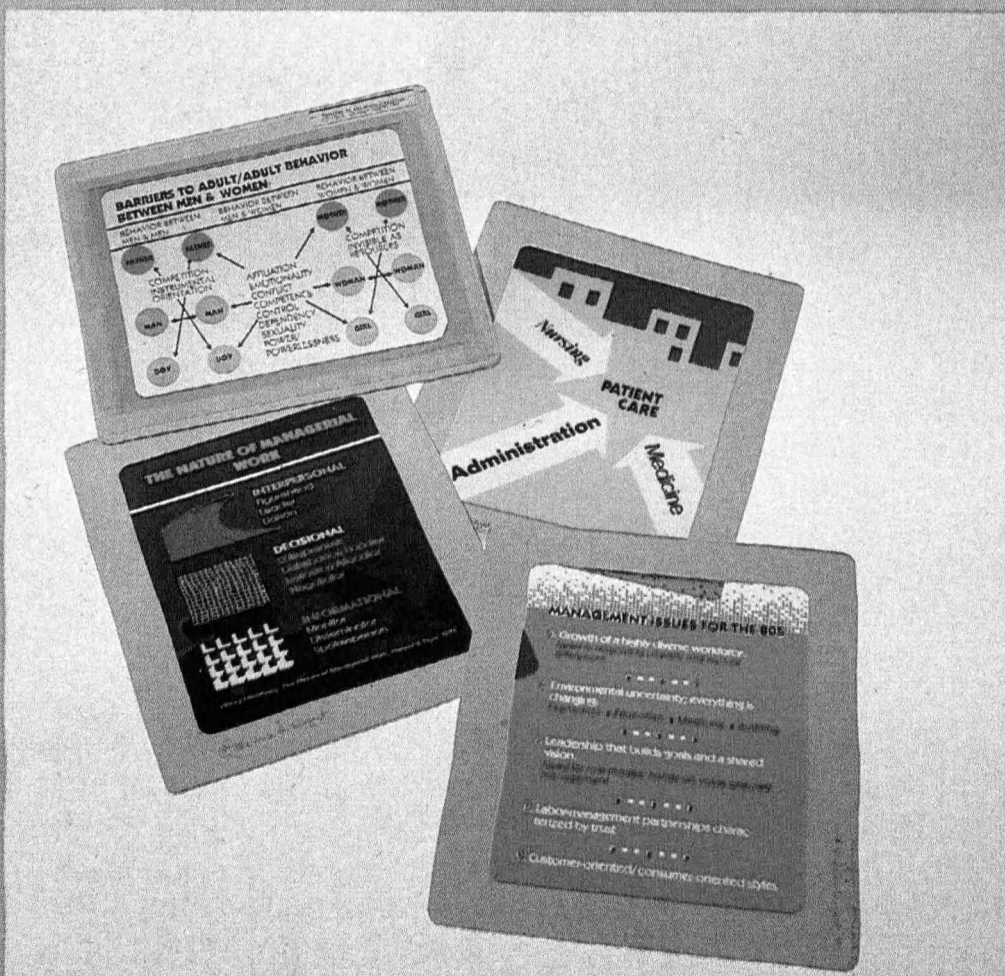
effectively in various training media.

■ *Static displays (charts, overheads, slides)*—Any of the following combinations will increase visibility: yellow on black; white on blue; black on orange; black on yellow; orange on black; black on white; white on red; red on yellow; green on white; orange on white; red on green.[27] Use color to organize and sequence information and to relieve the tension of learning.

■ *Printed materials (manuals, texts)*—A pale color, visible when covering a large area, may be almost invisible when used to print a word or a fine line, while a dark color will appear almost black and bright colors will create an illegible dazzle effect. Text printed over a broken ground such as an illustration or photograph is difficult to read. A strong color or black-and-white pattern is an irritant when positioned close to the text at the periphery of the visual field. If the printed page will likely be photocopied, keep in mind that colors will appear as black or gray, or disappear completely.[28]

■ *Film and video*—Keep colored letters large. Outline them in black or white to prevent them from visually merging with an adjacent color. Avoid pure whites, yellow and light off-whites, which produce glare; light colors will appear white. Medium tones reproduce best; dark colors may appear black. Use gray or a complementary color as a background for a colored object; black backgrounds are good for making both light and dark colors appear brighter. Warm colors will appear nearer and larger than cool colors.[29]

Color and the consultant

Cosmetics and laundry detergent aren't the only products that can be packaged effectively through color. Thousands of independent consultants in training and human resource development rely on printed materials, from letterhead and business cards to sophisticated brochures and direct mail campaigns to communicate the desired image and drum up clients. Their sensitivity to color can literally make or break their business.

Identifying the market and conceiving a strategy to match image, medium and message content to that audience's perceived needs is the first and most important step in promoting consulting services, according to Linda Berns, vice president of Berns & Kay, a graphic design firm specializing in educational and promotional materials for training consultants. She says color, in its role as a creator of mood and tone, is an impor-

tant part of that strategy.

More than one of Berns' clients has approached her with color swatches in hand, fresh from a professional color consultant, asking Berns to design promotional materials that fit their color profile. This is not a bad idea, according to Berns. "You must be comfortable with the colors in your promotional pieces; after all, they're representing you. Sometimes you have to start conservative, but, as you build credibility, you can move toward more individual, unusual color use."

One of Berns' clients, for example, a well-known consultant who deals in "soft" subject matter such as communications and team building, uses purple and lavender promotional materials successfully, even with conservative corporate clients. "Sometimes corporate executives sorely feel the need for an outsider to come in and teach them how to handle their people problems. What they know is black, gray and navy, and a touch of unusual color helps them identify this consultant with what they don't know."

Another consultant uses a rainbow of related promotional materials, color-keyed to the educational materials they promote. The simple, uncluttered designs in orange, green, purple, blue and red "still look professional," says Berns, "but corporate clients like them because they convey something warm and compassionate about the consultant and the organization that uses her services. They feel these kinds of materials show them as more caring, more interested in their employees."

A well-thought-out color strategy should be the self-promoter's goal, whether it is to stand out from the crowd or to be compatible with the traditional colors associated with a marketplace. Berns advises most consultants, especially newcomers, to stay with what's expected. "The corporate and institutional markets respect black, navy and maroon inks on white, off-white or gray paper,"

Berns says. Banks, accountants and other financial organizations like dark green or black ink, again on white, ivory or gray. Touches of silver are nice for financial types, but never, ever, use red.

References

1. Whiton, S. *Interior design and decoration*, New York. J.B. Lippincott Company, 1974.
2. *Ibid.*
3. Don, F. *Color your world*. New York: Destiny Books, 1983.
4. Sinofsky, E.R., & Knirk, F.G. Choose the right color for your learning style. *Instructional Innovator*, March 1981, 17-19.
5. Mueller, C.G., & Rudolph, M. *Light and vision*. New York: Time Incorporated, 1966.
6. Suplee, C. See red, do red. *The Washington Post Magazine*, September 11, 1983.
7. Luscher, M. [*The Luscher Color Test*] (I. Scott, Ed. and trans.) New York: Washington Square Books, 1969.
8. Kupchella, C. *Sight and sound*. Indianapolis: Bobbs-Merrill Company, 1976.
9. Don, F. *Color your world*.
10. Mueller, C.G., & Rudolph, M. *Light and vision*.
11. Birren, F. *Color psychology and color therapy*. New York: University Books, 1957.
12. Suplee, C. *See red, do red*.
13. Whiton, S. *Interior design*.
14. Luscher, M. *The Luscher Color Test*.
15. Whiton, S. *Interior design*.
16. Goldstein, K. *The organism*. New York: American Book Company, 1939.
17. Sinofsky, E.R., & Knirk, F.G. *Choose the right color*.
18. Reiser, R.A., & Gagne, R.M. *Selecting media for instruction*. Englewood Cliffs, N.J.: Educational Technology Publications, 1983.
19. Hartley, J. *Designing instructional texts*. New York: Nichols Publishing Company, 1978.
20. Lamberski, R.J., & Dwyer, F.M. The instructional effect of coding (color and black and white) on information acquisition and retrieval. *Educational Communication and Technology*, Spring 1983, 9-21.
21. *Ibid.*
22. *Ibid.*
23. *Ibid.*
24. Kenner, J.H. *The instructional effectiveness of color in television: A review of the evidence*. Washington, D.C.: Department of the Army, Office of the Assistant Chief of Staff for Communications-Electronics, 1968. (ERIC Document Reproduction Service No. ED 015 675).
25. Lamberski, R.J., & Dwyer, F.M. *The instructional effect of coding*.
26. *Ibid.*
27. Sinofsky, E.R., & Knirk, F.G. *Choose the right color*.
28. Hartley, J. *Designing instructional texts*.
29. Utz, P. *Video user's handbook*. White Plains, N.Y.: Knowledge Industry Publications, 1982.

Color coding is a tried and true method of organizing work materials and processes. What office hasn't used color-coded file folders to differentiate one group of customers from another? Here, yards and yards of electrical wire make a pretty picture; later, electricians will use the colors to make sure they don't get their wires crossed.