Color Harmony

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Abstract: Colors seen together to produce a pleasing affective response are said to be in harmony. The term color harmony is not, however, a concise, descriptive term; rather, it is one with a wide range of meanings because of any or all of several conditional attributes. A content analysis was done on a selection of books from color science, art and design, color theory, and psychology. The study identified key attributes and related terms consistently used to describe color harmony. Categories of terms found to be coincidental with the discussion of color harmony were order, tone, configuration, interaction, similarity, association, attitude, and area. © 2002 John Wiley & Sons, Inc. Col Res Appl, 27, 28–31, 2002

Key words: art; color harmony; color harmony attributes; order; tone; configuration; interaction; similarity; association; attitude; area

INTRODUCTION

Color harmony is learned, which has been known for many years; yet despite important evidence for this, no acceptable model exists for explaining the concept of color harmony. When two or more colors are brought together to produce a satisfying affective response, they are said to be harmonized. But very little is known about why such an effect occurs. Color harmony has a wide range of meanings. It is an abstruse concept described differently by different authorities and has diverse meanings when applied to the process of making art and when used in art-related and other specialized color-use opportunities.

Sufficient questions have been raised about color harmony to justify analysis of its meaning. Hardly is anything written about it when some mention is not made of its relative state of misunderstanding and incompleteness or its unruly complexity. Many artists declare harmony to be unimportant. Yet almost anyone who has ever taken up the study of color in art sooner or later turns to the aesthetics of color and to color harmony.

The purposes of this study were (a) to clarify the various attributes of color harmony and identify the vocabulary associated with each, as evolved through color literature; (b) to determine the relative emphasis placed on each attribute by analyzing a select group of important writings on color; and (c) to establish a basis for a color harmony conceptual-learning model.

METHOD AND DATA SOURCES

A content analysis was done of 12 books on color, each thought to be of particular historical importance to the field. Levels and types of color harmony meanings were identified and evaluated for their perceived emphases in each book. By using appropriate statistical procedures, it was possible to arrive at a number of conclusions based on the data collected.

Books used in the study were: Interaction of Color, by Josef Albers; Art and Visual Perception, by Rudolf Arnheim; Principles of Harmony and Contrast of Color, by M. E. Chevreul; Theory of Colours, by Johann Wolfgang von Goethe; Physiological Optics, by Hermann Ludwig Ferdinand von Helmholtz; Art of Color, by Johannes Itten; Language of Drawing and Painting, by Arthur Pope; Color in Business, Science and Industry, by Deane B. Judd and Gunter Wyszecki; Concerning the Spiritual in Art, by Wassily Kandinsky; World of Color, by David Katz; Color Notation, by Albert H. Munsell; and Measurement of Color, by William David Wright.

The books analyzed came from all areas of color study. This diversity of representation was used to test the relative importance of color harmony as a topic—that is, a book on color that excluded any mention of color harmony would have to be regarded as finding the concept unimportant in its particular bias toward the subject of color. If analysis of these 12 highly respected works on color had indicated only a limited interest in color harmony, it would have suggested
that this concept is not considered very significant. The opposite is, of course, equally applicable.

**DEFINITION OF COLOR HARMONY ATTRIBUTES**

An attribute is defined as a theory, condition, or definition of a color characteristic or phenomenon toward which color harmony is either partially or totally directed. Direction in this study referred to the preference of an author for one attribute category of achieving color harmony over another. This preference was detectable through its intensity, that is, the strength and degree to which it was developed by the author. The terms used were not arbitrary but were those synthesized from the selected literature, taken from contexts that described some facet of color harmony. Attribute categories were divided into a series of subcategories, or related terms (RT), to clarify and expand the categories.

**Area.** A reference to the dependence of color harmony on the amounts or proportions of color used, area may refer to the absolute scale of the color areas (in scientific terms, the angular size of a chromatic area subtended by the eye). Or it may refer to the relative size of the color field. The ultimate visual effectiveness of any color combination is said to be directly related to color area. Color area explains the phenomenon of color change because of enlargement when an effective color combination in a small scale may become unpleasant if magnified. RTs are: angular size, caricature, color measure, displacement, enlargement, extension, magnification, miniature, proportion, quantitative, ratio, reduction, relative size, and scale.

**Association.** Association is a social concept of likes and dislikes based on the level of sophistication and innate perceptiveness of the viewer. Or it may include a culturally induced psychological idea in which color harmony depends on the meaning or interpretation of how color is applied to objects in a scene—that is, affective responses are based on traditional color association and symbolism. Biases from previous experiences are often used to assess the feeling tone of a color arrangement, which is frequently called the principle of familiarity. The Fauves, a group of European artists working from 1905 to 1908, reversed this principle by interpreting the local color of objects as statements of pure color harmony for achieving strong emotional responses to unfamiliar color use. RTs are: appropriateness, color retention, familiarity, local color, memory color, natural color, preference, preferred direction, purpose, realistic, recognizable, symbolism, and taste.

**Attitude.** A condition of color harmony that appeals to the intuitive, possibly physiological response mechanism, color attitude generally is expressive of the personality of a color or a color combination. Preferences for such combinations frequently lack any conscious foundation. Sometimes used in psychology to interpret personality and mood characteristics of individuals, the term attitude is typically used by folk artists and many abstract expressionists who have sought color effects through impulse and individual feeling. Its use sometimes denies and rejects all formal training. RTs are: atmosphere, climate, effect, essence, expression, felt unity, inner need, intuition, mood, soul vibration, temperature (warm, cool), and weight (light, heavy).

**Configuration.** This term refers to the general overall design of colors and the manipulation of pictorial factors that modify the interrelationship of colors. Color response may be altered by the influence of shape or the proximity of colors to each other, which affects the fixation points by which color comparisons are made. Those who use this term also consider the concept of color as background. RTs are: arrangement, background, color distance, composition, design, direction, form, juxtaposition, orientation, placement, proximity, recurrence (extension in number), shape, and space.

**Interaction.** Basically a physiological phenomenon, interaction is dependent on the adaptation qualities of the eye. Interaction includes such effects as successive contrast (afterimage), simultaneous contrast, or any of several other false color characteristics attributable to the instability of the visual process. Such terms as optical vibration, advancing and receding colors, and dynamics of color are all references to the interaction attribute of color harmony. RTs are: adaptation dynamics, appearance modification, false color, hue shift, illusion, influence, intersection, leveling, outer equalization, sharpening, simultaneous contrast, successive contrast, and visual displacement.

**Order.** Order refers to color interval as represented by uniformly spaced points in a color system, a plan used in the orderly arrangement of object color samples. The term may also refer to any combination of colors selected according to any orderly plan that can be recognized by the viewer; for example, several of the near visual sequences commonly known as color schemes—triad, tetrad, complementary, or similar partition of a regular locus made up of equally spaced colors. RTs are: absolute harmony, circular principle, chord, color solid, color space, elliptical principle, equal spacing, equidistant, interval, locus, organization, paths, plan, regular path, ring star concept, scales, schemes, score, sequences, single surface principle (planes), straight-line principle, system, unambiguous, uniformly scaled, and unity.

**Similarity.** This term describes any group of colors or groups of color combinations perceived as having something in common, as colors that are more or less alike. The commonality may be a result of a predominant hue, value, or chroma. In practice the common aspect of quality may be achieved by adding to each color in a combination a liberal or chroma. In practice the common aspect of quality may be achieved by adding to each color in a combination a liberal proportion of some amount of one other color. Also, similarity includes any attempt to group various colors by their general expressive qualities. RTs are: affinity, analogous, approximate harmony, attraction, color connection, color sets, communality, consistency, consonance, constellations, family, harmony of attraction, monochromatic, mutual, predominance (of hue, etc.), relationship, sameness, similarity of the dominant, similarity of the subordinate, structural contradiction, structural inversion, subordinate elements, and themes.

**Tone.** A visually abstract aspect of color usually intended to describe the visual influences of color dimension—hue,
saturation, value or similar color appearance attributes—tone is often taken as a synonym for the term color itself. It is that quality of color produced by a particular combination of physical color characteristics. In color harmony tone is the fundamental attribute determining preference, but the term is usually narrowly defined and is likely to be excessively abstracted in the process of studying color harmony. In conjunction with attitude, it poses the hypothetical condition that harmonious color combinations are personal and exist ideally without the requirement of other conditional harmony attributes. RTs are: brightness, brilliance, broken, chroma, cleanness, depth, hue, insistence, intensity, pronouncedness, purity, saturation, shade, strength, temper, timbre, tint, and value.

CONCLUSIONS ON THE MEANING OF COLOR HARMONY

The ratio of total content devoted to color harmony in the 12 books analyzed compared with content devoted to other topics in the same books was found to be between 2.3% and 4.9%, depending on the inclusion of the Helmholtz and Wright data. Neither book addressed color harmony. When considered separately, each of the 10 remaining books devoted an average of 8.4% of its content to the discussion of color harmony, a figure sufficient to represent enough consistent attention to factors associated with color harmony to conclude that it is a viable concept, at least in 10 of the 12 books surveyed. The books of Itten, Munsell, and Pope were found to be well above average in their treatment of the subject of color harmony; however, all works analyzed, except Helmholtz and Wright, included some attention to the topic.

The meaning of color harmony is related to the definition of eight terms. The ranking of the mean emphasis given to each of the eight attribute categories resulted in a range of emphasis of meaning over order, tone, configuration, area, interaction, association, similarity, and attitude. Color harmony was usually, although not always, synonymous with the meanings attached to the terms tone, order, and configuration. Significant agreement with this ranked list of meanings was found in two books, Pope and Itten. None of the other authors demonstrated an acceptance of the list in its composite form. Thus, lack of agreement on color harmony meaning as attributed to one specific definition was confirmed. Color harmony is a viable and abstruse concept described differently by different authorities.

Although there was general disagreement in ranking the attributes, there was broad consensus that all the attributes shared in the meaning of the term in some way. Moreover, numerous connections between the attributes were discovered. It was found, for example, that an emphasis placed on one attribute was likely to be directly related to an emphasis seen in another. Figure 1 illustrates the significance of correlation among paired attributes. The correlation showed that as the ranking of the authors in their consideration of the concept of color harmony varied for one category of meaning, the ranking also changed proportionately in another category. From the spread of measures of correlation among the attributes, it was possible to examine the relationships of meanings that appeared to alternately describe the term color harmony. For example, when attributes were considered three at a time instead of two, it was found that the group of tone, order, and interaction demonstrated the strongest correlation of the 14 groups tested.

Certain attributes demonstrated a dependence on other attributes for meaning. It was discovered that the attribute interaction displayed the characteristics of an intervening variable on which most other attributes depended, except for tone and order, which were apparently independent in the sample. This would suggest at least some reason to approach the study of color harmony in a predetermined manner, beginning with tone and advancing to order, then interaction, and finally to the attributes that add meaning to harmony according to their respective dependencies: attitude, area, similarity, configuration, and association to account for the conjunction of all the attributes in their relative covariances and dependencies.

SUMMARY

The concept of color harmony exists with different meanings. The study failed to demonstrate a general acceptance of any ranked list of terms. However, disagreement on the order of importance of terms was complemented by strong evidence that color harmony is characterized by many definitions. It is a viable but multifarious concept. Moreover, emphasis placed on one aspect of color harmony is likely to be related directly to emphasis seen in another. When color harmony attributes are combined in different ways, the group of tone, order, and interaction demonstrates the strongest connection with the discussion of color harmony. Interaction displays characteristics of being an intervening variable on which most other terms depend for meaning.

![FIG. 1. Matrix of Spearman coefficient correlations for eight color harmony attributes. Lines connect variables for which a significant correlation coefficient was determined. Coefficients found to be significant at the <.05 level are shown as broken lines; those at the higher <.01 level of significance are shown as solid lines.](image-url)
Yet the predominant understanding of color harmony was determined to be attributed most frequently to order, referring to uniformly spaced points in a color classification system.

Coda

Content analysis is generally defined as a research technique for the objective and systematic description of the manifest content of communication. An analysis of content may be either quantitative or qualitative, depending on the research problem and the objectives of the investigation. Although it is believed that qualitative data in this instance would have adequately provided the information sought, the reliability and validity of conclusions based on impressions, personal judgments, and inferences alone are apt to be challenged. Therefore, in order to invite replication of the findings, the material used in this study was quantified and measured according to accepted statistical practices.