DOCUMENT RESUME

ED 408 956 IR 018 369

AUTHOR	Johnson, Ed
TITLE	The Meaning of Color in Trademarks.
PUB DATE	Jan 97
NOTE	13p.; In: VisionQuest: Journeys toward Visual Literacy. Selected Readings from the Annual Conference of the International Visual Literacy Association (28th, Cheyenne, Wyoming, October, 1996); see IR 018 353.
PUB TYPE	Reports - Research (143) -- Speeches/Meeting Papers (150) -- Tests/Questionnaires (160)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	*Color; *Color Planning; *Dimensional Preference; Models; Questionnaires; Research Needs; *Symbolism; Use Studies; Visual Arts; *Visual Perception; Visual Stimuli
IDENTIFIERS	*Color Stimuli; *Logographs

ABSTRACT

Accurately denoting colors and measuring their meanings have been long-standing challenges for scholars and artists alike. This study addressed this problem by suggesting that the use of a model of cyan, magenta, and yellow primary colors--which is common in industry but is generally neglected by scholars and fine artists--could greatly benefit scholars who conduct color-related research. In the study, over 500 fictitious trademarks were uniquely colored by using this commercial model. Questionnaires soliciting reactions to these trademarks were completed by a total of 569 respondents, with 38 eventually being discarded because participants indicated that they were color blind or slightly color blind. Respondents were each randomly assigned a one-page questionnaire. On the top right of the questionnaire was the randomly colored trademark; the participant was asked to evaluate the trademark in terms of 57 scales. The results revealed five predominant scales, or factors, which accounted for 90% of the total variance examined in this research: "activity," "up scale," "nice," "worn out," and "brassy." For example, respondents tended to see companies as more active when their trademarks contained a substantial amount of cyan while lacking yellow. The greater percentage of yellow used in a trademark, the more its company was perceived as "worn out." This study calls for the use of the professional color model of cyan, magenta, and yellow to become the conventional measure in future scholarly research of color. The questionnaire is appended. (Contains 28 references.) (AEF)

The Meaning Of Color In Trademarks

by Ed Johnson

Abstract

Accurately denoting colors and measuring their meanings have been long-standing challenges for scholars and artists alike. This study addresses this problem by suggesting the use of a model of cyan, magenta, and yellow primary colors, which is common in industry, but generally neglected by scholars and fine artists.

For this study, over 500 fictitious trademarks were uniquely colored by using this commercial model. Respondents evaluated these trademarks in terms of 57 scales. The results found five predominant factors (or meanings). Significant relationships were found between these meanings and the presence of these three primary colors.

Introduction

Scholars and artists have long discussed the nature of color, but failed to find a generally accepted system to denote specific colors until the 1930s. Since then professionals have used a three-color model in photography and printing to accurately reproduce colors. Strangely enough, this common industrial model is virtually never used by communication scholars and fine artists. Instead, they typically reply on earlier and less satisfactory models. This paper argues that the use of this industrially accepted color model could greatly benefit scholars who conduct color-related research.

Models Of Color Denotation

The modern notation of color began three centuries ago when Newton created his color wheel from the seven colors he observed in the rainbow. Waller created a chessboard color system to more effectively portray tints, shades, and hues. In 1772 Lambert added a third dimension by graphing color in the form of a pyramid (Birren, 1969). A century later, Maxwell (1877), the discoverer of the electromagnetic theory of light, was the first to measure color quantitatively by the means of revolving colored disks.

These new theories encouraged others to reformulate how fine artists might perceive relationships among colors. Cheveul's *Principles of Harmony and Contrast of Colors* (1839) greatly influenced the Impressionist movement, and the theories of Wilhem Ostwald influenced the German Bauhaus' use of color. Ostwald was also a colleague of American professor and colorist Albert H. Munsell (1994). Perhaps because of his presence here, Munsell's system became most common in America. Today many American fine artists and communication scholars continue to use his system.

Unfortunately, there are at least four serious problems with the Munsell system. It tends to be *nominal*, *unbalanced*, *outmoded*, and *unconventional*.

Munsell's system uses nominal terms rather than interval levels to denote hues. Colors are merely noted in terms of being "red," "yellow," "green," "blue," and "purple."

This nominal system limits the ability to analyze research results. Nominal-level data limit the use of more powerful statistical techniques that permit interval-level data (Hays, 1988). Such nominal-level data also make it nearly impossible for researchers to determine precisely when a color changes from one hue to another. There is no instrument to determine when a green becomes a blue-green. The Munsell system has the possibility of colors being subjectively and inconsistently denoted.

The problem of being unbalanced is best seen in the "Munsell Students Charts" that accompany Munsell's *A Color Notation* (1988). In it there are ten charts, one for each hue. These ten hues are represented with anywhere from 20 color chips (e.g. yellow) to 30 (e.g. red) color chips. Besides this disproportionate representation of hues, there are also abnormal distributions of color chips within these charts. The patterns of these charts tend to be skewed. For example, the color chips for yellow are heavily skewed toward the bright top of their chart.

Such an irregular model is problematic. Statistical techniques that assume a normal distribution should be avoided with such abnormally distributed scales (Hays, 1988).

As to being outmoded, Munsell (1988) originally conceived his color notation in 1898 as a tool to teach his color-composition students. His system is based on his personal evaluation of the pigments of his day, and lacks an index for the vivid synthetic organic pigments of today (Mayer, 1985, p. 408).

Although Munsell's system is still a useful tool that enables artists and scholars to subjectively denote color, it predates modern instruments that can measure color objectively. Interestingly, Munsell's own publisher, Macbeth, sells color densitometers (Macbeth, 1989). These instruments measure color not with Munsell's notation, but in terms of a more current system described by the Committee on Colorimetry (1943. 1944a, 1944b, 1953) and discussed more fully below.

Regarding Munsell's system being unconventional, professionals (such as photographers and graphic artists) who need to precisely reproduce colors virtually never use the Munsell system—nor are they trained to. For example, a student can earn a bachelor's degree in color without once encountering the Munsell system (Brooks Institute of Photography, 1969).

Because these earlier models, such as Munsell's, were inadequate for commercial professionals who needed an objective, measurable model by which to reproduce colors accurately, color research intensified throughout the first half of this century. Industrial researchers continually returned to the premise that a full spectrum could be denoted in measurable terms by only two or three "primary" colors. For example, inventors between 1910 and 1930 worked on a large number of experimental color processes for movies, including two-color processes that dyed film red and blue-green. In 1932 the Technicolor Motion Picture Corporation introduced its three-color imbibition process in which dyes were transferred to the film's gelatin coating, with results superior to any two-color process. About the same time, Kodak introduced its Kodacolor film, using a similar three-color system. Today all color photography is based on this three-color principle (Mees, 1961).

Perhaps the best description of this three-color measurement of color is to be found in Hardy's *The Handbook of Colorimetry* (1936) and his subsequent article on the topic (1937). Following these publications, the Committee on Colorimetry of the Optical Society of America (1943, 1944a, 1944b, 1953) published a series of articles that present in measurable terms virtually the same denotation of reproducible colors.

Hardy presents the three subtractive primaries (cyan, magenta, and yellow) and their complementary secondaries (red, green and blue) in terms of their specific wavelengths. These six colors are based on the "tristimulus values of the spectrum colors" (Hardy, 1936, p. 7). This color model is now used universally by those who reproduce colors through photography, graphic arts, and broadcasting.

The three-color model of color notation has none of the problems found in the Munsell system. Because it is the foundation for the present professional notation of color, it is neither outmoded nor unconventional. Because it allows for the interval measurement of color, it has none of the problems of nominal-level data. And because it can measure all three of its color dimensions on identical scales (such as from 0 to 100 percent), it does not have the problems of Munsell's irregular model. On the other hand, the three-color model of color notation can denote all the colors of the Munsell system.

In spite of all these advantages, communication researchers rarely use this three-color system. An extensive review of the literature failed to find one example of its use.

For these reasons, I suggest the use of the three subtractive primaries (cyan, magenta, and yellow) be considered by scholars and researchers of color in the future in place of the use of the Munsell system.

Measuring the Meaning of Color

Osgood, May, and Miron (1975) provide one of the most important works on the meaning of color. From a wide variety of research, they summarize how different colors tend to elicit meanings of activity, potency, and evaluation.

Interestingly, although Osgood wrote the "color solid" analysis of colorimetry (1953, p. 129), he failed to address the quantitative measurement of color in his writings on the meaning of color. His findings lack the objective denotation of color discussed above.

Regarding the measurement of the meaning, Osgood encourages researchers to develop their own scales that are appropriate to each investigated topic: "[the] criterion in scale selection is *relevance* to the concepts being judged" (1978, p. 78). Osgood elaborates:

> [A]lthough there are, we believe, standard *factors* of judgment, the particular scales which may, in any given research problem, best represent these factors, are variable and must be carefully selected by the experimenter to suit his purposes (1978, p. 80).

In summary then, the first purpose of this present study is to show the viability of using the current industrial color system of cyan, magenta and yellow to denote a full range of color (hopefully avoiding the potential problems of Munsell's system). The second purpose is to use original scales, as recommended by Osgood, to examine the meaning of these colors.

Research Questions

Osgood (1975) found three basic dimensions of meaning—evaluation, activity, and potency. The first set of research questions (RQ1–RQ3) predicts that this present study will find factors similar to those three dimensions repeatedly found by Osgood. (It is assumed that each research question has a null hypothesis in which no significant results are predicted.)

RQ1 A factor will be found that is similar to Osgood's factor of evaluation.

RQ2 A factor will be found that is similar to Osgood's factor of activity.

RQ3 A factor will be found that is similar to Osgood's factor of potency.

The other group of research questions (RQ4–RQ6) predict significant relationships between these factors and specific colors, similar to the results found by Osgood, May, and Miron (1975, p. 327). In summary, they found that blue related to a positive evaluation, red to potency, and red and yellow to activity.

RQ4 Blue (cyan+magenta), and green (cyan+yellow) will connote positive evaluation.

RQ5 Red (magenta+yellow) will connote potency.

RQ6 Red (magenta+yellow) and yellow will connote activity.

Method

Sampling

Respondents were sought who approximately represented the general population. Intercepts in a variety of public locations (such as a restaurant, laundry, and grocery store) were used to contact respondents from in and around a major Midwest city. Questionnaires were completed by a total of 569 respondents during October, 1995.

Because this experiment was designed to measure the effect of color, a question was asked at the conclusion of the survey in order to detect those who were colorblind. The question asked people whether the respondent was colorblind, with the possible responses being, "yes," "slightly," and "no." The "slightly" option was included to detect those with partial colorblindness. Two respondents indicated that they were colorblind and 36 others indicated that they were slightly colorblind. The responses from these 38 people were deleted. Of the remaining 531 respondents, 323 indicated that they were female and 208 male. Ages ranged from 12 to 77, with the average age being 25.

Survey Instrument

Respondents were each randomly assigned a one-page (11" X 8.5"), horizontal questionnaire. On the top right of the questionnaire was the randomly colored trademark (the stimulus material). Below it was a sentence requesting the respondent to evaluate the trademark in terms of 57 scales. The rest of the page was filled with two columns of scales. An example of the survey instrument with a medium gray trademark is included at the end of this article.

For at least four reasons it seemed appropriate to use a familiar context, such as a trademark, as a vehicle by which to present colors. First, trademarks are ubiquitous in American culture, so there is ecological validity in their use. Second, because a trademark may consist of different elements—such as typography—color as an independent variable may be somewhat masked from the respondents. Third, respondents can project their responses onto the personality of the company that would use such colors. Fourth, national trademarks are registered with the Department of Commerce, so one may compare these results with the colors actually registered. (Interestingly, only seven nominal colors may be registered—"red," "orange," "yellow," "green," "blue," "purple," and "other"—besides the achromatic black, white, and gray.)

Because of these reasons, it was decided to present the colors to be evaluated in the form of a trademark. The initials for the fictitious "BFH" company were selected at random. The selected typeface was Cooper Black—a heavy typeface that provided more inked area on the page for the colors being tested. No other logo or graphic element was included. All the trademarks were presented on the solid white background of the questionnaire.

A unique color was found for each trademark on the 569 questionnaires completed. In an extensive review of the literature, this is the only example found where random, interval-level color was used. Each trademark was printed in only the three subtractive primary colors—cyan, magenta, and yellow. Using a computer program to generate random numbers, random amounts of these three primary colors were found for all 569 questionnaires. Each uniquely colored trademark was then coded with a six-digit identification number that indicated the percentage of each color. For example, questionnaire number "69-42-63" indicates 69 percent cyan, 42 percent magenta, and 63 percent yellow.

Colored trademarks were printed by an ink-jet printer. Tests were conducted to compare how well these assigned colors matched their counterparts from the *Pantone Process Color Selector* (1983)—a book designed to specify such colors. The ink-jet printed colors had the same appearance as their corresponding Pantone example. This confirmed that the trademark colors do appear as they are supposed to, and that such an experiment could be successfully replicated later.

Regarding scales, there were three sources used in compiling semantic terms to be used for this study. The first was used to include those terms that are expected to be communicated by actual colored trademarks. A previous survey (Johnson, 1994) of 125 corporate executives of *Fortune* 500 companies asked the open-ended question as to what specific qualities their trademarks were meant to connote. The participants responded with 14 different terms that became the bases for this study's scales.

Next, to find whether the random colors being evaluated in this study connote the same meanings as had been found in previous research, the writings of Charles Osgood, May and Miron (1975) regarding the meaning of color were used as this second source.

A final source was included in an attempt to ensure are many meanings were included as possible. For this last source, responses were gathered from 16 visual communications students who had been asked what these randomly selected colors meant to them.

The lists of semantic terms from these three sources were compiled. Duplicate meanings were eliminated. Because the term "feminine" was included, its polar opposite "masculine" was also eliminated. This resulted in a final list of 57 different semantic terms (the complete list is available from the author). The 57 semantic terms were placed in alphabetical order to avoid a possible pattern of positive and negative evaluative terms.

The scales used with these terms reflect two modifications made by Zillmann (Johnson, 1995) to the Osgoods' (1978) original semantic differentials. One change is that the scales extend to "10." One advantage of this is that it allows a greater possible range of responses. Another advantage is that people are accustomed to making evaluations on a decimal-based scale. The other change is that each scale has only one semantic term rather than a pair of polar-opposite terms. New scales offered a range of agreement with each single semantic term, from "not at all agree" (1) to "extremely agree" (10). This eliminates any possible disagreement as to the selection of pairs of terms being polar opposites.

Settings

As the writings of Albers (1963) shows, adjacent colors can have a substantial effect on each other. For this reason, care was taken to ensure that no other color than the trademark appeared on each white questionnaire. The only other thing to appear on the questionnaire were the scales and instructions, which were printed in black.

Although adjacent colors can affect perception, previous research by Land (1959, 1977) shows that the human eye radically adjusts to widely different light sources. This is why people perceive white paper as white, whether it is viewed under green fluorescent, yellow incandescent, or blue north light; whereas conventional color photographs taken under these diverse settings would show marked color shifts. For this reason, no extraordinary precaution was taken to alter the light sources of where these trademarks were viewed.

Results

Five Factors of Color

To test the first three research questions (RQ1–RQ3), factor analysis was used to explain the relationship among the scales in terms of their underlying factors. The overall measure of sampling adequacy (MSA) was .94 with the lowest being .83. (An MSA score of .80 is generally considered more than adequate.)

The Kaiser method (Rummel, 1970) was used to determine the number of factors to examine. In this method, only factors with eigenvalues greater than 1.00 are retained. Five factors were found that met this criterion. The skree chart was also examined to confirm the soundness of this number of factors.

The rotation used was Varimax (the most common form of rotation). Scales with a factor loading of .60 or greater were kept to represent these factors in subsequent analysis. Thirty-two scales had loadings of .60 or greater on these five factors.

Chromebach's alpha was used to examine the scales that constitute each of these factors. The results appear sound, with the five factors having an average Chromebach alpha score of 0.86 and a range from .95 to .76. These five factors account for 90 percent of the total variance examined in this research (the full table is available from the author). Below is a summary of each of these five factors.

"Activity" is the phrase selected to describe the first factor, and it clearly supports the second research question (RQ2) regarding "activity." The terms from 13 scales loaded most heavily (with loadings of .60 or greater) onto the first factor. These semantic terms are "vibrant," "wild," "upbeat," "youthful," "energetic," "unique," "trendy," "innovative," "new," "sexy," "modern," "refreshing," and "sociable." The phrase "active" was subjectively selected to name this factor. This first factor accounts for 46 percent of the variance examined in this factor analysis.

"Up scale" is the phrase selected to describe the second factor. Six terms loaded most heavily onto the second factor. These terms are "rich," "professional," "sophisticated," "quality," "regal," and "serious." This second factor accounts for 19 percent of the variance examined in this factor analysis.

The third factor is named "nice." The six more terms that constitute this factor—"soft," "gentle," "cozy," "quiet," "calm," and "pleasant"—may also represent impotence, supporting the third research question (RQ3) regarding "potency."

"Worn out" is the phrase used to describe the fourth factor. It comprises the terms "depressing," "tired," "musty," and "tacky." It accounts for nine percent of the variance examined, and it is the factor that represents a most negative evaluation.

"Brassy" is the phrase used for the last factor. It contains only three terms—"big," "bold," and "blunt." It accounts for only four percent of the variance.

There is no one factor that decidedly represents evaluation, and so the first research question is not clearly supported. One could argue that the first three factors—activity, up scale, and nice—all represent different aspects of positive evaluation. In the same way the last two factors—worn out and brassy—may be seen as reflecting negative evaluation. The support for such speculation, though, seems questionable.

In summary the second and third research questions regarding activity and potency are specifically supported by these results. On the other hand, the first research question regarding evaluation is not specifically supported.

Five Meanings of Color

To examine the meaning of color, a single score—ranging from 1 to 10—was found for each of the five factors described above. This was done by finding the mean score of the words that constitute each factor. These mean scores were then used as dependent variables in further statistical analysis.

The independent variables were the random percentages of the three primary colors present in each questionnaire's trademark. Regression was selected as the most appropriate statistical technique to use to test the relationship between these factors and colors. Because it was believed that there may be curvilinear relationships between these sets of variables, quadratic as well as linear relationships were examined.

The stepwise method was used to select those independent variables (colors) that would best predict scores for each of the factors. For conciseness, only those models are reported here that have the greatest number of statistically significant colors. An alpha level of .05 was used to determine which colors to use as significant predictors in each regression model.

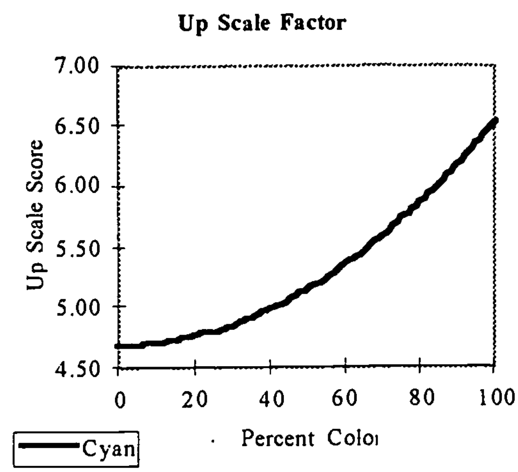
The standard statistical assumptions for regression were checked. It was found that many of the respondents tended either to agree strongly or disagree strongly with the terms used on the survey's scales. This high frequency of responses toward the extremes of the scales resulted in a distribution flatter than the conventional bell curve. Scores for kurtosis range from −.55 to −.82, which significantly depart from the normal distribution. These abnormal distributions are reported here, with the original data scores being used in a conventional manner in the regression technique and reported below.

Cyan means up scale (Figure 1). The greater the percentage of cyan used in a trademark, the higher its company tended to be evaluated in terms of being up scale.

Figure 1
Summary of Stepwise Regression Analysis for Variables Predicting the "Up scale" Factor (N = 503)

Variable	*B*	*SE B*	β
Intercept	4.36	0.13	
Cyan^2	>0.01	>0.01	.26*

Note. R^2 = .07
*$p < .05$

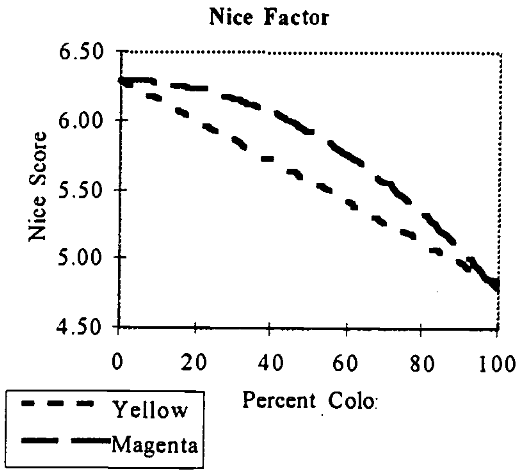


The greater the presence of yellow and magenta used in a trademark, the lower its company tended to be evaluated in terms of being nice (Figure). If one were to accept that these "up scale" and "nice" factors are analogous to Osgood's factor of positive evaluation, then these results support the fourth research question (RQ4).

Figure 2
Summary of Stepwise Regression Analysis for Variables Predicting the "Nice" Factor (N = 514)

Variable	*B*	*SE B*	β
Intercept	6.29	0.22	
Yellow	−0.01	>0.01	.19*
$Magenta^2$	−0.01	>0.01	.19*

Note. R^2 = .07
*$p < .05$

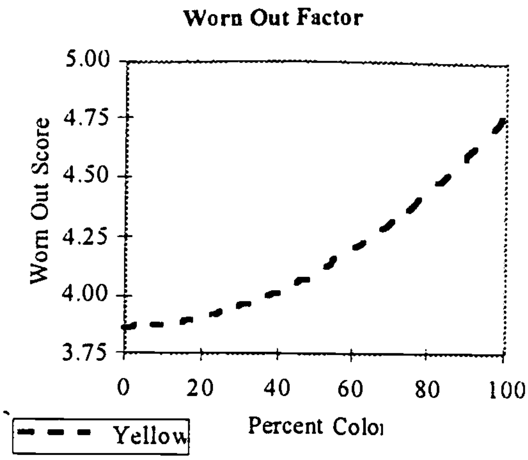


Yellow means worn out. The greater the percentage of yellow used in a trademark, the higher its company tended to be evaluated in terms of being worn out (Figure 3). If the "worn out" factor is analogous to potency, the results fail to support the fifth research question (RQ5).

Figure 3
Summary of Stepwise Regression Analysis for Variables Predicting the "Worn Out" Factor (N = 511)

Variable	*B*	*SE B*	β
Intercept	3.87	0.14	
$Yellow^2$	>.01	>.01	.12*

Note. R^2 = .02
*$p < .05$

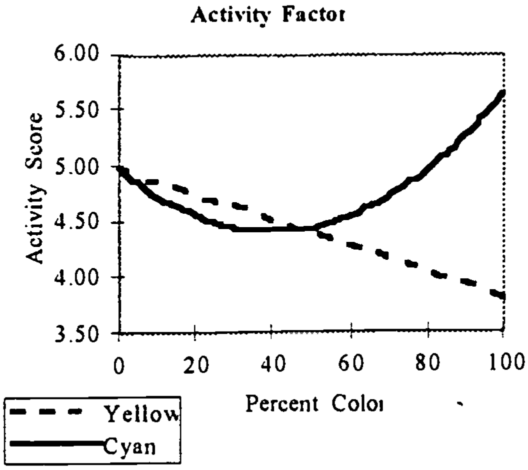


Contrary to the sixth research question (RQ6), the presence of cyan and absence of yellow mean activity (Figure 4). The greater the percentage of yellow used in a trademark, the lower its company tended to be evaluated in terms of being active. On the other hand, there was a curvilinear pattern found with the color cyan. Companies tended to be evaluated the lowest in terms of activity where there is about 40 percent cyan used, but evaluated highest with 100 percent cyan.

Figure 4
Summary of Stepwise Regression Analysis for Variables Predicting the "Activity" Factor (N = 511)

Variable	*B*	*SE B*	β
Intercept	4.96	0.32	
Cyan	−0.03	0.01	.16*
Yellow	−0.01	>0.01	.11*
$Cyan^2$	>0.01	>0.01	.09*

Note. R^2 = .05
*$p < .05$

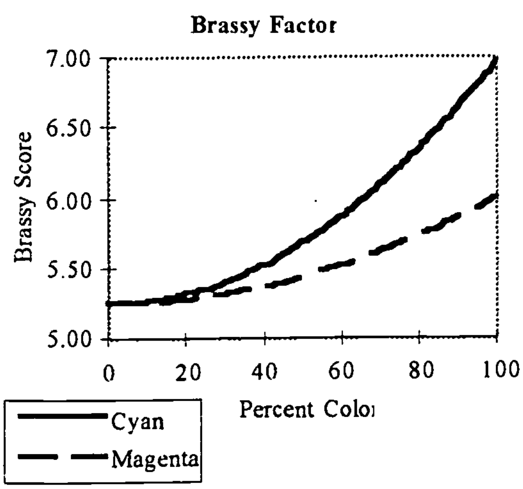


Cyan and magenta mean brassy (Figure 5). The greater the percentage of cyan and magenta used in a trademark, the higher its company tended to be evaluated in terms of being brassy.

Figure 5
Summary of Stepwise Regression Analysis for Variables Predicting the "Brassy" Factor (N = 515)

Variable	*B*	*SE B*	β
Intercept	5.25	0.20	
Cyan^2	>.01	>.01	.20*
Magenta^2	>.01	>.01	.08*

Note. $R^2 = .05$
$*p < .05$



Discussion

The first purpose of this study is to show the viability of using the commercial primary colors of cyan, magenta, and yellow in doing scholarly research. These results show that this color model can be successfully used, with all the benefits described previously. Among them is the ability to use interval measures of color in higher statistical analysis.

The second purpose is to examine the meaning of these three colors. The results related to this are discussed below.

Color Factors

The factors found in this study appear to generally approximate the findings of Osgood (1978). The first research question (RQ1) is not clearly supported. Whereas there was no one factor found that clearly represents Osgoods' evaluative factor, it could be argued that "up scale" and "nice" are aspects of positive evaluation.

The second research question (RQ2) was supported, with this study producing a factor for activity, as Osgood had also previously found. The third research question (RQ3) also seems to be supported, with the factor of being "worn out" relating to potency.

Meanings of Colors

The meanings found in this study are only somewhat successful in approximating the findings of Osgood (1978). The presence of cyan in trademarks that scored higher as being up scale and nice supported the fourth research question (RQ4). This is in line with several of our culture's clichés, such as royal blue, true blue, and blue blooded.

The presence of yellow related to being worn out, which fails to support the fifth research question (RQ5). Yellow (along with magenta) make red, which Osgood's finding suggest should mean potent. Perhaps respondents tend to recognize yellow as an index of deterioration. They may find yellow reminds them of items that are worn out, such as old yellow papers or clothe.

The respondents to this survey tended to see companies as being more active when the trademarks contained a substantial amount of cyan while lacking yellow, failing to support the sixth research question (RQ6). While there is no obvious reason why these results should be different from Osgood's, there are a number of possible explanations, discussed below.

Practical Significance.

Although these regression results may be statistically significant, there remains the question as to their practical significance. The amount of variance accounted for in each of these regression models ranges from only two to seven percent (R^2 = .02 to .07).

This suggests that the color of trademarks has a slight, albeit statistically significant, effect on how people evaluate companies. For example, these results predict that changing certain colors may tend to cause people to change their opinion of a company by a point or so on a ten-point scale. Although such a change may be subtle, it could still prove substantially beneficial to that company.

Color is only one element in the whole gestalt of a trademark. It works with the other elements, much as the rhythm section of a band supports a song's melody. The use of color in a trademark can harmonize the other graphic elements to present a pleasing, unified message. Just as a slight change in a tertiary note in music can change a chord from major to minor, so the discord in the graphic elements of a trademark may disrupt its intended meaning. The musician has the advantage of already having a generally accepted, codified set of chords that become the basis for his or her creativity. The graphic artist lacks such an advantage and must rely solely on his or her intuition in assembling a visual image. The result of this research is offered as a tool to help the commercial artist. It offers a guide to selecting colors that may better harmonize with a company's intended image.

Theoretical Rationale For these Findings

Although Osgood spent his life seeking universals of meaning (1975), he never claimed to have found them—not even for color. Part of the reason may be due to the fact that color is often an arbitrarily assigned symbol (Buchler, 1955, p. 112). The meaning of color may vary with time and convention.

As an example of the temporary aspect, the Color Association of the United States and the Color Marketing Group annually predict each year's fashionable colors. Samples of these colors are published each year in *Communication Art*. As this temporal aspect dictates a change in colors—indicating current as opposed to passé items—so too may other meanings of color, such as activity, be transient over time.

Convention is another arbitrary aspect. Perhaps several actual companies in one industry also share one predominant color in their trademarks. Respondents may be conditioned to recognize this association between color and industrial factor, where they may fail to recognize such a relationship in other items, such as the ones Osgood describes.

Yet another reason why the Osgood's findings are different from these findings is that the denotation of cyan, magenta, and yellow may have revealed more information than was possible previously with less precise colors.

A final possibility of the difference in findings may be that the scales used in this present study offer a different fit for the true underlying meanings of color in trademarks. If so, then this is an example of the very reason why Osgood advocated using original scales rather than standardized factors.

Implications

There are two main implications from these results. The first is for the commercial artist. When there are opportunities to select colors for trademarks, the artist may want to consider the possible meanings of color found in this study. The second implication is that these results show the viability of using the measurement of cyan, magenta, and yellow in academic research. This study calls for the use of the professional color model of cyan, magenta, and yellow to become the conventional measure in future scholarly research of color.

References

Albers, J. (1963). *Interaction of color*. New Haven, CT: Yale University Press.

Birren, F. (1969) *The color primer: A basic treatise on the color system of Wilhelm Ostwald*. New York: Van Nostrand Reinhold Co.

Brooks Institute of Photography. (1969). *Brooks Student Catalog*. Santa Barbara, CA: Brooks Institute of Photography.

Buchler, J. (Ed.). (1955). *Philosophical Writings of Peirce*. New York: Dover Publications.

Chevreul, M. E. (1839). *The principles of harmony and contrast of colours, and their applications to the arts*. London: Henry G. Bohn.

Committee on Colorimetry, Optical Society of America. (1943). *Journal of the optical society of America, 33*, (10). pp. 544-554.

Committee on Colorimetry, Optical Society of America. (1944a). *The Psychophysics of Color. Journal of the optical society of America, 34*, (5). pp. 245-265.

Committee on Colorimetry, Optical Society of America. (1944b). Quantitative Data and Methods for Colorimetry. *Journal of the optical society of America, 34*, (11). pp. 633-688.

Committee on Colorimetry, Optical Society of America. (1953). *The science of color*. New York: Thomas Y. Crowell Co.

Communication Arts. (1995). Color Predictions. *Communication Arts*. Palo Alto, CA: Coyne & Blanchard.

Hardy, A. C. (1937). The theory of three-color reproduction. *Journal of the optical society of America, 27*, (7). pp. 227-40.

Hardy, A. C., & Wurzburg, F. L. (1936). *Handbook of Colorimetry*. Cambridge, MA: The Technology Press.

Hays, W.L. (1988). *Statistics*. (4th ed.). Fort Worth, TX: Holt, Rinehart and Winston.

Johnson, E. (June, 1994). *An examination of the meanings of trademarks and their graphic elements*. Paper presented at VisCom '94—Eighth Annual Visual Communication Conference, Sierra City, CA.

Johnson, E. A. (1995). *The Meaning of Typography*. Unpublished doctoral dissertation, University of Alabama, Tuscaloosa.

Kodak. (1995). *Kodak Color Print Viewing Filter Kit*. Rochester, NY: Kodak Books.

Land, E. H. (1959). Experiments in Color Vision. *Scientific American, 200*, (5). pp. 84-99.

Land, E. H. (1977). The retinex theory of color vision. *Scientific American, 237*, (6). pp. 108-128.

Macbeth. (1989). *Munsell Color*. Baltimore, MD: Munsell Color.

Maxwell, J. C. (1877). *Matter and motion*. New York: Dover Publications

Mayer, R. (1985). *The artist's handbook of materials and techniques*. (4th Ed.). New York: The Viking Press.

Mees, C. E. (1961). *From dry plates to Ektachrome film: A story of photographic research*. New York: Zif-Davis Publishing Co.

Munsell, A. H. (1988). *A color notation*. Baltimore: Macbeth.

Osgood, C. E. (1953). *Method and theory in experimental psychology*. New York: Oxford University Press.

Osgood, C. E., Suci, G. J. & Tannenbaum, P. H. (1978). *The measure of meaning*. Urbana: University of Illinois Press.

Osgood, C., May, W. H., & Miron, M. S. (1975). *Cross-cultural universals of affective meaning*. Urbana: University of Illinois Press.

Pantone. (1983). *Pantone Process Color Selector*. Moonachie, NJ: Pantone.

Rummel, R. J. (1970). *Applied Factor Analysis*. Evanston, IL: Northwestern University Press.

BFH

Number: 50-50-50

Please circle the most appropriate number to indicate how strongly you agree that each word describes the BFH company.

	Not at all agree									Extremely agree
1. Adventurous	1	2	3	4	5	6	7	8	9	10
2. Attentive	1	2	3	4	5	6	7	8	9	10
3. Beautiful	1	2	3	4	5	6	7	8	9	10
4. Big	1	2	3	4	5	6	7	8	9	10
5. Blunt	1	2	3	4	5	6	7	8	9	10
6. Bold	1	2	3	4	5	6	7	8	9	10
7. Boring	1	2	3	4	5	6	7	8	9	10
8. Calm	1	2	3	4	5	6	7	8	9	10
9. Classy	1	2	3	4	5	6	7	8	9	10
10. Clean	1	2	3	4	5	6	7	8	9	10
11. Confident	1	2	3	4	5	6	7	8	9	10
12. Conservative	1	2	3	4	5	6	7	8	9	10
13. Cozy	1	2	3	4	5	6	7	8	9	10
14. Earthy	1	2	3	4	5	6	7	8	9	10
15. Depressing	1	2	3	4	5	6	7	8	9	10
16. Energetic	1	2	3	4	5	6	7	8	9	10
17. Feminine	1	2	3	4	5	6	7	8	9	10
18. Gaudy	1	2	3	4	5	6	7	8	9	10
19. Gentle	1	2	3	4	5	6	7	8	9	10
20. Innovative	1	2	3	4	5	6	7	8	9	10
21. Hostile	1	2	3	4	5	6	7	8	9	10
22. Inviting	1	2	3	4	5	6	7	8	9	10
23. Leader	1	2	3	4	5	6	7	8	9	10
24. Modern	1	2	3	4	5	6	7	8	9	10
25. Musty	1	2	3	4	5	6	7	8	9	10

	Not at all agree									Extremely agree
26. Mysterious	1	2	3	4	5	6	7	8	9	10
27. New	1	2	3	4	5	6	7	8	9	10
28. People-oriented	1	2	3	4	5	6	7	8	9	10
29. Plain	1	2	3	4	5	6	7	8	9	10
30. Pleasant	1	2	3	4	5	6	7	8	9	10
31. Precise	1	2	3	4	5	6	7	8	9	10
32. Professional	1	2	3	4	5	6	7	8	9	10
33. Quality	1	2	3	4	5	6	7	8	9	10
34. Quiet	1	2	3	4	5	6	7	8	9	10
35. Refreshing	1	2	3	4	5	6	7	8	9	10
36. Regal	1	2	3	4	5	6	7	8	9	10
37. Rich	1	2	3	4	5	6	7	8	9	10
38. Romantic	1	2	3	4	5	6	7	8	9	10
39. Serious	1	2	3	4	5	6	7	8	9	10
40. Sexy	1	2	3	4	5	6	7	8	9	10
41. Sociable	1	2	3	4	5	6	7	8	9	10
42. Soft	1	2	3	4	5	6	7	8	9	10
43. Sophisticated	1	2	3	4	5	6	7	8	9	10
44. Sterile	1	2	3	4	5	6	7	8	9	10
45. Strong	1	2	3	4	5	6	7	8	9	10
46. Stuffy	1	2	3	4	5	6	7	8	9	10
47. Sympathetic	1	2	3	4	5	6	7	8	9	10
48. Tacky	1	2	3	4	5	6	7	8	9	10
49. Tired	1	2	3	4	5	6	7	8	9	10
50. Traditional	1	2	3	4	5	6	7	8	9	10
51. Trendy	1	2	3	4	5	6	7	8	9	10
52. Trustworthy	1	2	3	4	5	6	7	8	9	10
53. Unique	1	2	3	4	5	6	7	8	9	10
54. Upbeat	1	2	3	4	5	6	7	8	9	10
55. Vibrant	1	2	3	4	5	6	7	8	9	10
56. Wild	1	2	3	4	5	6	7	8	9	10
57. Youthful	1	2	3	4	5	6	7	8	9	10

Finally, three last questions about you:

58. What sex are you? 1) Female_____ 2) Male_____
59. Are you color blind? 1) Yes____ 2) Slightly____ 3) No ____
60. What is your age? _______

Thank you very much for your help!

NOTICE

REPRODUCTION BASIS

☒ This document is covered by a signed "Reproduction Release (Blanket)" form (on file within the ERIC system), encompassing all or classes of documents from its source organization and, therefore, does not require a "Specific Document" Release form.

☐ This document is Federally-funded, or carries its own permission to reproduce, or is otherwise in the public domain and, therefore, may be reproduced by ERIC without a signed Reproduction Release form (either "Specific Document" or "Blanket").