AN ABSTRACT OF THE THESIS OF

Edith E. Collin for the degree of Master of Science in Clothing, Textiles and Related Arts presented on April 7, 1986.

Title: Development of a Methodology for Analyzing the Color Content of a Selected Group of Printed Color Analysis Systems

Abstract approved: _____
Ardis Koester

The purpose of this study was to develop a methodology to compare the color choice recommendations for each personal color analysis category identified by the authors of selected publications. The procedure used included: (1) identification of publications with color analysis systems directed toward female clientele; (2) comparison of number and names of categories used; (3) identification, by use of Munsell color notations, the visual and written color recommendations ascribed to each category; and (4) comparison of the publications on the basis of: (a) number and names of categories; (b) number of color recommendations in each category; (c) range of hue value and chroma presented; (d) comparison of visual and written color recommendations by category and author.

With the exception of comparison of publications on the basis of written color recommendations, all components of the methodology were successful. Comparison of the publications used in development of the methodology revealed that:

1. The majority of authors use the seasonal category system.

2. The number of color recommendations per category was quite consistent within a publication but varied widely among authors.

3. There were few similarities in color recommendations even among authors using the same name categories.

4. There was poor agreement between written and visual color recommendations within all color categories.

5. There was no discernable theoretical basis for the color recommendations presented by any author included in this study.

Development of a Methodology for Analyzing the Color Content of a Selected Group of Printed Color Analysis Systems

by

Edith E. Collin

A THESIS

submitted to

Oregon State University

in partial fulfillment of
the requirements for the
degree of

Master of Science

Completed April 7, 1986

Commencement June 1986

APPROVED:

Redacted for Privacy

Professor of Clothing and Textiles in charge of major

Redacted for Privacy

Head of department of Clothing, Textiles and Related Arts

Redacted for Privacy

Dean of Graduate School

Date thesis is presented April 7, 1986

Typed by Christina Pyle for Edith E. Collin

ACKNOWLEDGEMENT

I wish to acknowledge the assistance of the following people without whom the completion of this thesis would have been very difficult:

Dr. Ardis Koester, my thesis advisor, who provided enthusiastic, professional advice and practical assistance. The extra time and effort that she contributed was greatly appreciated.

Chris Pyle, my typist, whose typing, editorial skills and knowledge of OSU requirements were invaluable.

Administrators and staff at Olds College for their financial support and encouragement.

My family, especially my husband, Wilbur, who served as advisor, editor, encourager and chauffeur.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

DEVELOPMENT OF A METHODOLOGY FOR ANALYZING THE COLOR CONTENT OF A SELECTED GROUP OF PRINTED COLOR ANALYSIS SYSTEMS

CHAPTER 1

INTRODUCTION

Statement of Problem

Color has always been an important part of man's existence. Anthropologists have found that every language has words to denote color differences. The number of these terms increases with cultural complexity and the number of eye pigmentation colors in the culture (Berlin & Kay, 1969; Bornstein, 1973). In the North American culture, color has been examined by a large number of color experts, from a large number of perspectives. Psychological perspectives with specific reference to color preferences, relationship of color to personality and effects of color upon mood and behavior were studied by Birren (1962), Sharpe (1975), and Luschner (1979). Other color authorities (Maerz & Paul, 1950; Munsell, 1963; Ostwald, 1969) have concentrated their efforts upon developing systems of consistent and uniform color description. Still other color specialists have examined the effects of color mixing, principles of color harmony, and aesthetic appreciation of color (Albers, 1975; Burnham, 1963; Graves, 1952; Itten, 1973; Sargent, 1964). The application of color theory to aspects of daily life has been studied by Judd (1975), Billmeyer (1981), and Birren (1978).

Color in clothing selection has been a subject for study and publication since the early part of the 20th century. Books by writers such as Picken (1918), Winterburn (1914), and Whitney (1916) discuss color theory and its role in personal appearance. In these books personal physical coloring is divided into a number of categories which are based upon analysis of hair, eye, and skin coloration. Procedures are given for determining the category appropriate for a specific individual. Charts describe and illustrate appropriate color choices and combinations for each category.

After the middle of the 20th century, the amount of information on color in books dealing with clothing selection appears to decrease. Authors of the 1950's and 1960's, writing in this field, such as Dariaux (1964), Wingo (1953), Sturm (1962), and Oerke (1960) devote little space to the treatment of color as a component of clothing selection information. Two authors, Hill (1963) and Spears (1965), do provide a system for personal color analysis and a discussion of the role of color in enhancing personal appearance.

Since the late 1970's, there has been a tremendous increase in literature on clothing selection with emphasis on color analysis. The authors of much of this literature are called "image and color consultants." They work with the public in small groups or on a one-to-one basis to provide information on recommended clothing and color choices for the individual. They provide personal color categories, specific colors recommendations presented in fabric or color chips or societally accepted names of colors. Those who recommend colors are frequently referred to as "color analysts." The

color consulting movement experienced the greatest growth during the image and color phenomenon which occurred in the mid-1970's, the origins of which have been been ascribed to John Malloy, Suzanne Caygill, and Carole Jackson (Rasband, 1983; Ricci, 1983; Timberlake, 1983). Current estimates of practicing color analysts in North America vary from 6,000 to 13,000 (Rasband, 1983; Wallach, 1983). These practitioners operate independently or as part of a franchised company to provide information to the customer on color analysis and, in some instances, selection of clothing items.

As mentioned earlier, an outgrowth of the color analysis phenomenon has been the publication of books, pamphlets, and analysis aids for use by a color analyst or by an interested consumer. The majority of these works have been published since 1975, with the largest number appearing since 1980. These publications present a variety of systems of color analysis and appear to vary in content, procedure, and overall color recommendations. The purpose of this study will be to compare selected aspects of these systems. Since a focus of the color analysis movement is the selection of color for clothing, color would appear to be the obvious element to use as a basis of comparison. It is the intent of this researcher to compare selected published systems on the basis of their color content.

Justification of the Study

Analysis of personal coloring can be quite expensive for the average consumer. A personal color analysis can cost between $30 and

$800 (Rasband, 1983; Ricci, 1983; Wallach 1983; Williams, 1983). The consumer may be attracted to a less expensive alternative which has recently appeared on the market, color analysis books. These books present systems for the consumer to analyze personal color and do wardrobe planning. Following the success of Color Me Beautiful by Carole Jackson, which was published in 1980, more books on the subject have appeared in the bookstores. Still more books are being written or are in the process of being published. Each book offers the consumer a system of color analysis which, in the words of the authors, will improve personal appearance, save money, and enhance self-image.

The consumer is faced with the problem of selecting the best system for her purpose. Little research is available about the color analysis process, and none was found that specifically presents a method for comparing color analysis recommendations presented in book form. Therefore, there is need to develop and field test a methodology.

Purpose of the Study

The purpose of this study was to develop a methodology to compare the color choice recommendations for each personal color analysis category as identified by the authors of selected publications. Color recommendations may be presented in the form of illustrations of color chips or by listing colors using societally accepted names such as "old rose." This study examined both forms of presentation and compared recommendations within and between published systems.

Objectives of the Study

In order to achieve the purpose of this study, the following objectives were formulated:

1. To identify publications which present systems of color analysis.

2. To identify by name and compare by count the personal color categories developed by the authors, in the publications under study, to classify individuals who are to be color analyzed using the system outlined by each author.

3. To identify by a visual color measurement method, using a recognized atlas of color, the color chips of recommended colors specifically ascribed to each category into which an individual can be placed, in each published work.

4. To identify, using a color dictionary, the written color recommendations for each color category into which an individual can be placed, in each published work.

5. To develop a methodology for comparing the publications included in the sample on the basis of:

    a. number of categories used to classify individuals for the purposes of color recommendations;

    b. number of colors identified as recommended for each category;

    c. the range of hues, values, and chroma represented in each category;

d. the personal color categories on the basis of the names ascribed to them; and

e. the similarity of the color recommendations presented in color chip form with those presented in written name form.

Limitations of the Study

1. This study was limited to publications available within Corvallis, Oregon, with a dollar value not to exceed $25.

2. This study was limited to publications primarily directed toward women.

3. This study was based upon color presentations in one book only from each publisher's stock. That is, no attempt was made to determine the accuracy of the color presentations among books of the same title.

4. The study was limited to books printed since 1975.

5. Since the color chips presented in the sample volumes vary in size, gloss, shape, and print quality, the accuracy of the color analysis may have been affected.

Assumption of the Study

It was assumed that the color chips presented in the sample volumes accurately represent the authors' color recommendations for the color category identified.

Definitions

For purposes of this study, terms were defined in the following manner.

Chroma (or intensity):	The dimension of a color that describes its brightness or dullness.
Color:	The visual sensation which results from the selective absorption of light reflected from a pigmented surface.
Color analysis:	The process of identifying color for an individual which will enhance personal hair, skin, and eye color.
Color analysis books:	Publications which have as their primary purpose (as identified in the preface, introductory statement, first chapter, or on the book jacket) the presentation of a system for determining color choices to enhance an individual's personal coloring.
Color analyst:	A consultant who identifies colors for an individual which enhance personal hair, skin, and eye color.
Color atlas:	A physical representation of colors arranged in an order and sequence determined by a specified notation system for precise identification of the colors represented.
Color circle:	Graphic presentation of the sequence of colors resulting from the breakdown of natural light.
Color consultant:	Synonym for color analyst.
Color dictionary:	A record of the meaning of individual color names and the identification of the colors in reference to a standard color notation system.
Color draping:	The process of placing large colored fabric swatches over an individual's neck and shoulders in order to determine colors which are attractive with the individual's personal coloring.

Color name:	A written title ascribed to a color.
Hue:	The name of a color family, such as green, red, yellow.
Image consultant:	A practitioner who advises other individuals on aspects of personal appearance and presentation in order to enhance public and self images.
Personal color category:	A group of colors identified by an author in a color analysis system which is given a specific identification, such as "winter," "sunrise," "midnight."
Shade:	A color darker than the normal hue.
Tint:	A color lighter than the normal hue.
Tone:	A color which results when both black and white are added to a color. It may be darker or lighter than the normal hue.
Undertone:	A faint or subdued color. The term frequently refers to the underlying color quality of an object.
Value of a color:	The lightness or darkness of a color.
Visual color measurement:	The identification of a specific color sample by means of a standard notation system, using a recognized color atlas and the human eye as a discriminator.

CHAPTER 2

REVIEW OF RELATED LITERATURE

Color has been an important part of man's environment since the dawn of history. Its influence upon the immediate environment has been studied by the layman and scientist alike. This has necessitated the development of color theories, and color identification processes and notation systems to provide a common language for color understanding.

The first section of this review will address color theory, particularly the three color systems most commonly used in color application to clothing selection. The second section will identify pertinent research studies in the area of color in clothing selection. Literature on color in clothing selection in the 20th century is presented in the third section. In the final section, the most recent development in this area, color analysis, is discussed

Color Theory

Though Plato, Aristotle, and Pythagoras discussed the nature of color, it was not until 1660, when Sir Isaac Newton discovered the nature of color, that the first color circle was devised. The circle developed by Newton was composed of the seven colors present in light--red, orange, yellow, green, blue, indigo, and violet. This development was followed less than a century later (circa 1731) by the pigment mixture theory of J. C. Le Blon. He proposed that three pigments--red, yellow, blue--were basic to the formation of all other

colors. This was the origin of the red, yellow, blue theory. Other well-known color theorists, including Goethe, M. E. Chevreul, Thomas Young, Helmholtz, Brewster, and Prang, have used red, yellow, and blue as a theoretical base (Birren, 1969).

The red, yellow, blue theory applies to pigments but not to light rays. The primaries of light are red, green, blue. These were studied and developed into theories by Helmholtz, Maxwell, Rood, Church, Wilhelm van Begold, and Michel Jacobs (Birren, 1969).

Munsell also developed a color circle based on the analysis of light. His primary hues are red with a touch of yellow (vermillion), green, and purple blue (Munsell, 1963).

A psychological theory of color was developed by Ewald Hering. This theory holds that there are four primaries: red, yellow, green, and blue. These together with black and white are all principal in human sensation. Hering's theory is believed to be the basis of the Ostwald color system (Birren, 1969).

Out of this historical base have risen three theoretical positions which are widely used today in both the application of color theory and the measurement of color. These three are: (a) the red-yellow-blue theory (sometimes referred to as the Prang system), (b) the Munsell system, and (c) the Ostwald system.

Prang System

Color in the Prang system has three dimensions. The first is the warmth or coolness of a color, which is identified by its name or hue. The second is the lightness or darkness of a color, which is defined as its value. The third is the dullness or brightness of a color,

which is defined as its chroma or intensity (Goldstein & Goldstein, 1940).

The Prang system divides hues into three categories: primary, secondary, and intermediate. There are three primary or fundamental hues in this system: red (R), yellow (Y), and blue (B). The secondary hues are formed by mixing equal quantities of two primary hues. This produces violet (V), orange (O), and green (G). Intermediate hues are formed by combining a primary with an adjacent secondary color. This produces six hues identified as yellow-orange (YO), yellow-green (YG), blue-green (BG), blue-violet (BV), red-violet (RV), and red-orange (RO). The 12 hues of primary, secondary, and intermediate colors make up the Prang color circle. The warm colors are red and orange, the cool colors are blue and violet, and yellow and green are warmish or coolish depending upon whether they contain more warm or cool hues. Black, white, and grey are identified as neutral colors (Goldstein & Goldstein, 1940).

There are nine steps in the value scale of the Prang system. They range from white through shades of grey to black. The steps are identified as white (W), high light (HL), light (L), low light (LL), medium (M), high dark (HD), dark (D), low dark (LD), and black (B) (Goldstein & Goldstein, 1940).

Intensity, which describes the brightness or dullness of a color, ranges from neutrality in grey to full intensity in the pure hue. Levels of intensity are described in terms of neutralization (N) of the color, with the smallest fraction representing the least neutralization. The basic levels used are 1/4 N, 1/2 N, and 3/4 N.

Other fractions can be used to describe other degrees of neutralization (Goldstein & Goldstein, 1940).

Notation of a color in the Prang system is expressed as follows: hue/value/intensity. Hue is expressed as letters of the color name, value by the name or initials on the value scale, and intensity by a fraction of neturality. A red color, then, may be identified as "R / LL / 1/4 N" (Goldstein & Goldstein, 1940).

Munsell System

Like the Prang system, the Munsell system identifies the same three dimensions of color: hue, value, and chroma. However, the Munsell system uses much finer definition of the dimensions.

The color solid in this system is an uneven spherical shape with a white-to-black value scale as the axis, hues ranged around the circumference, and chroma ranging from the most intense hue on the periphery of the sphere in toward the neutral grey center. The top of the axis is white and the bottom black. Hues which are higher in value appear higher on the axis (Munsell, 1963).

The Munsell system has five basic hues: red (R), yellow (Y), green (G), blue (B), and purple (P). There are five secondary hues: yellow-red (YR), red-purple (RP), purple-blue (PB), blue-green (BG), and green-yellow (GY). The primary and secondary hues make up the ten colors of the basic circle. These are further subdivided, then alphabetically and numerically identified to give 100 hues in the complete notation system. Reds may range from 1 to 10, with 5R being a true red (Munsell, 1963).

Munsell (1963) defines value in the same manner as Prang but has ten gradations in the system, with black being 0 and 10 being white.

The third dimension of color Munsell labels as chroma. The chromosity of a color is expressed as a number indicating the intensity of the color measured from a neutral grey. The spokes of colors extend out varying distances from the center because at full intensity some colors are stronger than others. The true hue is always the farthest out on the spoke. In the Munsell system the true hue is always the lowest value with the highest chroma. In the Munsell notation system, chroma is expressed as a step outward on the intensity scale (Munsell, 1963).

A complete Munsell notation is expressed in the sequence: hue (space) value/chroma. A number-letter combination denotes the hue, a number preceding a slash denotes the value, and a number following the slash denotes the chroma. A complete notation for true red would read "5R 4/14" (Munsell, 1963).

Ostwald System

In the Ostwald system, as in the Prang and Munsell systems, color is said to have three properties or dimensions. However, in the Ostwald system these dimensions are hue, black content, and white content (Ostwald, 1969).

Color in the Ostwald system is classified into two groups: achromatic, which includes black, white, and grey; and chromatic, which includes all colors excluding the three achromatic colors (Ostwald, 1969).

The color solid in the Ostwald system is represented by an equilateral triangle, its base on the left, with white at the top, black at the bottom, and hue at the point on the right (Figure 2.1). Strips of colors are arranged obliquely, grading through eight steps to a neutral color. The complete triangle has 28 colors whose composition can be found by tracing upward on an oblique line to determine percentage of black and downward on an oblique line for the percentage of white. The remaining percentage is stated as the pure hue content since the three component parts form 100 percent or unitary one. These monochromatic triangles are arranged so that white-black forms a common axis and the solid thus formed is a double cone. The upper surface of the cone contains the light colors, the lower surface the dark colors. The Ostwald cone (triangle) has a finite number of colors, with equal perceptible differences between them (Ostwald, 1969).

There are 24 pure colors identified by numbers, which are arranged clockwise on the Ostwald color circle. Three numbers identify colors in each of the eight major groupings of yellow (1,2,3), orange (4,5,6), red (7,8,9), purple (10,11,12), blue (13,14,15), turquoise (16,17,18), sea green (19,20,21), and leaf green (22,23,24). A complete lettering system is used to indicate black and white content within the color solid (Figure 2.1). Designation of a color is written with the number identity of the color followed by the two letter designation of the black and white content. A true red in the Ostwald notation would be written as 8pa, while a light pink would be expressed as 8ea (Ostwald, 1969).

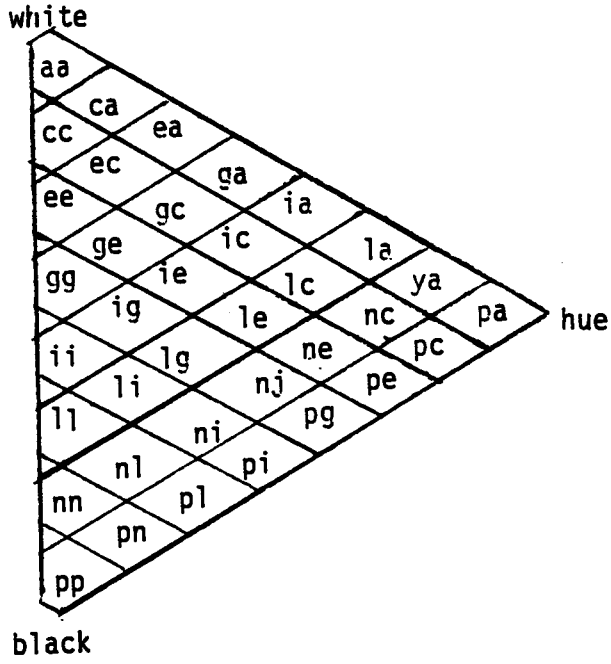


Figure 2.1. Ostwald triangle.

Research on Color in Clothing Selection

Seven studies, using diverse subject groups, examined color preferences and clothing selection. Williams, Arbough, and Rucker (1980) used 60 black and 60 white high school students. College and university students were used in studies by Stemm and Johnson (1984), with 20 subjects; Ford and Drake (1978), with 372 subjects; Compton (1962), with 145 subjects; and Phillip (1945), with 28 subjects. Geriatric populations were used in studies by Mather, Stare, and Breinin (1971, with 105 female and 45 male subjects; and Spruiell and Jernigan (1982), with 30 female subjects.

Most of these studies used color cards to present color choices. The three exceptions to using color cards were Compton (1962), who used fabric swatches; Phillip (1945), who used colored fashion plates; and Spruiell and Jernigan (1982), who used interview questions directed to the subjects.

In most of the studies, verbal definitions of hue, value, and chroma were given for the colors represented in the studies. One study (Williams et al., 1980) used a recognized standard, in the form of Color-Aid paper, for establishment of the color characteristics. The other studies did not indicate how the identified color characteristics, such as full saturation or tint, were established. No standard notation system was used to identify the specific hues used for the studies.

In four studies, findings on single hue color preference identified blue as the preferred color (Mather et al., 1971; Phillip, 1945; Spuriell & Jurnigan, 1982; Williams et al., 1980). Two studies

identified a preference for cool colors over warm colors. In the Stemm and Johnson (1984) study, cool colors were preferred to warm colors on a 3:1 ratio, regardless of personal coloring. McInnis and Shearer (1964) found cool colors were preferred by 70 percent of the subjects, with a breakdown by sex of 56 percent of the males and 76 percent of the females preferring cool colors. In the McInnis and Shearer study, over 60 percent of the students who chose cool colors also chose cool colors for clothing, while just over 40 percent of the students who chose warm colors also chose warm colors for clothing.

Color-order preference was examined in two studies of geriatric populations. Spruiell and Jernigan (1982) found the color-order preference to be blue, pink, navy, green, rose, and red. Mather et al. (1971) found male preference to be blue, red, green, and yellow and female preference to be blue, green, red, and yellow.

Researchers (Compton, 1962; McInnis & Shearer, 1964; Stemm & Johnson, 1984) have found no relationship between personal coloring of the subject and color preferences. This appears to be in conflict with the finding by Spuriell and Jurnigan (1982) that the reason given for color choice was enhancement of personal coloring.

Extroverted personality characteristics were linked to color choices in three studies. Ford and Drake (1978) found dark values related to aggressive, bohemian, and experimenting characteristics. McInnis and Shearer (1964) found bright and warm color preference was related to more creative activities, more active sports, and extroversion, while cool color preference was related to shyness, introversion, and interest in plays and concerts. Compton (1962)

found preference for deep shades and saturated colors, rather than preference for tints, was related to higher sociability.

On a different approach, one study (Duntley, 1982) examined the role of color of clothing in the formation of first impressions. This study involved 75 college students who viewed a slide presentation of models and were asked to evaluate the models on the basis of personality characteristics. Findings indicated there was no significant relationship between warm and cool colors of clothing and the first impression of personality characteristics.

A study conducted by Brandau (1942) was designed to develop a process for color analysis to be used with 25 female college students in a classroom setting. A process of color draping using 30 fabric swatches representing a complete color wheel with equal numbers of light and dark values was employed. Group decisions were used to determine effects of the 30 colors on an individual's skin, hair, and eyes. Students then painted matching color samples for the selected colors. Of note is the comment made by the experimenter that the students should be encouraged to carry their color samples with them on all shopping trips.

Popular Literature on Color in Clothing Selection

1900 to 1950

In the first 30 years of the 20th century there seems to have been a great deal of consistency in both the theories of color used and the recommendations for use of color. Winterburn (1914), Whitney (1916), Picken (1918), and Story (1924) all used the red-yellow-blue

theory of color. The four authors presented a process of color analysis, with specific categories of personal coloring identified. With the exception of Winterburn, the authors discussed the creation of color harmonies and the application of the principles of color to dress, and made specific color recommendations for each category of personal coloring.

In the second quarter of the 20th century, general references on clothing selection, as represented by Hopkins (1935), McFarland (1936), Kettunen (1941), Ryan and Phillips (1947), and Hempstead (1947), presented similar types of information to that which were presented by writers in the first quarter of the century. However, Kettunen (1941) and Ryan and Phillips (1947) used the Munsell system as a color theory base. McFarland (1936) and Hopkins (1935) presented no method for color analysis and, consequently, made no color recommendations.

Since 1950

In the second half of the 20th century there have been a number of authors writing in the field of color in clothing selection. The extent of the coverage of the subject varies among volumes. Hillhouse (1963), Spears (1965), Kefgen and Touchie-Specht (1976), and Davis (1980) gave comprehensive descriptions of both theory and application of color to dress. Cho and Grover (1979), Feldon (1982), Fatt (1983), and Tate (1984), by contrast, gave no theoretical base and little application information.

Three theoretical bases were used by the authors reviewed. These included red-yellow-blue (R-Y-B) or Prang, Munsell, and Ostwald systems. The R-Y-B or Prang system was used by Oerke (1960), Sturm and Grieser (1962), Morton (1964), McJimsey (1973), Rhoades (n.d.), Porter (n.d.), and McCalls (n.d.). The Munsell system was included in explanations by Wingo (1953), Hillhouse (1963), Morton (1964), McJimsey (1973), and Davis (1980). Both the Prang and the Munsell systems were included in volumes by Kefgen and Touchie-Specht (1976) and Horn and Gurel (1981). The Ostwald system was explained by only two authors, Morton (1960) and Davis (1980).

Basic understanding of color harmony and the principles of color interaction were described by Wingo (1953), Oerke (1960), Sturm and Grieser (1962), Hillhouse (1963), Martin (1964), McJimsey (1973), Kefgen and Touchie-Specht (1976), Davis (1980), Horn and Gurel (1981), Fatt (1983), McCalls (n.d.), and Porter (n.d.). Principles of color interactions with no base in formal color theory were presented by Cho and Grover (1979), Goday (1979), Cho and Lueders (1982), Feldon (1982), and Tate (1984).

Descriptions of a process for personal color analysis were presented by a number of authors. Processes were all based on analysis of the individual's hair, skin, and eye coloring. Some systems presented personal color categories and described colors appropriate for each category. Others gave guidelines for color recommendations but identified no specific colors. Analysis processes were presented by Oerke (1960), Sturm and Grieser (1962), Hillhouse (1963), Head (1967), Morton (1964), McJimsey (1973), Kefgen and

Touchie-Specht (1976), Goday (1979), Davis (1980), Hackler (1983), and McCalls (n.d.). Categorization schemes for classifying personal coloring were presented by only six authors: Oerke (1960), Sturm and Grieser (1962), Hillhouse (1963), Morton (1964), Hackler (1983), and McCalls (n.d.). All of these authors presented specific color recommendations for each personal color category. Total presentation of information on the role of color in clothing selection was brief in Cho and Grover (1979), Feldon (1982), Cho and Lueders (1982), Fatt (1983), and Tate (1984). More attention has been devoted to the role of color in clothing selection since 1980. Of the 24 publications printed since 1950, which are included in this literature review, eight of them have been published since 1980.

The major shift in emphasis in the information presented on the role of color in clothing selection began in the late 1970's. Eight authors from among those reviewed present no theoretical base for the color recommendations made (Cho and Grover, 1979; Fatt, 1983; Feldon, 1982; Goday, 1979; Hackler, 1983; Hemingway, 1977; Tate, 1984; Thompson, 1980). In several of the volumes, including Hemingway (1977) and Tate (1984, the color presentation, calculated on the basis of page count, was less than 3 percent. This same situation was found in a review of clothing selection books which were aimed at specific audiences (August, 1981; Levitt, 1981; Malloy, 1977; Mitchell, 1983). In these volumes the information on color was limited and there was no color theory presented.

Color Analysis Movement

There has been little formal research in the area of personal color analysis. The information presented in this review of color analysis is obtained from popular press sources and from individuals and companies conducting business in this field.

Color analysis may be a recent phenomenon but the movement was predicted in 1874 by Adda Woolson in a speech later published in book form by Robert Brothers of Boston. She is quoted as stating:

> Then we shall begin to have doctors of dress; and there will be specialists in the profession, those who will recommend to us colors and textures, those who will see to it that we are so well dressed that no one can tell what we wear, and so comfortably attired that self and clothes blend into an harmonious whole. (Timberlake, 1983, p. 50).

It has taken 100 years for Woolson's prediction to be realized. In the words of Timberlake (1983), image consulting is "a hot new career option" (p. 13). Image consulting includes three areas of personal counseling. Color analysis is one of them.

Financially, color analysis has become big business. Estimations of the number of practitioners vary from 6,000 (Wallach, 1983) to 13,000 (Rasband, 1983). The estimated annual return from businesses owned or operated by these practitioners is $270 million (Rasband, 1983).

Though Wallach (1983) suggested that retailers are rather mixed in their response to the color analysis movement, Timberlake (1983) indicated there is a growing interest in color analysis on the part of department stores, speciality shops, and cosmetic firms. Companies such as J. C. Penney, Garfinkels, Mary Kay, Amway, and Avon have already shown interest (Timberlake, 1983; Wallach, 1983). Many color

analysis companies, such as Beauty for All Seasons, Success Perceptions, and La Voy's Image Dynamics, have expanded their color consulting business to include marketing of a line of cosmetics which are color coordinated to the analysis system being promoted (Rasband, 1983).

Another major group of color analysts, providing a non-commercial color service, is comprised of the Cooperative Extension home economists. According to Williams (1983), many home economists are trained as color consultants. In some states, home economists' programs are based on the Munsell color system.

A review of telephone books and newspapers reveals additional consultants who are individual entrepreneurers in color analysis.

Background and training of the consultants vary widely. There are no standardized training programs, requirements, licensing or control mechanisms in the color consulting business (Rasband, 1983). A number of the larger more-established companies offer training programs to instruct aspiring color consultants. These programs vary in length from weekend seminars, such as those offered by Beauty for All Seasons, to 2-1/2 weeks of formal program, such as those offered by Fashion Academy (Timberlake, 1983).

Rasband (1983) outlined three main categorical systems for color analysis: Color Key Theory, Season Theory, and Color I Associates Theory. However, the authors of the brochure Color Me a Season (n.d.) state that the Season's categorical system is just a further division of the Color Key Theory. Other consultants may use systems incorporating elements from one or another of these frameworks, so

they do not fit any of the categorical systems outlined by Rasband. These firms include Alive With Color, Concept 7, Success Perceptions, Shades of Beauty, and Academy of Color (Rasband, 1983; Timberlake, 1983).

The Color Key Theory was developed by Robert Door and is now owned by Color Key Corporation. The basic concept in this system is that all colors can be divided into two color groups which are labelled Key I and Key II. All colors within a group blend and harmonize together. With the exception of orange (which is exclusive to Key II) and magenta and blue-green (which are exclusive to Key I) all hues are represented in both keys. The difference between the two is that Key I has a blue undertone base while Key II has a yellow undertone (Color Key Program--Transcripts, 1981; Kefgen & Touchie-Specht, 1976).

The Season system, whose origin is ascribed to Caygill by Rasband (1983), divides the color spectrum into four groups: Spring, Summer, Autumn, Winter. This system is also based upon blue and yellow undertones in the coloring of the individuals being classified. Autumn and Spring have a yellow undertone, while Winter and Summer have a blue undertone. Spring and Summer contain the less intense tones of the colors.

Most Color Key System adherents declare that colors from two groups cannot be combined. Proponents of other systems vary in their adherence to this rule. Carole Jackson, the popularizer of the Season system and the author of the best-selling book Color Me Beautiful, stated that colors cannot be combined from two seasons and that an

individual cannot be categorized in more than one season (Jackson, 1982, p. 37). Myra Craig of Beaux Monde, and Judy Lewis-Crum and JoAnne Nicholson of Color I Associates and Le Voy's Image Dynamics do not classify individuals into a small number of inflexible categories (Holten, 1983; Rasband, 1983; Timberlake, 1983). All representatives of these companies classify their clients into two or more categories or use subgroupings within the system.

Many color consulting firms, excluding Color I Associates, use color draping as in the analysis process. This involves stripping the individual of all makeup, then draping color fabric lengths or cardboard collars on the individual to determine colors that are attractive on them (Wallach, 1983; Young, 1983). They base the color match analysis upon the attractiveness of the draped color in relation to the color of hair, eyes, and skin of the individual being draped; however, the relative importance of each component varies with the system being used. Color Me Beautiful followers emphasize the importance of skin tones (Jackson, 1983; Satran, 1983). Color Me a Season analysts place greater importance upon eyes, with attention being paid to pattern as well as color (Rasband, 1983).

Color I Associates use a system of matching color chips to individual coloring and give equal importance to skin and eyes.

Some systems also relate body build and personality to the classification system being used. Consulting firms, including Everyone Is Someone in Color, Academy of Color, and Alive With Color, relate personality to classification groupings (Rasband, 1983).

The accuracy of the procedures used depends to a large extent upon the color perception skills and abilities of the consultant carrying out the analysis. As indicated by Hunt (1982), Ricci (1983), and Satran (1983), consultants do not agree with each other on an analysis of a common subject. This holds true whether the consultants are using the same or different systems of analysis (Hunt, 1982; Ricci, 1983; Satran, 1983).

CHAPTER 3

PROCEDURES

The procedures to be used in this research are described in five main sections, which are sequentially organized.

The first section addresses the selection of publications to be included in the research. It addresses the development of criteria for selection of the publications, the identification of publications to be considered, and the final selection of the publications to be reviewed. Publications included in the study are listed.

The second section outlines the processes used in identifying and recording the personal color categories presented in each selected publication.

The third section outlines the methods used in the visual measurement of the color chips. It includes the selection process of a standard used for identification, the procedure for the identification of specific color chips, the procedure for the visual measurement of the color chips, and the method used for recording data obtained from the measurement process.

The fourth section outlines the methods used in determining written color recommendations in the selected publications. It includes the selection of a standard, the identification of the written recommendations presented, the procedure for comparison of written color recommendations with the standard, and the method used for recording the data obtained.

The fifth and final section outlines the methods used in comparing publications on the basis of the personal color categories used by each author. It also includes the procedure for comparing these publications on the basis of color recommendations made through the medium of color chip presentations, and on the basis of colors named in written color recommendations.

Selection of Publications

Criteria for Selection

The first task in designing methodology for this study was to establish criteria for selection of the publications to be used in the research. Consideration was given to availability and cost of publications to the consumer, who for purposes of this study was defined as a female resident of Corvallis, Oregon.

The developmental nature of this study necessitated the establishment of a procedure to obtain all books to be reviewed, within Corvallis. A price limit, believed to be within the limits of the target consumer, was established by the researcher and three other clothing and textile professionals.

To limit the scope of the research, only books aimed primarily at a female audience were included. Most of the publications available targeted the female consumer.

To ensure that information presented in the publications was relevant to the consumer's current interests, selection was limited to those publications printed after 1975.

Finally, since an objective of the study was to develop a methodology to compare a component of color analysis systems which were available in published form, a final criterion was that the publication focus on color analysis.

Based on these considerations, the following criteria were used:

1. The publication was printed in the U.S.A. after 1975 and was available in print at the time of the study.

2. The publication was available for purchase, or by order through a bookstore, in Corvallis, Oregon, on July 1, 1984.

3. The publication's focus was upon analysis of a female clientele.

4. The purchase price of the material did not exceed $25 (U.S. dollars).

5. The publication had as a major focus, or as a stated purpose, guidance in color of clothing selection to suit personal coloring, or self-determined color analysis. This was determined by a study of the book jacket or cover, preface, introduction, or first chapter.

Procedure for Identifying Publications

The first step in identifying publications for review was to locate titles of potential volumes. This was accomplished by surveying bookstore shelves within Corvallis, by obtaining suggestions from other professionals working in the area of color analysis, and by reviewing the subject and title listings in Books in Print. Books in Print was available in major bookstores and in the Kerr Library at Oregon State University.

Books which, on the basis of title or subject area, or from statements made by professionals, appeared to meet the criteria were considered for final selection (Appendix A, Table A.1).

Final Selection of Publications

A chart format was devised in order to evaluate each publication on the basis of the criteria set. Publication date, source, clientele of the publication, cost, and stated purpose/focus were recorded for each publication considered (Appendix A, Table A.2). The data compiled determined whether a publication would be included in the study. Books selected were those which met all criteria. A list of these publications was made (see Table 4.1).

Identifying and Recording Personal Color Categories

The number and names of personal color categories identified in the color analysis systems presented in the selected publications were determined by the following procedure:

1. One copy of each publication was obtained and reviewed by the researcher to determine the portions of the volume which describe and illustrate the personal color categorization system presented by the author.
2. A format was devised to record the data obtained, including:
    a. Title of publication and author;
    b. The pages with reference to the categories and visual presentations of actual colors recommended;
    c. The number of distinct categories identified by name in each publication;

d. The names ascribed to the categories; and

e. The number of actual color chips presented for each category.

3. Data for each publication were recorded

Visual Measurement of Color Chips

Selection of Standards

The first step in determining the standard to be used for making color judgments was the establishment of the level of precision necessary for the research. Kelly (1976) identified six levels of precision in measurement. Levels 1 and 2 utilize hue discrimination only for color measurement. At level 3 a limited evaluation of value and chroma is added to hue discrimination. These levels are understood by the average person. Level 4 measurement procedure provides an evaluation of a color in terms of Munsell hue, chroma, and value, or an equivalent designation in another system. The precision of the level 4 measurement can be further enhanced by visual interpolation between samples presented in the Munsell system. This provides the degree of precision of measurement identified by Kelly (1976) at level 5. Level 5 is the highest level which can be achieved without the use of instrumentation. Kelly (1976) stated that level 5 is the most widely used in industry, art, and education.

Judd and Wyszecki (1975) stated that the use of color standards as employed in Kelly's (1976) levels 4 and 5, rather the more precise CIE system used in level 6, is often preferred in commerce.

The choice between level 4 and level 5 is dependent upon the degree of precision desired and the color standard available for use. Since an objective of this research study was to compare the actual color chips presented, level 5 precision was used.

Level 5 measurement requires the use of the Munsell Book of Color as a standard (Kelly, 1976). As noted by Judd and Wyszecki (1975), the Munsell color-spacing system is the most important single body of data developed to date on value and chromosity scales. It is used as a standard in the American Society for Testing and Materials (ASTM) standard procedures for visual measurement of color and in the Inter-Society Color Council (ISCC) and the National Bureau of Standards (NBS) method of designating colors (ASTM 1983a, 1983b; Kelly, 1976). Therefore, the standard used for this study was the Munsell Book of Color. And since nine of the eleven publications selected for the study have glossy presentations, the glossy edition of the Munsell Book of Color was used.

Identification of Color Chips

Since the order, size, and arrangement of published color chips (PCC) presented in each volume varies, a standard procedure was developed by the researcher to identify the specific chip being analysed. To facilitate the accurate and orderly recording of color chip identity and location, the following procedure was used. For each publication, each page with color chips was identified and an outline drawing of the location of all color chips was made. The color chips were numbered from left to right and from the top of the page downward. Book title, author, page number, and personal color

category identification was listed for each group of samples being identified. At the bottom of the data recording chart were listed the identification numbers of each sample. (For examples of identification format, see Appendix B.)

Preparation of Color Chips

In the publications, the color chips are presented in assorted sizes and are surrounded by other colors; therefore, some means must be used to reduce extraneous effects. To achieve this, a uniform grey matte background matte material provided by the Munsell company was used in viewing the color chips. Openings were cut to expose only the chip being identified. Mattes of sufficient size to hide all surrounding color were used (ASTM, 1983a).

All publications used in this study were in new condition in order to ensure that chip samples used in the analysis were not soiled, damaged, or faded (ASTM, 1983b).

Following the recommendations of Chamberlin and Chamberlin (1980) the sample size viewed was the size of a thumbnail. For purposes of standardization, it was interpreted to be 1-1/2 centimenters square. This was controlled by the size of the opening cut out in the background matte. Where the color chip was too small to meet the specified size, the opening in the background matte was cut as close as possible to the specified size without allowing more than one color chip to be viewed at one time. Where color chips were larger than the specified size, the background matte was used to block the color chip to conform to the specified size.

Observer

The researcher, who made the color identifications or measurements, met the following characteristics:

1. Normal vision, as determined by an opthalmologist, August 1983.

2. Normal color vision, as determined by testing June 1984 using the Farnsworth-Munsell 100 Hue color test.

3. Eye color designated as Munsell color notation 9YR 4.2/5.

4. Age mid-forties.

Viewing Conditions and Lighting

Color chips and standard was placed side by side on the viewing table. The viewing table was at a height of 28 inches above the floor, with a smooth, nonglare surface in a neutral color.

The color chip and standard were viewed from a viewing distance of approximately 16 inches.

Since an objective of this research was to compare colors, a specific type of light was not required. However, research has shown that varying the light source will vary the visual perception of the colorant (Billmeyer, 1981; Chamberlin & Chamberlin, 1980). Therefore, the recommendations of ASTM publication D1535, Method of Specifying Color by the Munsell System, was followed. Light from a north window was used. Minimum light used was 100 foot candles, measured by a light meter. The light struck the table at a 45-degree angle from the horizontal (ASTM, 1983a).

In keeping with ASTM 1535 (1983a) recommendations, a canopy of black cloth was placed above the working area to prevent errors due to light reflection from the ceiling or objects within the room.

Procedure

Each published color chip (PCC) was examined separately. This was done by comparing each PCC with a standard, using the procedure identified by Kelly and Judd (1976). The procedure was as follows: Two adjacent Munsell constant-hue charts between which the color chip hue lies were selected. These two charts were placed on either side of the PCC. Notation for value, chroma, and hue were determined in that order, using interpolation and extrapolation.

To determine value, the chart which most closely matched the hue of the sample was selected. The researcher visually moved up and down from one value level to another until a match was found or until the two values were established between which the sample fell. Estimation to the nearest half of a value step was made of the value of the PCC relative to the two levels of standard being used. The value on a scale from 1 to 10 was recorded as a number preceding a slash mark (virgule), for example, 4.5/.

To determine chroma, selection of color chips was made across the notation chart in order that hue and value were constant and only chroma variations were observed. The closest match possible was selected, or if the sample fell between two standards, interpolation of the sample value was made. Estimation of the chroma was made to the nearest half of the 2-chroma interval. The number for chroma established by using the Munsell system was recorded as a number

preceded by a slash mark, for example, /6.4. It should be noted that since chroma in the Munsell system is dependent upon the level of intensity of a hue that can be measured by scientific means, the scale is not a uniform length for all hues. For example, the chroma range for red is 0 to 14, while the chroma range for blue green is 0 to 5.

Estimation of the hue was interpolated between color chips of the nearest Munsell chroma and value in the selected charts. Hue was estimated to the nearest half of the 2.5 hue steps between adjacent hue charts. The hue estimate was recorded as a number-letter combination in front of the value and chroma notations, for example, 3.5R 4.2/6.4. Although there are 100 hue divisions in the Munsell system, only 80 were used in this analysis. These included values of 2.5, 5, 7.5, and 10 for each hue name and the central value interpolated between each of these. For example, between 2.5 and 5 the interpolated value is 3.75.

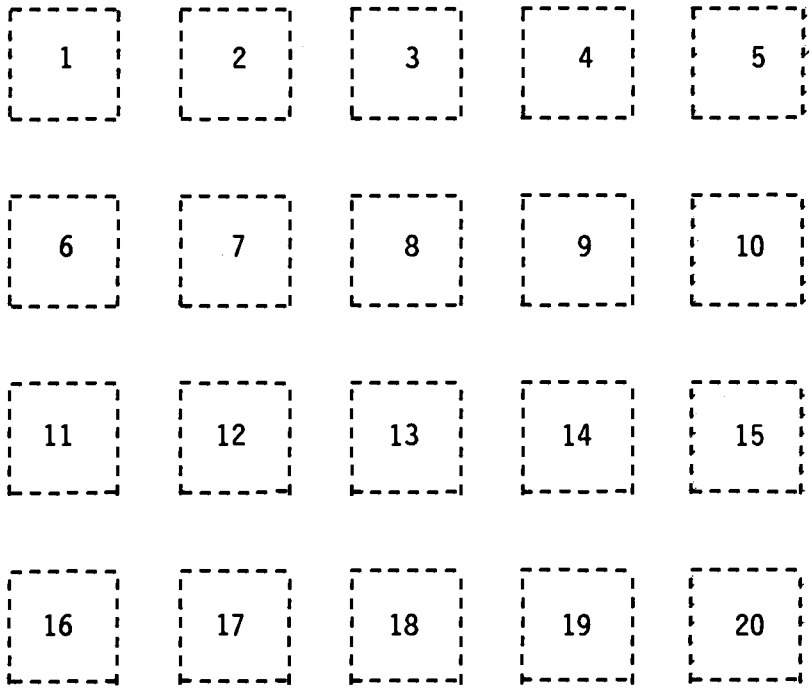
To clearly identify the specific color chip to which a particular notation applies, the format shown in Figure 3.1 was used to record notation data.

Written Color Recommendations

Many of the selected publications (see Table 4.1) used color names such as "nutmeg" or "old rose" in making color recommendations for personal color categories. This study identified those color recommendations by using a recognized color notation system.

Book_____ Author_____

Page number_____ Color Category_____



Identification Number and Visual Color Record

1.	6.	11.	16.
2.	7.	12.	17.
3.	8.	13.	18.
4.	9.	14.	19.
5.	10.	15.	20.

Figure 3.1 Color chip identification format.

Selection of a Standard

A number of color dictionaries have been published. Among the most comprehensive of these are the Maerz and Paul Dictionary (Maerz & Paul, 1930), the Ridgway Color Standard and Color Nomenclatures (Ridgway, 1912), the Descriptive Color Names Dictionary (Taylor, Knoche, & Granville, 1950). Any one of these three works would be a satisfactory choice to use in determining notations of colors named in the publications being studied. However, an ISCC-NBS document entitled Dictionary of Color Names (Judd & Kelly, 1976) combines and includes these three works as well as more specialized color dictionaries. The Dictionary of Color Names assigns an ISCC-NBS designation to each named color (level 3 in Kelly's measurement system) (Kelly, 1976), and the ISCC-NBS designation can be translated into the Munsell notation system. Since the ISCC-NBS Dictionary of Color Names is the most comprehensive dictionary, it was used as the standard.

Identification of Written Color Recommendations

The text of each publication was examined to determine the pages on which reference was made to written color recommendations ascribed to specific personal color cagegories. For each publication all color names which were written color recommendations were listed under the appropriate personal color category.

Comparison of Written Color Recommendations with Standard

Each color name recorded for a publication was identified using the Dictionary of Color Names (Judd & Kelly, 1976). The names of the colors were identified in both written and serial number form, following the designation system used in the standard.

Recording of Written Color Recommendations

Using a chart format, designations of color names identified were recorded beside each named color. The equivalent notation was also recorded.

Procedure for Comparing Publications

Comparison of Personal Color Categories

A comparison of the publications was made on the basis of the number of personal color categories used by the author(s), the names of the categories used, and the number of color recommendations given for each category. A table showing the comparison was constructed.

Comparison of Color Chips

For all publications used in this study which presented personal color categories, comparisons were made on the basis of hues recommended, and value and chroma ranges presented. The procedure used was multi-staged. First, as described previously, each published color chip was identified, using a Munsell designation (Appendix B). Second, a spoked diagram (Figure 3.2) representing the 40 major Munsell hues and a rectangular grid (Figure 3.3) representing the Munsell value scale were used to plot all published color chip desginations for each personal color category presented by each author. Third, the information obtained from these diagrams was summarized. For each personal color category, counts were made to identify hues names (e.g., R, GY) with largest number of chips, smallest number of chips, or no chips. The numeric range for all hues within a category was also recorded. Value and chroma ranges for each category were recorded.

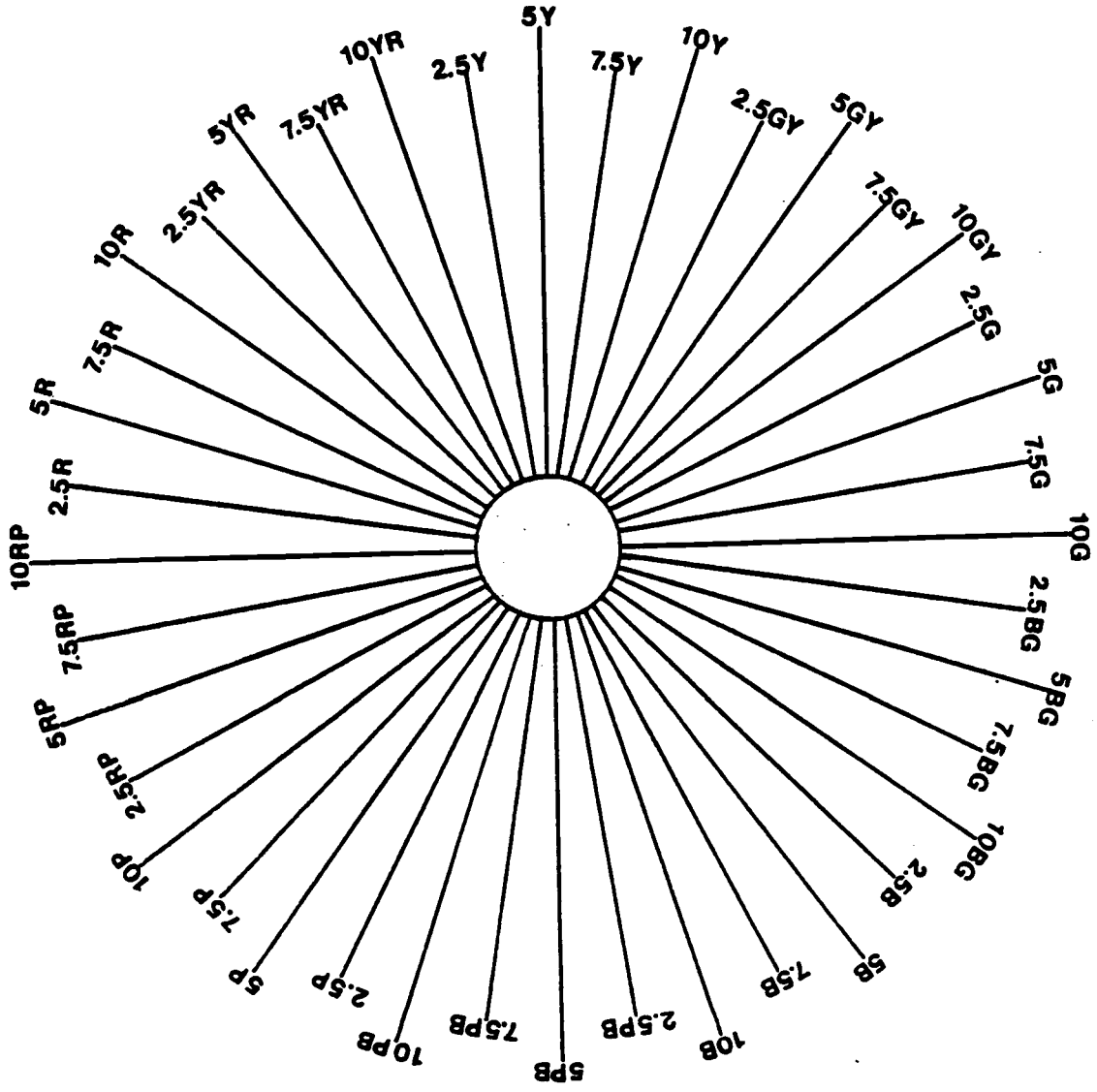


Figure 3.2. Hue and chroma of color chips. Chroma scale was plotted on the hue notation line with notation 0 at the center and 14 at its extremity.

Book: Author:
Page: Color Category:

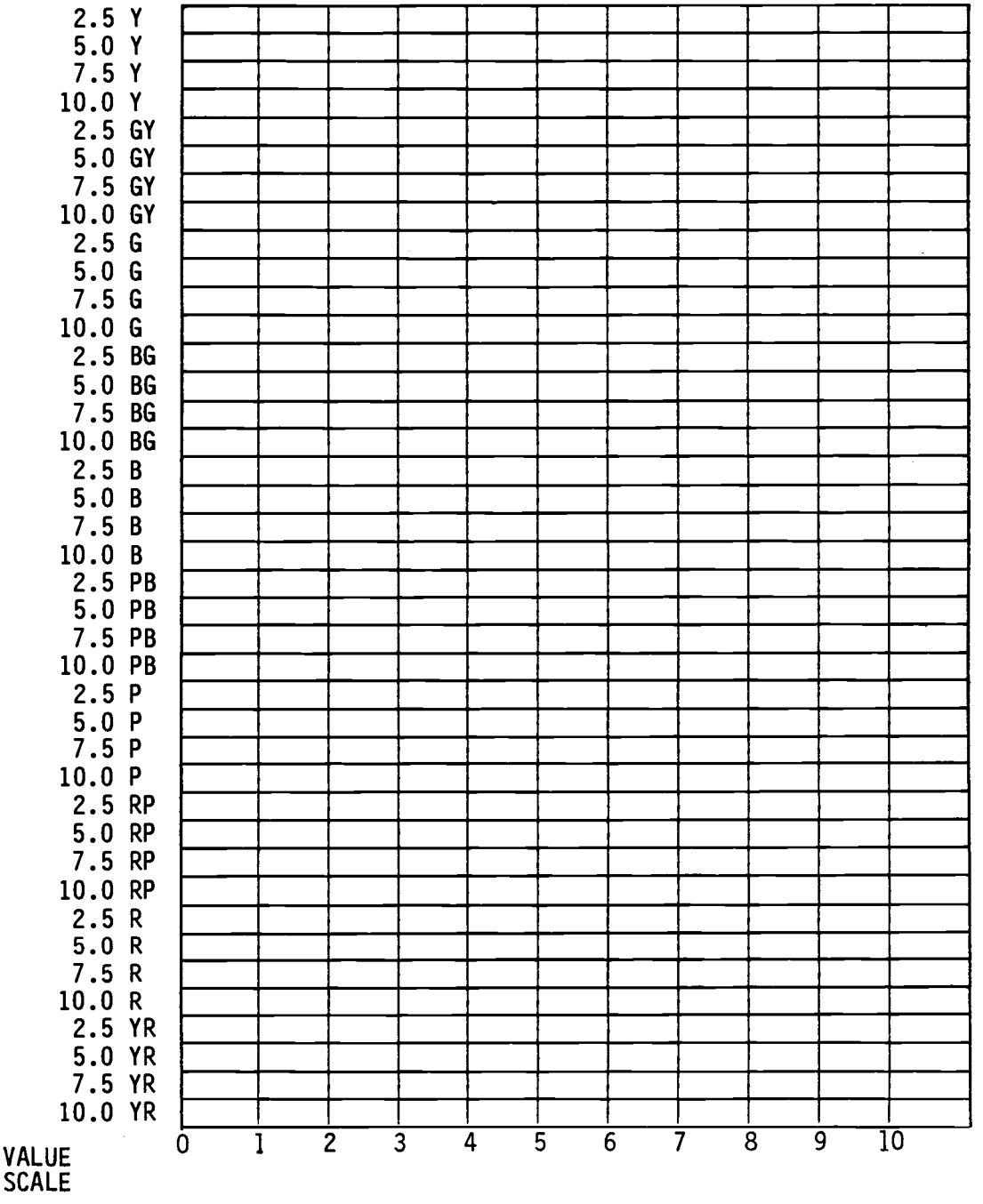


Figure 3.3. Hue and value of color chips.

The potential hue range for any designated hue such as red (R) is .1 to 10. The value range for any designated hue is 1 to 10. The chroma range, as stated previously, is specific to each hue; however, the high and low limits for all hues as a group are .1 and 14, respectively.

Comparison of Written Color Recommendations

Comparisons were made among systems presented in publications using same name identification of categories on the basis of written color recommendations (named colors). ISCC-NBS designations were used for these comparisons. Similarities and differences between publication recommendations for each same name category were identified.

Some publications included in this study identified the color chip presentations by name. Where this was done, a comparison of the Munsell notation for the color chip and the Munsell notation for the name was made. This provided a measure of the accuracy of the color identification used by the author and publisher. Systems were compared on the basis of the extent of agreement between the two methods of color recommendation.

No overall ranking of publications or systems was made. This research compared only four aspects of the color analysis systems reviewed. These four aspects were: (1) the published color chips; (2) the written color recommendations presented for each personal color category; (3) the names and number of personal color categories used; and (4) the number of color recommendations made. Other aspects, such as reading level, clarity of instructions, procedures used in actual analysis, quality of illustrations, method for color analysis, and completeness of information presented would have to be considered in order to make an overall rating of the publications.

CHAPTER 4

RESULTS OF THE STUDY

This study was designed to develop a procedure for comparing specific color recommendations for each personal color analysis category as identified by the authors of selected publications. The procedure included the following steps: (1) selection of publications; (2) identification of personal color categories presented by the authors of the selected publications; (3) visual measurement and recording of the published color chips identified for each personal color category presented by the authors; (4) identification and recording of written color recommendations (color names) for each personal color category presented in the selected publications; (5) comparison of selected publications on the basis of (a) personal color categories; (b) colors presented in published color chip form; (c) range of color recommendations presented in published color chip form; and (d) degree of agreement of color recommendations presented as written color recommendation (color name) compared with published color chip presentations.

Selection of Publications

The procedure used in selecting the publications for this study was described in Chapter 3. Sixteen publications were considered for inclusion in the study (Appendix A, Table A.1). They were compared on the basis of the criteria established for selection of works for this study (refer Chapter 3 and Appendix A, Table A.2). Eleven of the

reviewed works met all the established criteria: all were published subsequent to 1975; were available for purchase; were aimed primarily at a female clientele; had a purchase price under $25; and presented a system for personal color analysis (Table 4.1). The remainder of the results presented in this chapter are based on these eleven publications.

Identification of Personal Color Categories

The eleven publications selected were analyzed to determine the presence or absence of a personal color category system. The procedure used in this process was described in Chapter 3. A summary of the data obtained from the sample of publications included in this study is given in Table 4.2.

The data showed that three publications (Quinn, Linn & Hale; Segerstrom; and Johnson) used no color categories. Among the publications using a color category system, the number of categories varied from two (in the system of Mumford) to eight (in the system of Littauer and Littauer). Of the remaining systems, one (Eiseman) used three categories while five others (Jackson; Kentner; Pinckney & Swenson; Revelli; Wallace) used four.

The total number of published color chips presented by the authors varied from 48 (Mumford) to 403 (Littauer & Littauer). The number of color chips assigned to each category varied from 16 (Kentner) to 61 (Pinckney & Swenson).

Table 4.1

Publications Selected for the Study

Eiseman, L. (1983). Alive with color. Washington, D.C.: Acropolis Books Ltd.

Jackson, C. (1980). Color me beautiful. Washington, D.C.: Acropolis Books Ltd.

Johnson, J. (1983). Clothing: Image and impact. Cincinnati, OH: South-Western Publishing.

Kentner, B. (1978). Color me a season. Concord, CA: Kenkra.

Littauer, M., & Littauer, F. (1982). Shades of beauty. Eugene, OR: Harvest House Publishers.

Mumford, J. (1976). Everyone is someone in color. Salt Lake City: Publishers Press.

Pinckney, G., & Swenson, M. (1981). Your new image. Costa Mesa, CA: Fashion Image/Crown Summit Books.

Quinn, F., Linn, A., & Hale, W. N. (1976). Consumer color charts (3rd ed.). Baltimore, MD: Munsell Color, Macbeth Division of Kollmorgan Corporation.

Revelli, C. (1982). Color and you. New York: Simon and Schuster.

Segerstrom, J. (1980). Look like yourself and love it. Houston: Triad Press.

Wallace, J. (1983). Dress with style. Old Tappan, NJ: Fleming H. Revell Company.

Table 4.2

Personal Color Categories and Numbers of Color Chips in Eleven Selected Publications

Author(s)	Page Identifying Categories	Number of Distinct Categories	Names of Categories	Number of Colors in Each Category
Eiseman*	33-37 47-50 140-plates C, E, G, I, K, M, N, O	3	Sunrise (A.M.) Sunlight (Midday) Sunset (P.M.)	35 + 14 35 + 14 35 + 14
Jackson	25-36	4	Spring Autumn Winter Summer	31 31 31 31
Kentner	1 144-147 50-51 41-46	4	Winter Autumn Spring Autumn	16 18 16 16
Littauer & Littauer	9-16 32 46, 60 74, 88 102, 114 128	8	Dawn Sunrise Morning High Noon Afternoon Sunset Evening Midnight	51 51 51 51 51 51 51 46
Mumford	14-15 18-27, 56	2	Key 1 Key 2	24 24

*In Eiseman there are 35 color recommendations specific for each category. There are 14 common colors (labeled "Crossover") that are common to all three categories.

Table 4.2 (continued)

Author(s)	Page Identifying Categories	Number of Distinct Categories	Names of Categories	Number of Colors in Each Category
Pinckney & Swenson	2 120-127	4	Winter Summer Spring Autumn	61 60 60 60
Quinn, Linn, & Hale		(No color categories)		
Revelli	6 38-41	4	Spring Summer Autumn Winter	20 20 20 20
Segerstrom		(No color categories)		
Wallace	36-43	4	Cool Summer Cool Winter Warm Spring Warm Autumn	25 29 29 30
Johnson		(No color categories)		

Visual Measurement and Recording of the Published Color Chips

Data presented in Table 4.2 show that eight publications used a personal color categorization system with published color chips ascribed to each category. In order to compare the color recommendations within and among the publications, a uniform standard for published color chip identification, measurement, and recording was used--the Munsell Book of Color, glossy edition. The method used was described in Chapter 3. Published color chips were identified using the form shown in Figure 3.1. Results of the visual identification of the color chips presented in the publications were recorded beside the numbers identifying the specific chips. All color chips presented by the authors as belonging to a specific color category were identified. The procedure included interpolation which made measurements possible when the match between the published color chip and the standard was not exact. Table 4.2 indicates the number of color chips identified for each category and the pages on which the chips were presented in each publication. Identifications were recorded in standard Munsell designations (see Appendix B for examples).

Identification and Recording of Written Color Recommendations

Of the eight publications identified which presented personal color categories with published color chips ascribed to them, five

presented written color recommendations (color names) identified with the specific published color chips (Eiseman; Jackson; Littauer & Littauer; Revelli; Wallace). These written color recommendations were identified and recorded using the procedure outlined in Chapter 3. Results of this identification procedure were recorded using the format identified in Appendix C. For every color category used by each of the five authors, all color names were listed together with the color chip identification number. Using section 15 of the Dictionary of Color Names (Judd & Kelly, 1976), all ISCC-NBS color designations assigned to each color name were determined, as presented in Appendix C. Section 13 (Color Name Charts) of the Dictionary was then used to determine all Munsell color notations represented by each ISCC-NBS color designation. These were listed in the appropriate column. A sample of these data is presented in Appendix C.

A review of Table 4.3 indicates the difficulties in using words to specify color. Two problems resulting in an imprecision in color recommendation are evident. They are: (1) a large number of written color recommendations had no recognized notation in either the ISCC-NBS or Munsell system; and (2) no written color recommendation had a single Munsell designation and less than 22 percent of the written recommendations by any author had one ISCC-NBS designation. The latter problem can be clarified by the following example. The single color name "melon" has one ISCC-NBS designation, which is identified by the Munsell notations of hues 4R to 10R with values 6.5 to 10 and chroma 7 to 11 as well as hues 0YR to 2YR with values of 6.5 to 10 and chroma 7 to 11. These ranges give rise to the potential of

Table 4.3

Identification of Written Color Recommendations (Color Names) Using ISCC-NBS and Munsell Notations, by Author

Author	Category	Number of Color Names	ISCC-NBS Notation Designation			Munsell Notation Designation		
			None	One	Multiple	None	One Hue*	Multiple Hue
Eiseman	Sunrise	35	6	10	19	6	3	26
	Sunlight	35	11	7	17	11	6	18
	Sunset	35	8	7	20	8	5	22
	Crossovers	14	2	1	11	2	2	10
	TOTAL	119	27(23%)	25(21%)	67(56%)	27(23%)	16(13%)	76(64%)
Jackson	Winter	31	8	5	18	8	3	20
	Summer	30	2	5	23	2	0	28
	Autumn	31	2	3	26	2	6	23
	Spring	31	3	8	30	3	6	22
	TOTAL	123	15(12%)	21(17%)	87(71%)	15(12%)	15(12%)	93(76%)
Littauer & Littauer	Dawn	11	2	4	5	2	2	7
	Sunrise	11	1	3	7	1	3	7
	Morning	11	4	0	7	4	1	6
	High Noon	11	3	1	7	3	2	6
	Afternoon	11	3	2	6	3	2	6
	Sunset	11	2	1	8	2	2	7
	Evening	11	3	3	5	3	2	6
	Midnight	10	2	1	7	2	0	8
	TOTAL	87	20(23%)	15(17%)	52(60%)	20(23%)	14(16%)	53(61%)
Revelli	Spring	20	3	3	14	3	4	13
	Summer	20	2	3	15	2	1	17
	Autumn	20	1	2	17	1	4	15
	Winter	20	6	2	12	6	1	13
	TOTAL	80	12(15%)	10(12.5%)	58(72.5%)	12(15%)	10(12.5%)	58(72.5%)
Wallace	Cool Summer	25	2	7	16	2	3	20
	Cool Winter	29	3	4	22	3	3	23
	Warm Spring	23	9	2	12	9	1	13
	Warm Autumn	29	9	2	18	9	4	16
	TOTAL	106	23(22%)	15(14%)	68(64%)	23(23%)	11(10%)	72(68%)

*One Hue Name, e.g., green yellow

many specific colors which could be identified as melon. Since a single ISCC-NBS designation never translates into a single Munsell designation, this problem is multipled for all written color recommendations having multiple ISCC-NBS designations.

It is important to compare the percentages for color names with single, multiple, and no designations for both ISCC-NBS and Munsell notations which are presented in Table 4.3. Three of the five authors (Eiseman; Littauer & Littauer; Wallace) used approximately 23 percent written color recommendations (color names) for which there were no ISCC-NBS notations. The other two authors (Jackson and Revelli) used 12 percent and 15 percent, respectively, written color recommendations with no ISCC-NBS notation. Since a Munsell designation is determined from an ISCC-NBS notation, the percentages for no Munsell designation were the same as for ISCC-NBS. Percentages with one ISCC-NBS notation varied from a high of 21 percent (Eiseman) to a low of 13 percent (Revelli). No written color recommendation (color name) included in this study had a single Munsell designation, but a small percentage had one hue name (e.g., yellow red) designation. The percentage with a single hue name varied from 7 percent (Jackson) to 16 percent (Littauer & Littauer). Over 60 percent of the written color recommendations (color names) presented by the authors in this study had multiple hue designations using the Munsell notation system. This indicates a lack of precision in color recommendation.

Comparison of Selected Publications

Personal Color Categories

As shown in Table 4.2, of the eleven publications analyzed in this study for the presence of a personal color category, only eight included such categories.

The data presented in Table 4.2 indicate that further comparisons among systems could be made if the data were regrouped on the basis of nomenclature used to identify personal color categories within the system. Regrouping of the publications included in this study, using personal color category system headings, resulted in five systems being classified as "seasonal," two systems as "time of day," and one system as "key."

Since color recommendations in the form of color chips and written color recommendation were the focus of the procedure developed in this study, personal color category groups were further compared. The bases used were the number of categories, total number of published color chips, and number of published color chips identified with each personal color category. This information is presented in Table 4.4.

Table 4.4 shows that within the seasonal systems category, Pinckney and Swenson presented the most published color chips (240). This was almost four times the number presented by Kentner, whose system presented the fewest color chips (66). The average number of chips presented by the authors using the seasonal system was 124.6, or 31 color chips per category.

Table 4.4

Comparison of Publications by Personal Color Category System Used, Number of Categories, and Number of Color Chips

Author	Number of Categories in System	Total Number of Color Chips Presented	Number of Color Chips Per Category		
			Lowest	Highest	Average
Seasonal System of Categorization					
Jackson	4	124	31	31	31
Kentner	4	66	16	18	16.5
Pinckney & Swenson	4	240	60	60	60
Revelli	4	80	20	20	20
Wallace	4	113	25	30	28.3
Time of Day System of Categorization					
Eiseman	3	147	49	49	49
Littauer & Littauer	8	397	46	51	50.4
Key System of Categorization					
Mumford	2	48	24	24	24

The authors (Eiseman; Littauer & Littauer) using times of day (e.g., Sunrise) to identify categories showed no similarity in number of categories (3 and 8, respectively) or in number of published color chips (147 and 397, respectively) presented. However, both used the same name designations (Sunrise and Sunset) for two categories (see Table 4.3).

Mumford, who used the key system, presented the fewest categories (2) and the fewest published color chips (48).

Colors Presented in Published Color Chip Form

Numerical comparisons of published color chips ascribed to categories used by the authors included in this study were made. Counts were made of the numbers of chips falling into each of the ten Munsell hue names. These hue names are red (R), yellow red (YR), yellow (Y), green yellow (GY), green (G), blue green (BG), blue (B), purple blue (PB), purple (P), and red purple (RP). The hue range (1-10), value range (1-10), and chroma range (1-14) for each hue name were also determined (see Appendix D for an example of these data.) A summary of this information is presented in Table 4.5. It should be noted that hue range varied little within individual authors or among all authors. Almost all hues ranged from 1.25 to 10, with one exception. The exception was Mumford, with top hue ranges for categories of 7.25 and 8.75.

Value ranges were also similar among authors, with most lower end values betwen 2 and 3.5 and most upper values between 8 and 10.

Chroma ranges varied from 1-7 in the case of Littauer and Littauer for "Afternoon" category, to 1-14 in the case of Kentner for

Table 4.5

Summary of Hue, Value and Chroma of Color Chip Presentations by Author and Category

Author	Category	Hue Name			Hue Range	Value Range	Chroma Range
		Highest Number of Chips	Lowest Number of Chips	No Chips			
Eiseman	Sunlight	Y-R, Y	B-G	-	1.25-10.0	2.5- 9.0	1-12
	Sunrise	Y-R, Y	P	-	1.25-10.0	2.0-10.0	1-10
	Sunset	R	Y-R	-	1.25-10.0	2.5- 9.0	1-10
Jackson	Summer	R-P	P, Y	GY, BG	2.50-10.0	3.0- 9.0	1-12
	Winter	RP	G, BG	Y-R	1.25-10.0	3.5- 9.0	1-12
	Autumn	Y	G, PB	BG, B, P, RP	1.25-10.0	2.5- 9.0	2-10
	Spring	R	GY, B, P, RP	-	1.25-10.0	2.0- 8.5	1-13
Kentner	Winter Bouquet	R	Y, BG, B	YR, GY, P	1.25-10.0	3.0- 9.0	1-10
	Summer Bouquet	Y, PB	GY, B, P, RP	BG	2.50-10.0	5.5- 9.0	1-14
	Spring Bouquet	YR, Y	GY, BG, RP	G, P	1.25-10.0	3.0- 8.5	1-14
	Autumn Bouquet	R, YR, GY	G, P	BG, PB, RP	1.25-10.0	3.5- 8.5	3-12
Littauer & Littauer	Dawn	YR	G	GY, RP	1.25-10.0	3.0- 9.0	1- 8
	Sunrise	YR, Y	G, B	P	2.50-10.0	1.0- 9.0	1-10
	Morning	Y	BG	P	1.25-10.0	3.0- 9.0	1- 8
	High Noon	Y	R	PB, P	2.50-10.0	3.0- 9.0	1- 8
	Afternoon	Y	G	PB, P, RP	1.25-10.0	3.5- 9.0	1- 7
	Sunset	YR	BG, B	G, PB, P, RP	1.25-10.0	3.0- 9.0	1- 8
	Evening	YR	GY, B	RP	2.50-10.0	3.0- 9.0	1- 8
	Midnight	R	Y, RP	GY	1.25-10.0	2.0- 9.0	1-12

Table 4.5 (continued)

Author	Category	Hue Name: Highest Number of Chips	Hue Name: Lowest Number of Chips	Hue Name: No Chips	Hue Range	Value Range	Chroma Range
Mumford	Key 1	R, Y	G, PB	GY, YR, BG, P	1.25- 7.5	2.0-10.0	4-10
	Key 2	Y	GY, G, BG, B, PB	YR, P, RP	2.50- 8.75	1.0- 9.0	1-11
Pinckney & Swenson	Spring	Y, PB	G	B, RP	1.25-10.0	2.5- 9.0	1-13
	Autumn	Y	B	P, RP	1.25-10.0	2.5- 9.0	1-12
	Winter	PB, RP	GY, P	YR	2.50-10.0	2.5- 9.5	1-14
	Summer	PB	B, P	GY	2.50-10.0	2.5- 9.0	1-14
Revelli	Autumn	R, YR, Y	B, PB	P, RP	1.25-10.0	4.0- 9.0	2-12
	Winter	R	Y, B, P, RP	GY, BG	2.50-10.0	3.5- 9.0	2-12
	Spring	YR	RP	G, BG	1.25-10.0	4.0- 8.5	1-12
	Summer	RP	YR, Y, G	R, GY, B	1.25-10.0	4.0- 8.0	2-11
Wallace	Warm Spring	YR	R, BG	PB, P, RP	1.25-10.0	3.0- 9.0	1-10
	Warm Autumn	R	BG, B, PB	P, RP	1.25-10.0	3.0- 8.0	2-12
	Cool Summer	RP	R, GY, BG, PB	P	1.25-10.0	2.0- 8.5	1- 9
	Cool Winter	RP	YR, GY, P	-	1.25-10.0	3.0- 8.0	1-13

"Summer" and "Spring" categories, and Pinckney and Swenson for "Winter" and "Summer" categories. When all categories were viewed as a whole, Littauer and Littauer had the narrowest chroma range; Pinckney and Swenson, and Kentner had the widest chroma ranges.

Range of Color Chip Recommendations

Data presented in Table 4.5 reveal that the authors spanned almost the complete hue, value and chroma ranges in making their color chip recommendations.

Hue names with the largest number of recommended color chips would represent the portion of the color circle most highly recommended by a specific author for a color category. Hue names with the smallest number of color chip recommended by a specific author for a color category would represent less favored portions of the color circle. Where no chips are presented for a hue name, it could be assumed that those portions of the color circle are not recommended for that particular color category. In comparing authors using "time of day" categories, it is of interest that Eiseman recommends the yellow-red and yellow portions of the color circle for two of the three "time of day" categories (Sunlight and Sunrise).

No major recommendation for any category in Eiseman's system were in the green to purple portions of the color circle. This includes green, blue green, blue, purple blue, and purple hues, or half of the color circle. Also of note, Eiseman was the only author who made at least one color recommendation from every one of the ten Munsell hue names for each of the personal color categories presented. Red through red-purple hue name groups in some value and chroma are

recommended for each of the three Eiseman categories (Sunlight, Sunrise, Sunset).

Littauer and Littauer, like Eiseman, used red to yellow hue names groups in making recommendations for all eight "time of day" cagetories in their system. This includes red, yellow red, and yellow, or three-tenths of the color circle. Purple and green hues were less favored color recommendations. Purple, red purple, and purple blue were the hues most frequently omitted from recommendations for any category within the Littauer and Littauer system. Both of these authors favored the same small segment (R, YR, Y) of the color circle for recommendations in all categories. This would indicate that categories do not have descrete color recommendations.

In Mumford's system, yellow was the most recommended hue name for both "key" categories; yellow red and purple were not recommended for either category.

A comparison of publications using the seasonal categorization system indicated both a number of similarities and a number of differences among them. Similarities could be seen in terms of the hue range presented as well as the segment of the color circle used for the major portion of the color chip recommendations for similarly identified categories. Overall, the hue range from low to high, for all authors, was 1.25-10 out of a possible 1-10. The hue range for specific similarily identified categories for each author was similar, with a maximum difference of 1.25.

In all seasonal systems, the largest number of chips was presented for the summer category in the purple blue to red purple

portion of the color circle. Similarly, the largest number of chips presented in the winter category in the systems fell in the purple blue to red portion of the color circle. For all seasonal systems compared, the largest number of chips presented for the autumn category fell in the red to green yellow portion of the color circle. For the autumn category in all seasonal systems, either blue or green was the least recommended hue name group.

When systems were compared on the basis of hue groups in which no color recommendations were made, similarities appeared in the winter, summer and autumn categories. Three out of five systems made no yellow red recommendations for winter and no green yellow recommendations for summer. All five systems made no red purple recommendations for autumn, and four of the five made no purple recommendations for this category.

The five seasonal systems compared in this study differed in both overall value range and specific category value range. The largest overall value range was presented in Pinckney and Swenson; the smallest was presented by Kentner. Kentner presented the greatest variation in size of value range among categories (3.5 to 6), while Pinckney and Swenson presented the smallest variation (6.5 to 7).

Chroma range varied greatly within and among systems. Kentner had the most variation (8 to 13) within the system, while Pinckney and Swenson had the least (11 to 13). No consistency among systems was found for chroma range for a specific seasonal category.

A study of specific hue name group recommendations for any one seasonal category showed little general agreement among systems.

Although agreement was noted, overall there were more differences than similarities among the hue name recommendations for any specific seasonal category.

Degree of Agreement of Color Chip and Written Color Recommendations

A table was devised to compare the agreement of Munsell designations for each published color chip with each written color recommendation (color name) (Table 4.6). The data for these comparisons were obtained by using the procedure described in Chapter 3. Degree of agreement was established at two levels. The first of these was total agreement of Munsell designation (hue/value/chroma) between published color chip and written color recommendation (color name). This is shown in Table 4.6 under "Hue/Value/Chroma Agreement." The second level of agreement was determined on the basis of hue designation only. For example, if the published color chip designation was 7.5R 6/2 and the written color recommendation (color name) identified with that chip had any 7.5 R designations identified with it, this was taken as hue agreement. This information is presented in Table 4.6 under the heading "Hue Agreement Only." Where no Munsell designations for the written color recommendation (color name) were available, the item was deleted from the total number of colors compared. (The number of written color recommendations without designations is given in Table 4.3.)

Table 4.6 presents a summary of the number of colors compared and agreement in both percent and numbers for both hue/value/chroma agreement and hue agreement only. The information is presented for

Table 4.6

Comparison of Publications on the Basis of Agreement Between Color Chip Identification and Written Color Recommendations (Color Names)

Author	Color Category	Number of Colors Compared	Hue/Value/Chroma Agreement		Hue Only Agreement	
			Number	%	Number	%
Eiseman	Sunlight	40	7	17.5	18	45.0
	Sunrise	36	7	19.4	16	44.4
	Sunset	39	10	25.6	18	46.2
	Total	115	24		52	
	Average			20.9		45.2
Jackson	Summer	23	10	43.5	14	60.9
	Winter	30	3	10.0	15	50.0
	Autumn	29	12	41.4	24	82.8
	Spring	28	10	35.7	20	71.4
	Total	110	35		73	
	Average			31.8		66.4
Littauer & Littauer	Dawn	9	5	55.5	7	77.8
	Sunrise	10	6	60.0	6	60.0
	Morning	7	2	28.6	4	57.1
	High Noon	8	4	50.0	6	75.0
	Afternoon	8	4	50.0	5	62.5
	Sunset	9	5	55.5	5	55.5
	Evening	8	5	62.5	5	62.5
	Midnight	8	4	50.0	8	100.0
	Total	67	35		46	
	Average			52.2		68.7
Revelli	Autumn	17	8	47.1	13	76.5
	Winter	18	5	27.8	13	72.2
	Spring	19	5	26.3	13	68.4
	Summer	14	8	57.1	9	64.3
	Total	68	26		48	
	Average			38.2		70.6
Wallace	Warm Spring	23	9	39.1	13	56.5
	Warm Autumn	26	11	42.3	17	65.4
	Cool Summer	14	3	21.4	9	42.9
	Cool Winter	21	6	28.6	12	57.1
	Total	84	29		51	
	Average			34.5		60.7

every personal color category as well as for each publication as a whole.

Of special note is the procedure used to determine agreement between color chip identification and written color recommendations for the Littauer and Littauer publication. These authors ascribed one name to a group of color chips. Agreement was recorded if any chip designation in the group ascribed to a written color recommendation matched the written designation. For example, color chips 1 to 5 inclusive where identified by the written color recommendation "Dusty Aqua." Because no color chip in this group had a purple (P) or purple blue (PB) designation, no agreement was shown.

As can be seen in Table 4.6, hue/value/chroma agreement between color chip and written color recommendations was highest for Littauer and Littauer (average percent 52.2 agreement) and lowest for Eiseman (average percent 20.9 agreement). Agreement of hue only for color chip and written color recommendations was highest for Revelli (average percent 45.2 agreement). All authors showed a great range of percent total agreement of color chip and written color recommendations among categories within a system. The smallest range was in Eiseman's system (8.1); the largest range was in Littauer and Littauer (33.9). Jackson showed a range difference of only .4 less than Littauer and Littauer.

Range of percent for hue agreement only among categories within a system was even greater than for hue/value/chroma agreement. The smallest range was in Eiseman's system (1.8 percent); the largest range was in Littauer & Littauer (44.5 percent). Littauer and

Littauer was the only system which presented a category with 100 percent agreement of hue only.

The lack of agreement between color chip identification and written color recommendations would indicate that most authors present readers with two rather than one set of color recommendations for each category.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

According to Rasband (1983) and Wallach (1983), color analysis has become big business. Color analysis is based on the assumption that personal coloring can be analyzed and that, based upon this analysis, individuals can be placed in specific categories with distinct color recommendations ascribed to the category. Color recommendations may be presented visually (color chips) or verbally (color name). This study examined both forms of presentation and compared recommedations within and among published systems.

In this chapter, the procedures and results of the investigation are summarized, conclusions are given, and recommendations for further research using the methodology developed for this study are presented.

Summary

Procedures

The purpose of this study was to develop a methodology to compare the color choice recommendations for each personal color analysis category identified by the authors of selected publications.

The objectives of this study were to:

1. identify publications presenting color analysis systems;
2. compare by name and count the color categories identified in the selected publications;

3. identify the specific color recommendations presented in published color chip form for each category;
4. identify the specific colors given in written color recommendation (color name) form for each category;
5. develop a methodology for comparison of the publications on the basis of the:
    a. number of categories;
    b. number of color recommendations presented for each category;
    c. range of hue, value, and chroma represented;
    d. names ascribed to the categories used;
    e. similarities (and differences) of the color recommendations presented in published color chip form, with those in written color recommendation (color name) form.

Six steps were used to achieve the purpose of this study:

1. Criteria were established for selection of publications. The criteria were: published after 1975; available in Corvallis, Oregon, at the time of the study; focus on female clientele; purchase price under $25; stated purpose of guidance in color selection.

2. Eleven publications were identified as meeting the established criteria.

3. The personal color categories were identified and the data recorded.

4. The published color chips were visually measured using a recognized color standard and procedure, and the data recorded.

5. The written color names were identified using a standardized procedure and color notation system, and the data recorded.

6. Three comparisons of the selected publications were made. First, personal color categories were compared on the basis of name of categories, number of categories, and number of color recommendations ascribed to each category. Second, publications using the same or similar names within categories were compared on the basis of commonality of color recommendations for a category in terms of hue, value, and chroma. Third, the agreement between color recommendations in published color chip form and in written color recommendation (color name) form was determined for each category in each publication.

Comparison on the Basis of Color Categories

Of the original sample of eleven publications, only eight presented a color category system and ascribed specific colors to it (Table 4.2). Those eight publications were selected for comparison. A different procedure would have been necessary in order to compare all publications in the original sample.

There was no overall consistency in names or numbers of categories used among systems. The number of categories used varied from 2 to 8. Although all publications presenting a seasonal system used the same number (four) of categories, there was no consistency in the number of categories among the "time of day" systems. Nonetheless, the data support the statement made by Rasband (1983, p. 3) that the "four seasons" theory is the most popular or the most widely available.

A comparison of the number of color chips presented showed no consistency overall or within system types, such as seasonal systems. The number of color chips presented in the selected publications ranged from 16 to 51. Three systems (Kentner; Littauer & Littauer; Wallace) did not present the same number of color chip recommendations within each category. Both Kentner and Wallace used a seasonal system; but Kentner ascribed the most colors to summer, while Wallace presented the least number of color chips within this category.

There appeared to be little or no uniformity in the number of color chip recommendations per category within a system.

Comparison on the Basis of Written Color Recommendations

The procedure used for identification of written color recommendations was detailed and specific, providing an accurate method for comparison by using a recognized system of color measurement. However, it was time consuming.

A surprising finding of the analysis was the number of written color recommendations (color names) presented which had no recognized ISCC-NBS or Munsell color designation (Table 4.6). Jackson had the least (12 percent) with no designation; whereas Eiseman, Littauer and Littauer, and Wallace had the most (23 percent). This indicates that the authors likely did not use the ISCC-NBS or Munsell color designation system when making written recommendations. Also, since most written color recommendations (color names) had multiple Munsell designations (at least 61 percent in all systems), the written color recommendations lacked precision. Because of the lack of precision in the written color recommendations, it was impossible to carry out a

comparison of the publications on the basis of written color recommendations alone. However, it should be noted that written color recommendations (color names) are widely used in fashion and merchandising; consumers may use them as the source of color recommendations and thus be using a very imprecise guide for making color decisions.

A comparison of the publications on the basis of written color recommendations by category showed no uniformity in number of recommendations with no ISCC-NBS designations. Eiseman, Jackson, and Revelli all had one category with a much larger number of "no designations." In both the Jackson and Revelli systems, this category was "Winter"; in the Eiseman system, it was "Sunlight." The Eiseman, Jackson, and Wallace systems each had one category ("Sunrise," "Spring," and "Cool Summer," respectively) which had a larger number of written color recommendations with one ISCC-NBS designation. Revelli and Jackson both had a much larger number of written color recommendations with no designation in the winter category. These variations could indicate a difference in specificity of color palette definition for the different categories. As noted previously, multiple designations present an imprecise color recommendation.

Comparision on the Basis of Published Color Chips

A comparison was made among categories within each color analysis system and among systems presented in the publications comprising the sample. This comparison was made by using counts of color chips presented within each of the ten hue names identified in the Munsell color system and the ranges of hue, value, and chroma represented.

This analysis provided a comparison of the segments of the color circle represented by the color recommendations for each personal color category.

The hue emphasis presented did not show the distribution of color chip designations within the hue range. Likewise, this analysis did not indicate distribution of color recommendations in the value and chroma ranges presented. A much more complex analysis of color chip presentations would be needed to present this information. Considering the quality of color reproductions in these publications, it is questionable whether further analysis would be justified.

It should be noted that within a category system presented in a publication, the same hue name is the major recommendation for more than one category (Table 4.5). For example, Eiseman recommends yellow red (YR) and yellow (Y) for both "Sunlight" and "Sunrise." In this system, the two categories differ in that "Sunlight" has the smallest number of chips in the blue green (BG) hue, while "Sunrise" has the least in the purple (P) hue. However, blue green (BG) and purple (P) hues are recommended for both categories. These findings suggest that there are no discreet categories in this system. A similar observation can be made regarding categories presented by Jackson, Littauer and Littauer, Mumford, Pinckney and Swenson, Revelli, and Wallace. In the case of Eiseman, Littauer and Littauer, and Mumford, major recommendations for all categories within their respective systems fall in the color circle segment red (R) to yellow (Y). Two conclusions may be drawn from this. First, when compared on the basis of hues represented the categories presented are not distinct from one

another. Second, the green (G) to purple (P) segment of the color circle is not highly recommended for anyone. The green (G) to purple (P) segment is one-half of the color circle. This is a large proportion of colors to classify as not highly recommended for anyone. Rasband (1983) stated that Pinckney in the book Your New Image (1981) stressed that no one can wear colors from both "warm and cool undertones" yet analysis of the Pinckney and Swenson color system shows a recommendation of both yellow (warm) and purple blue (cool) for the "Spring" category. This suggests a lack of agreement between visual presentations and written text for color recommendations.

Limited agreement of recommendation can be found when comparing the seasonal systems presented on the basis of same name categories. Jackson, Revelli, and Wallace all used red purple (RP) as the major hue recommendation for the category "Summer," but in no case do all three agree on recommendations for any other category. Red purple is also the major recommendation for "Winter" category in the Jackson, Wallace, and Pinckney and Swenson systems, although Pinckney and Swenson also recommend purple blue for this category. On the whole among seasonal systems, more hue name recommendations for "Summer" and "Winter" occurred in the green (G) to purple (P) segment of the color circle than in the red (R) to yellow (Y) segment. For "Autumn" and "Spring," most hue name recommendations occurred in the red (R) to yellow (Y) color circle segment. This would suggest that there may be some differences between the two groups of categories. Notable exceptions were Kentner with a yellow (Y) recommendation for "Summer"; Kentner and Revelli with a red (R) recommendation for "Winter"; and

Pinckney and Swenson with a purple blue (PB) recommendation for "Spring." When recommendations were compared on a basis of red (R) to yellow (Y) or green (G) to purple (P) segments of the color circle, for a specific seasonal category, there appears to be considerable agreement. Agreement on the basis of specific hue names, however, was limited.

The least recommended hue name groups for categories within systems do not present any pattern. Hue names with no chip presentations, which could be interpreted as hue groups not recommended for a category or system, may indicate some color biases on the part of authors represented in this study. For example, both the Wallace and the Littauer and Littauer systems showed a predominance of purple (P) and red purple (RP) as not recommended colors for most categories.

In Mumford's key system there appeared to be no major hue name distinctions between Key 1 and Key 2 in either green (G) to purple (P) versus red (R) to yellow (Y) color circle segments or in specific hue names recommended or in hues not recommended for a category.

According to Rasband (1983, p. 5), Jackson suggests that "Winter" category individuals should wear bright colors while "Summer" category individuals should wear pastels. Yet a comparison of value and chroma ranges for Jackson showed no notable differences between "Summer" and "Winter" categories (3.0-9 and 1-2 compared to 3.5-9 and 1-2, respectively). Rasband (1983, p. 5) also suggested that "Spring" category individuals should wear delicate lighter shades. The value range of 2.0-8.5 and chroma range of 1-13 shown by this analysis of

Jackson's color chip recommendations for "Spring" does not support Rasband's suggestion. Similarly, value and chroma ranges for seasonal color categories presented in the other personal color systems do not support Rasband's statements. In summary, no distinctions among categories were possible on the basis of hue, value or chroma ranges.

From the analysis and comparison of the published color chips there is no commonality of color recommendations. Furthermore, there is nothing in this study to indicate that any one author is more accurate than any other in published color chip recommendations.

Agreement of Color Recommendations in Color Chip Form and Written Color Recommendations

When publications were analyzed for agreement of color recommendations in visual (color chip presentations) and verbal (written color recommendations) forms, no author had a total agreement of hue, value, and chroma notations for all categories on a level greater than 50 percent. When compared on a basis of hue agreement only, the results were better. Eiseman's system was the only one having agreement below the 50 percent level. Considering the number of written color recommendations (color names) which have multiple designations (Table 4.3) and thus have more potential for agreement, these results may indicate a lack of knowledge of hues represented by specific written color recommendations (color names). This lack of agreement leaves the reader with the problem of which recommendation to follow--written or visual. It also makes questionnable the accuracy of all the written color recommendations (color names).

With the exception of Eiseman, all authors showed some disparity in percent agreement of written color recommendations

with published color chip presentations for categories within the system; however, no patterns of differences are evident.

Results of this study indicate that written color recommendations, though widely used, are an inaccurate method for color identification. Though this study examined only the color presentations of systems, it suggests that there may be little basic color theory at the root of the systems and that there is little agreement on classification or recommendations of colors between systems. This research does not suggest that any one system included in the study is better than any other.

Conclusions

Achievement of Objectives

The objectives of this study were met to the extent outlined below:

Objective 1. Identify publications which present systems of color analysis.

The procedure developed to identify publications which presented systems of color analysis was successful using the criteria established. Eleven of the 20 publications identified presented systems for personal color analysis and were included in this study. The nine not included failed to meet one or more criteria.

Objective 2. Identify by name and compare by count the personal color categories developed by the authors in the publications under study to classify individuals who are to be color analyzed using the system outlined by each author.

A study of selected chapters within the publications included in this study generated information relative to the number and names of personal color categories developed by the authors.

Objective 3. Identify by a visual color measurement method, using a recognized atlas of color, the color chips of recommended colors specifically ascribed to each category into which an individual can be placed, in each published work.

Identification of published color chips presented for each category in each publication required a number of steps. First, a reliable color standard and procedure for designating the color notation of color chips was established. Secondly, a procedure for identifying the published color chips presented by each author was developed. Thirdly, the Munsell notation for each published color chip was identified. This procedure was time consuming but produced a standardized identification of each published color chip, which permitted accurate comparisons among categories and among systems.

Objective 4. Identify, using a color dictionary, the written color recommendations for each color category into which an individual can be placed, in each published work.

Written color recommendations were analyzed using a standard color dictionary. This process did not result in precise identification of a written color recommendation (color name) as most color names have multiple designations, as referenced in the Dictionary of Color Names (Judd & Kelly, 1976). Therefore, comparisons of color recommendations among categories and among systems could not be made. The information gained did provide an

systems could not be made. The information gained did provide an accuracy check for author knowledge of written color recommendations (color names) and the use of written color recommendations as a means for specifying colors. In other words, this portion of the research indicated that authors did not use accurate color names and that the color names are not an accurate method for identifying colors.

Objective 5. To develop a methodology for comparing the publications included in the sample.

A methodology was developed to compare the publications on the basis of: (a) the number of personal color categories used; (b) the number of colors as recommended for each category; (c) the range of hue, value, and chroma represented in the color recommendations presented in published color chip form; (d) the personal color categories used on the basis of the names ascribed to them; and (e) the similarity of the color recommendations presented in color chip form and those presented in written color recommendation (color name) form.

Tables were developed to compare numbers of categories and numbers of published color chips ascribed to each category. These tables presented numerical comparisons of the systems. The data indicated that three systems were presented in the publications. There was little or no consistency in the numbers of published color chips among systems or among categories within a system.

A table comparing personal color analysis systems on the basis of numbers of written color recommendations presented by category and number of ISCC-NBS and Munsell designations ascribed to each was

generated. This facilitated a comparison of the personal color analysis systems on the basis of numbers of recognized designations for the written color recommendations presented by a system and by category within a system.

This information was summarized further to provide a comparison of categories in the color analysis systems on the basis of concentration of color recommendations by hue name group.

Objective 5 was accomplished except for part (e). Comparisons were made on the number of categories used; the number of color recommendations presented; the range of hue, value, and chroma presented; and the names ascribed to the categories used. But a comparison of the color recommendations presented in color chip form and those presented in written name form was not possible; the forms were too dissimilar. The written color recommendations were very broad and generalized; the published color chips were very specific.

The publications were compared with the result that overall no two of them made the same color recommendations. This research did not indicate that any one publication was any better than any other.

Comparison With Other Authors

The review of literature by this researcher revealed no parallel research studies which could be used for comparison. Rasband (1983), an author of popular literature on color in clothing selection, suggested that the most popular color system is the seasonal system. This is borne out by this research in that five of the eight systems presenting personal color categories use a seasonal system. Rasband further stated that the second most widely recognized system is the

key system. The findings of this study do not support this statement as two of the remaining three systems use "time of day," not "key," category identification.

The review of literature did not reveal any information comparing color presentations ascribed to personal color categories in written color analysis systems; therefore, no comparisons with other research could be made.

Recommendations

Recommendations for Modification of the Methodology Developed

As far as possible, the objectives of the study were met. However, modification of the methodology developed for this study is needed. One modification in the procedure for identification of published color chips could be made. If an artificial light source which approximated northern natural daylight were used in place of natural light, the researcher would not be constrained by limitations of day length and sun conditions.

Difficulties were encountered when comparing the systems because not all systems in the original sample used categories and not all systems made specific color recommendations. The procedure developed for this study depended upon these two characteristics. Therefore, in order to include all color analysis systems in a study, a different basis of comparison must be developed. Other bases of comparison which could be used are readability of text, clarity and accuracy of procedure for personal color analysis, and other self-development information presented in the publication (personality analysis,

physical enhancement, application of color to other aspects of life).

This study does not provide a great many answers for consumers who wish to select one publication. More studies are needed to provide a comparison of publications dealing with color analysis systems. Since more of these publications appear on the market yearly, some means must be developed for evaluation of them. Information is needed which enables the consumer to make knowledgeable selection from the choice of color analysis publications available.

Recommendations for Use of the Methodology Developed

The methodology developed in this study makes possible a very precise identification of color presentations in personal color analysis systems. It could be use for further study in two ways:

First, the present study could be extended to include publications which have appeared on the market subsequent to the development of this study.

Second, the methodology for analysis of color presentations could be applied to the personal color analysis systems presented and practiced by color analysts. Either the color bibs or the color chip packets used by color analysts could be used as the basis of comparison of personal color categories and personal color analysis systems. This could provide an indication of discreetness of categories and similarity of recommendations presented by different personal color analysis systems.

Third, a study could be mounted to apply this methodology for color chip analysis but carry out a comprehensive statistical analysis

to provide system and category comparisons based on Munsell's 100 hue designations and the complete value and chroma ranges.

And fourth, another study could be carried out using the same methodology but employing a number of observers to give validation of the color identifications presented in the original study or in any study utilizing this methodology.

BIBLIOGRAPHY

Albers, J. (1975). Interactions of color. New Haven: Yale University Press.

ASTM. (1983a). Method for specifying color by the Munsell system (ASTM D1535). Philadelphia: American Society for Testing and Materials.

ASTM. (1983b). Recommended practice for visual evaluation of color differences of opaque materials (ASTM D1729). Philadelphia: American Society for Testing and Materials.

August, B. (1981). The complete Bonnie August dress thin system. New York: Rawson, Wade Publishers, Inc.

Berlin, B, & Kay, P. (1969). Basic color terms, their universalities and evolution. Berkeley: University of California Press.

Billmeyer, F. W., & Saltzman, M. (1981). Principles of color technology (2nd ed.). New York: John Wiley & Sons.

Birren, F. (1962). Color in your world. New York: Collier Books.

Birren, F. (1969). Principles of color. New York: Van Nostrand Reinhold Company.

Birren, F. (1978) Color psychology and color therapy. New York: Citidal Press.

Brandau, E. P. (1942, Winter). Experiment in color analysis. Journal of Home Economics, 714-716.

Burnham, R. W., Lanes, R. M., & Bartleson, J. C. (1963). Color, A guide to basic facts and concepts. New York: John Wiley & Sons.

Chamberlin, G. J., & Chamberlin, D. G. (1980). Color: Its measurement, computation and application. London: Heyden & Sons Ltd.

Cho, E., & Grover, L. (1979). Looking terrific. New York: Ballantine Books.

Cho, E., & Lueders, H. (1982). Looking, working, living terrific 24 hours a day. New York: Ballantine Books.

Color Me a Season. (n.d.). Educational Color Corporation, 1070-A Shary Circle, Concord, CA 94518. (brochure)

The color key program--Transcripts. (1981). Long Beach, CA: Ameritone Paint Corporation.

Compton, N. H. (1962). Personal attributes of color and design preferences in clothing fabrics. Journal of Psychology 54, 191-195.

Dariaux, G. A. (1964). Elegance. New York: Doubleday & Co., Inc.

Davis, M. L. (1980). Visual design in dress. Englewood Cliffs, NJ: Prentice-Hall Inc.

Duntley, L. K. (1982) Color of dress as it relates to first impressions of personality traits. ACPTC Proceedings, 289-290.

Fatt, A. (1983). Conservative chic. New York: Times Books.

Feldon, L. (1982). Dressing rich. New York: G. P. Putnam's & Sons.

Ford, I. M., & Drake, M. F. (1978). Color value preferences for clothing and personality factors. ACPTC Proceedings, 97.

Goday, D., & Cochran, M. (1979). Dressing thin. New York: Simon & Schuster.

Goldstein, H., & Goldstein, V. (1955). Art in everyday life. New York: McMillan.

Graves, M. (1952). Color fundamentals. New York: McGraw-Hill.

Hackler, N. (1983). Your most becoming colors. Gainesville: Cooperative Extension Service, University of Florida.

Head, E. (1967). How to dress for success. New York: Random House.

Hemingway, P. D. (1977). The well dressed woman. New York: David McKay Company.

Hempstead, L. (1947). Color and line in dress (3rd ed.) New York: Prentice Hall.

Hillhouse, M. S. (1963). Dress selection and design. New York: Macmillan.

Holten, N. (1983). Color can affect your total look. Spectrum 2. (Reprint of magazine article)

Hopkins, M. S. (1935). Dress design and selection. New York: McMillan.

Horn, M. J., & Gurel, L. M. (1981). The second skin. Boston: Houghton Mifflin.

Hunt, Judi. (1982, December 9). A reading of the colors. Seattle Post-Intelligencer, C1, C3.

Itten, J. (1973). The art of color. Toronto, Ontario: Van Nostrand Reinhold Co.

Jackson, C. (1983, August). Color yourself beautiful. Readers Digest, pp. 94-98.

Judd, D. B., & Wyszecki, G. (1975). Color in business, science and industry. New York: John Wiley & Sons.

Kefgen, M., & Touchie-Specht, P. (1976). Individuality in clothing selection and personal appearance. Toronto: Macmillan.

Kelly, K. L. (1976). The universal color language. In K. L. Kelly and D. B. Judd, Color universal language and dictionary of names (NBS Special Publication 440). Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office.

Kelley, K. L., & Judd, D. B. (1976). Color universal language and dictionary of names (NBS Special Publication 440). Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office.

Kettunen, M. (1964). Fundamentals of dress. New York: McGraw-Hill.

Levitt, M. (1981). The executive look--How to get it--How to keep it. New York: Athenium.

Luschner, M. (1979). The 4 color person. New York: Simon & Schuster.

Maerz, A., & Paul, R. M. (1950). A dictionary of color. New York: McGraw-Hill.

Mather, J., Stare, C., & Breinin, S. (1972, Winter). Color preferences in a geriatric population. Gerontologist 1, 311-313.

McCalls. (n.d.) Color and you. New York: McCalls Pattern Co.

McFarland, F. W. (1936). Good taste in dress. Peoria, IL: Manual Arts Press.

McInnis, J. H., & Shearer, J. K. (1964, March). Relationship between color choice and selected preferences of the individual. Journal of Home Economics, 56(3), 181-187.

McJimsey, H. T. (1973). Art and fashion in clothing selection (2nd ed.). Ames: Iowa State University Press.

Mitchell, C., & Burdick, T. (1983). The extra edge. Washington, D.C.: Acropolis Books Ltd.

Molloy, J. T. (1977). The women's dress for success book. Chicago: Follet.

Morton, G. M. (1964). The arts of costume and personal appearance (3rd ed.). New York: John Wiley & Sons.

Munsell, A. H. (1963). A color notation. Baltimore: Munsell Color Company.

Munsell Color Company. (1976). Munsell Book of Color (glossy ed.). Baltimore, MD: Author.

Oerke, B. V. (1960). Dress. Peoria, IL: C. A. Benneth & Co., Inc.

Ostwald, W. (1969). The color primer (F. Birren, Ed.). Toronto, Ontario: Van Nostrand Reinhold Company.

Phillip, B. R. (1945). A method for investigating color preferences in fashion. Journal of Applied Psychology 29, 108-114.

Picken, M. B. (1918). The secrets of distinctive dress. Scranton, PA: International Textbook Press.

Porter, E. (n.d.). Let color work for you. Moscow: Cooperative Extension Service, University of Idaho.

Rasband, J. (1983). Color crazed. (Available from author, P.O. Box 7052, University State, Provo, UT 84602)

Rhoades, B. (n.d.). Create the look you like with color. Texas: Texas A & M University System.

Ricci, C. (1983, March 24). How our reporter learns she sparkles in black, burgundy. Wall Street Journal, pp. 1; 27.

Ridgway, R. (1912). Color standards and color nomenclature. Baltimore, MD: Alfred Hoen.

Ryan, M. G., & Phillips, V. (1947). Clothes for you. New York: Appleton-Century.

Sargent, W. (1964). The enjoyment and use of color. New York: Dover Publications Inc.

Satran, P. R. (1983, December). Red, yellow, peach or purple: How do you find your best colors? Glamour 81(12), pp. 22-23+.

Sharpe, D. T. (1975). The psychology of color and design. Totowa, NJ: Littlefield, Adams & Co.

Spears, C. W. (1965). How to wear colors with emphasis on dark skins. Minneapolis: Burgess Publishing Company.

Spruiell, P. R., & Jernigan, M. (1982). Clothing preferences of older women: Implications for gerontology and the American clothing industry. Educational Gerontology 8, 485-492.

Stemm, A., & Johnson, S. (1984). Student preference for wardrobe colors based on personal coloring. ACPTC Newsletter, 7.

Story, M. (1924). How to dress well. New York: Funk & Wagnalls.

Sturm, M. M., & Grieser, E. H. (1962). Guide to modern clothing. Toronto, Ontario: McGraw-Hill.

Tate, S. L. (1984). Inside fashion design (2nd ed.). New York: Harper & Row.

Taylor, H. D., Knoche, L., & Granville, W. C. (1950). Descriptive color names dictionary. Chicago: Container Corporation of America.

Thompson, J. (1980). Image impact. New York: A&W Publishers Inc.

Timberlake, J. (1983). Image consulting, the new career. Washington, D.C.: Acropolis Books Ltd.

Wallach, J. (1983, September). Color analysis. Stores, 41-46.

Whitney, B. A. (1916). What to wear. Michigan: Good Health Publishing Co.

Williams, J., Arbough, J., & Rucker, M. (1980, September). Clothing preferences of adolescent females. Home Economics Research Journal 9(1), 57-63.

Williams, M. (1983, January 3). Recession increases color consciousness. News (Cooperative Extension, University of California at Davis).

Wingo, C. E. (1953). The clothes you buy and make. Toronto, Ontario: McGraw-Hill.

Winterburn, F. H. (1914). Principles of correct dress. New York: Harper & Brothers.

Young, S. (1983, November). Color correct. Homemakers Magazine, pp. 92-96.

APPENDICES

APPENDIX A

SELECTED PUBLICATIONS CONSIDERED FOR STUDY

Table A.1

Selected Publications Considered for the Study

Bixler, S. (1984). The professional image. New York: G. P. Putnam & Sons.

Cho, E., & Grover, L. (1978). Looking terrific. New York: G. P. Putnam's Sons.

Cho, E., & Lueders, H. (1982). Looking, working, living terrific 24 hours a day. New York: G. P. Putnam & Sons.

Eiseman, L. (1983). Alive with color. Washington, D.C.: Acropolis Books Ltd.

Jackson, C. (1980). Color me beautiful. Washington, D.C.: Acropolis Books Ltd.

Johnson, J. (1983). Clothing: Image and impact. Cincinnati, OH: South-Western Publishing.

Kentner, B. (1978). Color me a season. Concord, CA: Kenkra.

Kentner, B. (1981). A rainbow in your eyes. Concord, CA: Kenkra.

Kentner, B. (1983). Color analysis workbook. Concord, CA: Kenkra.

Littauer, M., & Littauer, F. (1982). Shades of beauty. Eugene, OR: Harvest House Publishers.

Mitchell, C., & Burdick, T. (1983). The extra edge. Washington, D.C.: Acropolis Books Ltd.

Molloy, J. (1977). The women's dress for success book. Chicago: Follet.

Mumford, J. (1976). Everyone is someone in color. Salt Lake City: Publishers Press.

Pinckney, G., & Swenson, M. (1981). Your new image. Costa Mesa, CA: Fashion Image/Crown Summit Books.

Quinn, F., Linn, A., & Hale, W. N. (1976). Consumer color charts (3rd ed.). Baltimore, MD: Munsell Color, Macbeth Division of Kollmoregn Corporation.

Revelli, C. (1982). Color and you. New York: Simon and Schuster.

Table A.1 (continued)

Segerstrom, J. (1980). Look like yourself and love it. Houston: Triad Press.

Spears, C. W. (1965). How to wear colors with emphasis on dark skins (4th ed.). Minneapolis: Burgess Publishing Company.

Swenson, M., & Pinckney, G. (1983). New image for men. California: Queen Beach Printers, Inc.

Wallace, J. (1983). Dress with style. Old Tappan, NJ: Fleming H. Revell Company.

Wallach, J. (1981). Working wardrobe. New York: Warner Books Inc.

Table A.2

Analysis of Publications Considered for the Study

Author	Publication Date	Where Obtainable	Clientele	Price	Focus or Purpose (location of quoted statement)
Bixler	1984	OSU Bookstore Inc.	Female & male	16.95	"dynamic image...how you communicate thru body" (jacket)
Cho & Grover	1978	OSU Bookstore Inc.	Female	14.25	"focuses first on language of clothing" "next comes you" (jacket)
Cho & Lueders	1982	OSU Bookstore Inc.	Female	8.95	"dress for the job" "dress younger" "shopping smarts" (cover)
Eiseman	1983	OSU Bookstore Inc.	Female	18.95	"how to use the secrets of the Color Clock to..., dress with flair" "which is your Colortime" (jacket)
Jackson	1980	OSU Bookstore Inc.	Female	8.95	"through this book, you will discover your season and learn which colors will make you look fabulous" (p. 11)
Johnson	1983	OSU Bookstore Inc.	Female & male	--	"how to use color to best advantage" enhance personal and co-ordinate wardrobe (cover)
Kentner	1978	OSU Bookstore Inc.	Female	10.95	"how to find and use your most flattering colors" (cover)

Table A.2 (continued)

Author	Publication Date	Where Obtainable	Clientele	Price	Focus or Purpose (location of quoted statement)
Kentner	1981	OSU Bookstore Inc.	Female	14.95	"will start you on a new hobby of finding peoples' Seasons....business of color analysis" (cover)
Kentner	1983	OSU Bookstore Inc.	Female	8.95	"help you get started on a new career,...finding people's colors" "workbook" (first chapter)
Molloy	1977	OSU Bookstore Inc.	Female	4.95	"dress for success for women" (cover)
Mitchell	1983	OSU Bookstore Inc.	Female	8.95	"getting the extra edge as as a women executive" (jacket)
Mumford	1976	From author	Female & male	8.95	"Use and choice of specific colors to enhance an individual's personality" (preface)
Pinckney	1981	OSU Bookstore Inc.	Female	18.95	"magic method for you to determine your best colors" (p. 1)
Quinn	1976	OSU Extension Service	Female	25.00	"color relationship reference for use when making color choices in clothing" (preface)
Revelli	1982	Grassroots	Female & male	4.95	"discover your personal palette the colors which will always make you look great" (cover)

Table A.2 (continued)

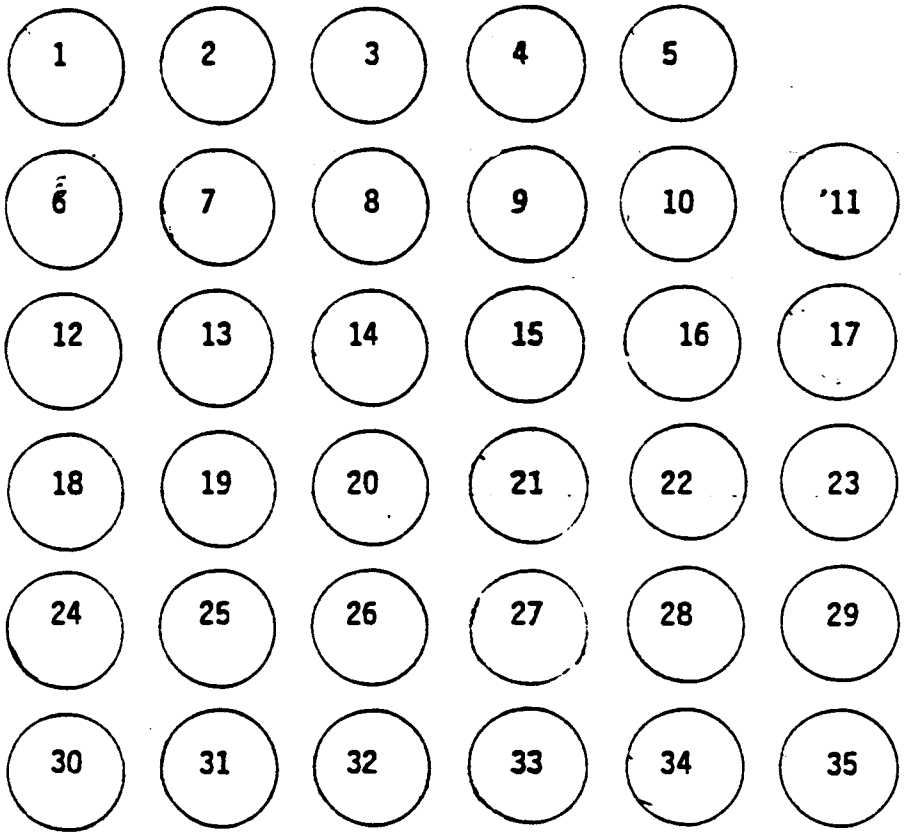
Author	Publication Date	Where Obtainable	Clientele	Price	Focus or Purpose (location of quoted statement)
Segerstrom	1980	OSU Bookstore Inc.	Female & male	14.95	"discover your 200 complementary colors and where to wear each" (cover)
Spears	1965	OSU Bookstore Inc.	Female	12.95	"simplify selection of colors which will harmonize with their complexion and personality" (cover)
Swenson & Pinckney	1983	OSU Bookstore Inc.	Male	14.95	"know which colors look best on you and how to co-ordinate your colors" (cover)
Wallace	1983	OSU Bookstore Inc.	Female & male	10.95	"how to find your best colors" (cover)
Wallach	1982	OSU Bookstore Inc.	Female	8.95	"how to more than triple your wardrobe with two-color coordinated dressing" (cover)

APPENDIX B

MUNSELL DESIGNATION OF COLOR CHIPS

Book: Alive With Color Author: Leatrice Eiseman

Page number: Plate E Color Category: Sunrise Palette



36	37	38	39	40	41	42
43	44	45	46	47	48	49

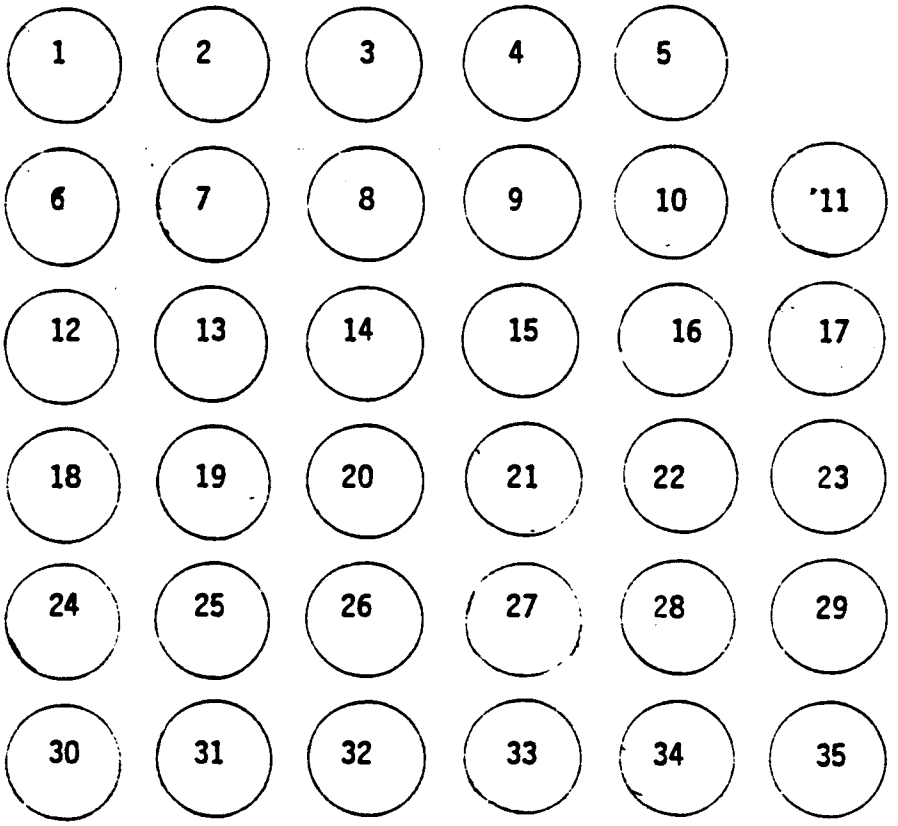
Identification Number and Visual Color Record

1. 10Y 9/6
2. 7.5Y 8.5/8
3. 7.5RP 5/9
4. 5RP 6/10
5. 6.25R 4/10
6. 10R 8.5/2
7. 7.5R 7/5
8. 5RP 6/6
9. 10P 7/6
10. 7.5R 5/6
11. 9R 4/6
12. 7.5RP 8/3
13. 5RP 8/4
14. 7.5R 6.5/8
15. 2.5G 7/6
16. 7.5GY 7.5/6
17. 10GY 6/10
18. 10BG 8.5/2
19. 10BG 6.5/4
20. 7.5B 6/7
21. 2.5PB 5.5/6
22. 5G 7/7
23. 1.25 G6/10
24. 5PB 8/4
25. 10B 6/8
26. 2.5PB 6/8
27. 7.5PB 4/8
28. 10PB 6/6
29. 7.5P 4/5
30. 5Y 9/1
31. 2.5Y 8/2
32. 10B 7.5/2
33. 10YR 7/2
34. 2.5YR 5.5/4
35. 1.25Y 3/3
36. 10Y 8.5/6
37. 7.5Y 9/1
38. 10R 4/8
39. 5B 7/4
40. 7.5YR 2.5/4
41. 2.5YR 3/4
42. 10YR 3/2
43. 10B 7/6
44. 7.5BG 9/1
45. 5Y 4/1
46. 2.5GY 3.5/4
47. 10PB 4/3
48. 10YR 3/3
49. 5YR 2/.5

Figure B.1. Example of color chip identification chart.

Book: Alive With Color Author: Leatrice Eiseman

Page number: Plate I Color Category: Sunlight Palette



36	37	38	39	40	41	42
43	44	45	46	47	48	49

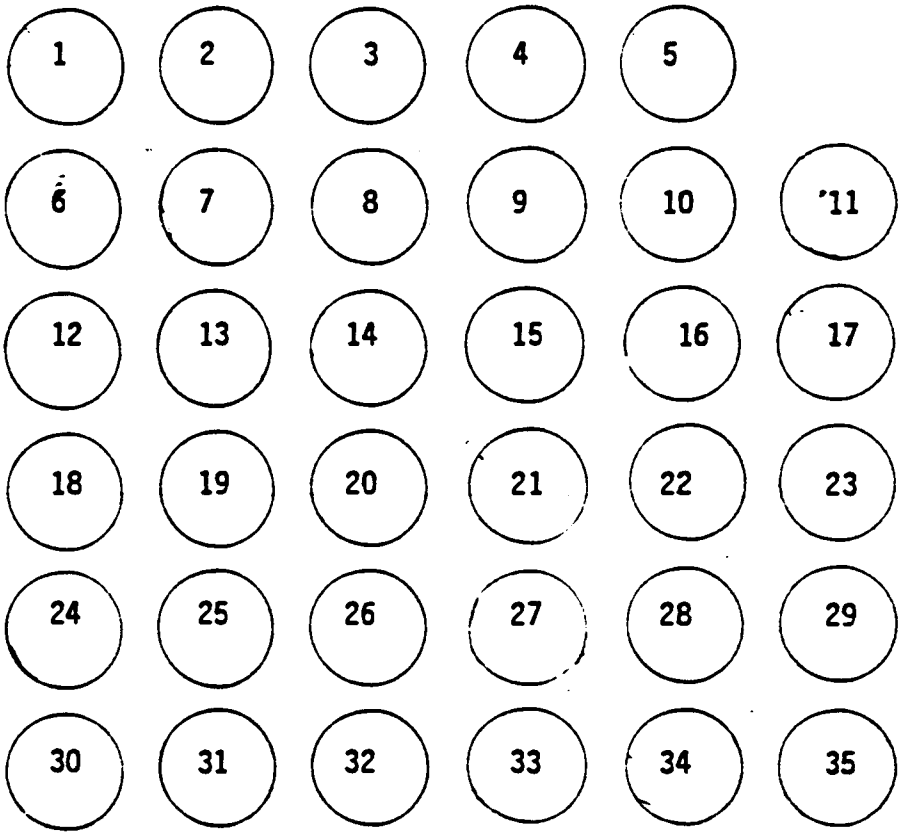
Identification Number and Visual Color Record

1. 10Y 9/6
2. 10Y 8.5/8
3. 10YR 8/6
4. 1.25YR 6/8
5. 5R 5/12
6. 3.75Y 8/8
7. 2.5R 8/4
8. 5R 5/6
9. 5R 7/5
10. 1.25YR 4/4
11. 10YR 5/3
12. 10YR 8/3
13. 2.5GY 8/7
14. 5GY 7/3
15. 10GY 6/7
16. 2.5G 6/8
17. 2.5G 4/5
18. 2.5G 7/7
19. 2.5G 6/6
20. 10B 6.5/6
21. 10B 7/8
22. 10B 4/2
23. 7.5PB 3/6
24. 7.5P 7/4
25. 5RP 7/6
26. 6.75PB 6/6
27. 10PB 5/6
28. 10P 3.5/4
29. 10RP 5/6
30. 10Y 9/1
31. 10Y 7/1.5
32. 5GY 7.5/1
33. 5Y 8/6
34. 7.5YR 5/5
35. 7.5YR 4/2
36. 10Y 9/6
37. 5Y 8/1
38. 5B 8/.5
39. 5R 4/8
40. 1.25R 2/2
41. 10RP 3/2
42. 10RP 2.5/2
43. 10B 6.5/8
44. 10BG 8.5/1
45. 10P 3/3
46. 7.5GY 3/3
47. 10PB 3/3
48. 10RP 2.5/1
49. N1/1.2%R

Figure B.2. Example of color chip identification chart.

Book: Alive With Color Author: Leatrice Eiseman

Page number: Plate M Color Category: Sunset Palette



36	37	38	39	40	41	42
43	44	45	46	47	48	49

Identification Number and Visual Color Record

1. 7.5Y 8.5/6
2. 6.25Y 7/6
3. 1.25YR 5/8
4. 7.5R 5/10
5. 8.75R 5/10
6. 10R 7/6
7. 5R 6.5/6
8. 7.5R 5.5/8
9. 5R 5.5/6
10. 5R 4/8
11. 10R 3.5/4
12. 10Y 7/6
13. 2.5GY 7/4
14. 7.5GY 6/7
15. 2.5G 6/7
16. 2.5G 5/4
17. 8.75Y 3/1
18. 2.5PB 6/5
19. 5PB 5/6
20. 7.5PB 4.5/8
21. 5BG 5/4
22. 2.5BG 4/2
23. 2.5G 5/4
24. 10GY 5/4
25. 5Y 5/2
26. 7.5RP 4.5/8
27. 7.5RP 3.5/4
28. 2.5RP 5.5/5
29. 5P 4/6
30. 10Y 9/2
31. 1Y 7/4
32. 10R 5/6
33. 10R 4/4
34. 10R 4/6
35. 2.5Y 4.5/3
36. 10Y 9/6
37. 5Y 8/1
38. 5R 4/8
39. 5B 8/.5
40. 1.25R 2/2
41. 10RP 3/2
42. 10RP 2.5/2
43. 10B 6.5/8
44. 10BG 8.5/1
45. 10P 3/1
46. 10GY 3/2
47. 10PB 3/3
48. 10RP 2.5/1
49. N1/1.2%R

Figure B.3. Example of color chip identification chart.

APPENDIX C

EXAMPLES OF RECORDED ISCC-NBS DESIGNATIONS AND MUNSELL NOTATIONS FOR WRITTEN RECOMMENDATIONS (NAME COLORS) FOR PERSONAL COLOR CATEGORY

Table C.1

ISCC-NBS Designations and Munsell Notations

Book: Alive with Color Author: Eiseman

Category: Sunrise Palette Page: Plate E

Color Name	Color Chip Number	ISCC-NBS Designation	Munsell Notation
Daffodil	1	v. Y 82, brill. Y 83	1Y-7Y 8-10/8-11 and 5.5-10/11-14
Daybreak	2	l. V 210, l. P 222, p. P 227	9PB-3P 5.5-7.5/1.5-3 and 4.5-7.5/5-9 3P-9P 5.5-7.5/1.5-9 9P-1R 5.5-6.5/1.5-3
Fuchsia	3	v. rP 236, s. R 12, s. pR 255, v. pR 254	3RP-1R 3.5-5.5/11-13, 3RP-1R 0-2/11-14.5 9P-3RP 0-5.5/13-14.5, 3RP-1R 2-5.5/13-14.5 1R-7R 3.5-5.5/11-13
Shocking Pink	4	s. pR 225	3RP-1R 3.5-5.5/11-13
Watermelon	5	deep Pk3, m. R15	4R-6R 5.5-6.5/7-11 9RP-4R 5.5-6.5/7-14.5 1R-7R 3.5-5.5/7-11
Misted Rose	6	l. gy R 18, gy. yPK32, m. Pk 5, gy. PK 8, gy. pPk 253	9RP-6R 6.5-8/1.5-7, 9P-9RP 6.5-7.5/1.5-5 1R-8R 5.5-6.5/1.5-5, 6R-5YR 6.5-8/1.5-3 8R-1YR 5.5-6.5/1.5-3
Sea Pink	7	s. PK 2, m. PK 5, deep PK 3	9RP-6R 6.5-8/3-7, 9RP-4R 6.5-10/7-11 9RP-4R 5.5-6.5/7-14.5 4R-6R 5.5-6.5/7-11
Raspberry Glace	8	m. R 15, gy. R 19, pR 258, gy. pR 262	1R-7R 3.5-5.5/1.5-7, 7R-8R 3.5-5.5/1.5-7 8R-1YR 4.5-5.5/1.5-3 3RP-1R 3.5-5.5/3-11

Table C.1 (continued)

Orchid Dawn	9	-	-
Cherry	10	v. R 11, s. R 12, m. R 15, s. pR 255	3RP-9RP 3.5-5.5/11-13 1R-7R 3.5-5.5/7-13 9RP-1R 3.5-5.5/11-13
Ruby Red	11	deep R 13	1R-9R 2-3.5/9-11
Mauve Moon	12	-	-
Shell	13	p. OY 73	8YR-1Y 7.5-10/2-6
Rose Pink Coral	14	s.y PK 26	4R-2YR 6.5-10/7-11
Seafoam Green	15	p. YG 121	9Y-4G 7.5-10/1-3
Limeade	16	-	-
Kelly	17	s. yG 131, deep yG 132, s. G 141, v. d. yG 138, d. G 146	8GY-3G 2.5-6/7-11 plus 2.5-4.5/11-14+ 8GY-3G 0-2.5/2-7 3G-9G 3.5-5.5/7-11 3G-9G 2-3.5/2.5-7 plus 2-2.5/2-2.5
Aqua	18	l. bG 163, l. gB 172	9G-10BG 5.5-7.5/2.5-7 10BG-9B 5.5-7.5/3-7
Aquamarine	19	l. gG 163, pB 185	10BG-9B 5.5-7.5/3-7 10BG-6PB 5.5-7.5/1.5-3 9B-5PB 5.5-7.5/3.5
Bright Turquoise	20	brill. bG 159, S. bG 160	9G-10BG 3.5-10/7-11
Celestial	21	m. B 182	9B-5PB 3-5.5/5-9 5PB-7PB 3-4.5/5-9 and 4.5-5.5/7-9
Opalescent Teal	22	-	-
Emerald Green	23	s. yG 131, m. yG 136, brill. G 140, v.l. yG 134, brill. yG 130, s. G 141, m. G 145, s. bG 160, m. bG 164	8GY-3G 4.5-10/3-11 minus 4.5-6.5/3-7 3G-9G 3.5-10/7-11 and 3.5-5.5/2.5-7 9-G10BG 3.5-5.5/2.5-11

Table C.1 (continued)

Lavender Frost (Lavender Green)	24	gy. YG 122	2GY-8GY 4.5-7.5/1.2-3
Ice Blue	25	-	-
Windsor Blue	26	gy. pB 204, m. pB 200	5PB-6PB 3-5/3-5 6PB-7PB 2-5/3-5 plus 2-2.5/2-2.5 7PB-9PB 2-5/3-7 plus 3-4.5/7-9
Sapphire	27	d. B 183	9B-7PB 0-3/2-7 exclude 6PB-7PB 0-3/2-5
Amethyst	28	gy. rP 245, m. P 223	9P-3RP 3.5-5.5/3-5 3P-9P 3.5-5.5/5-9
Regal Purple	29	s. V 207	9PB-3P 2.5-4.5/9-13
Snow White	30	-	-
Rose Beige	31	m. yPK 29, l. Br 57, l. gy. Br 60	6R-2YR 6.5-8/3-7, 2YR-7YR 6.5-8/3.6 5YR-8YR 4.5-6.5/1.2-3
Crystal Grey	32	p. GY 283	9PB-1R 4.5-6.5/.5-1.5
Mauve Taupe	33	gy. pR 262, d. gyP 229, d. pGy 234	3RP-1R 3.5-5.7/3-7 9PR-1R 2-4.5/.5-1.5 plus 2.5-3.5/2-3
Cocoa	34	m. rBr 43, m. Br 58	6R-8R 2.5-3.5/3-7 3YR-8YR 2.5-4.5/2.5-5 8R-2YR 2.5-4.5/3-7
Bitter Sweet	35	deep O 51, deep rO 36, d. rO 38	7R-2YR 3.5-4.5/7-13 2YR-7YR 4.5-5.5/10-14

Table C.2

ISCC-NBS Designations and Munsell Notations

Book: Alive with Color Author: Eiseman

Category: Sunlight Palette Page: Plate M

Color Name	Color Chip Number	ISCC-NBS Designation	Munsell Notation
Banana	1	gy. Y 90, l. Y 86	1Y-7Y 8-10/5-8 and 6.5-8/2-5
Lemonade	2	-	-
Melon	3	s.y PK 26	4R-2YR 6.5-10/7-11
Orange Blossom	4	-	-
Raspberry Sherbet	5	-	-
Buttercream	6	-	-
Peach Melba	7	-	-
Dusty Rose	8	d. PK 6, d. pPK 251, gy. pR 262	3RP-1R 3.5-5.5/3-7 3RP-9RP 5.5-6.5/5-9 9RP-6R 5.5-6.5/5-7
Strawberry Cream	9	-	-
Chestnut	10	gy. Br 61, m. rB 43	6R-8R 2.5-3.5/3-7 2YR-3YR 2.5-4.5/3-5 3YR-5YR 2.5-4.5/3-7 5YR-8YR 2.5-4.5/1.2-2.5
Rosewood	11	m. rBr 43, l. gy. rB 45	6R-8R 2.5-3.5/3-7 2YR-3YR 2.5-4.5/3-5 8R-2YR 2.5-4.5/3- 1YR-5YR 4.5-6.5/1.5-3

Table C.2 (continued)

Bisque	12	P. OY 73, yGY 93, m. yPK 29, gy. yPK 32, l. gy. Br 79, gy. Y 90	6R-7YR 6.5-8/3-7 6R-5YR 6.5-8/1.5-3 5YR-8YR 4.5-8/1.2-3 7YR-8YR 7.5-10/3-6 plus 6.5-8.5/.7-1.2 8YR-1Y 7.5-10/2-6 plus 7.5-8.5/1.5-3 and 5.5-6.5/1.2-2 7Y-9Y 6.5-8.7-3 plus 8-8.5/.7-2 9Y-4GY 6.5-8.5/.5-1.2
Celadon	13	v. p. G 148, p. G 149	8GY-10BG 5.5-10/1.2-2.5
Sage	14	m. YG 120	2GY-8GY 4.5-7.5/3-7
Mint	15	d. G 146, D. bG 165	3G-10BG 2-3.5/2.5-7 plus 2-2.5/2-2.5
Creme de Menthe	16	-	-
Teal Green	17	m. G 145, gy. 01G 127	2GY-8GY 2.5-4.5/1.2-3 3G-9G 3.5-5.5/2.5-7
Soft Turquoise	18	-	-
Jade	19	-	-
Limoge	20	s. B 178, m. B 182	9B-7PB 3-5.5/9-13 9B-5PB 3-5.5/5-9 5PB-7PB 3-4.5/5.9 plus 4.5-5.5/7-9
Wedgwood	21	p. B 185	10BG-9B 5.5-7.5/1.5-3 9B-5PB 5.5-7.5/1.5-4.5 5PB-6PB 5.5-7.5/1.5-3
China	22	-	-
Delft	23	gy. pB 204, gy. B 186, m. B 182, d. B 183, p. pB 203	6PB-9PB 2-1/3-5 plus 2-2.5/2-2.5 10 BG-9B 3-5.5/1.5-3 9B-5PB 0-3/2-7 minus 2.5-3/2-2.5 5PB-9PB 3-5.5/.5-3 9B-5PB 0-3/2-7 minus 3-7.5/3-5

Table C.2 (continued)

Mauve	24	brill. P 217, s. P 218, brill. 206, m. rP 241	9PB-3P 4.5-10/7-13 3P-9P 3.5-10/9-13 9P-3RP 3.5-5.5/3-9
Orchid	25	l. P 222, p. P 227, gy. pP 253, s. rP 237, l. rP 240, m. rP 241, deep pPK 248, m. pPK 250, l. pPK 249, p. pPK 252	9P-9RP 6.5-10/1.5-9 plus 5.5-6.5/9-14.5 9P-3RP 3.5-6.5/5-9 plus 3.5-5.5/9-13 9P-1R 5.5-6.5/1.5-3, 3P-9P 5.5-7.5/1.5-7 9PB-3P 5.5-7.5/1.5-3
Lilac	26	pkGY 10, v. l. V 209, l. V 210, v. l. P 221, v. p. P 226, p. P 227, gy. P 228, p. White 231, l. pGy 232, pGY 233, m. rP 241, p. rP 244, p. pPK 252, gy. pPK 253, l. gy. pR 261, m. P 223, gy. pR 262, l. P 222	9RP-5YR 6.5-8.5/.5-1.5 plus 5.5-6.5/9-14.5 3P-9P 3.5-10/1.5-9 9PB-9RP 4.5-10/.5-1.5 9RP-1R 4.5-6.5/.5-1.5 9P-3RP 6.5-10/1-5.5 9RP-3RP 3.5-5.5/5-9 plus 5.5-6/3-5 3RP-1R 3.5-5.5/3-7 plus 5.5-6.5/3-5
Wisteria	27	l. V 210	9PB-3P 4.5-7.5/5-9
Grape	28	d. V 212, d. gy. P229	9PB-3P 0-2.5/2-7 9PB-1R 2-2.5/.5-2 plus 2.5-3.5/1.5-3
Plum Cordial	29	-	-
Vanilla	30	p. Y 89, gy. Y 90	1Y-7Y 6.5-10/2-5
Mushroom	31	br. Gy 64, p. Y 89, yWhite 92	1Y-7Y 8-10/2-5 plus 8.5-10/.5-2 7Y-9Y 8.5-10/.7-2 plus 8-10/2-3 9Y-4GY 8.5-10/.5-1.2 5YR-4Y 2.5-4.5/.5-1.2 9R-5YR 2.5-4.5/.5-1.5
Dove Grey	32	l. pGY 232, gy. pPK 253, pGy 233	9P-9PR 6.5-7.5/1.5-5 9PB-9RP 4.5-8.5/.5-1.5 9RP-1R 4.5-6.5/.5-1.5
Creme Caramel	33	p. OY 73	7YR-8YR 7.5-10/3-6 8YR-1Y 7.5-10/2-6

Table C.2 (continued)

Mocha	34	d. OlBr 96	1Y-4Y 0-2.5/.5-14 minus 0-1.5/.5-1
Bark	35	d. OlBr 96	1Y-4Y 0-2.5/.5-14 minus 0-1.5/.5-1

Table C.3

ISCC-NBS Designations and Munsell Notations

Book: Alive with Color Author: Eiseman

Category: Sunset Palette Page: Plate I

Color Name	Color Chip Number	ISCC-NBS Designation	Munsell Notation
Harvest Gold	1	l. Y 86	1Y-7Y 8-10/5-8
Honey	2	d. gy. Y 91	1Y-7Y 5.5-6.5/3-5
Burnt Orange	3	s. O 50, s. rO 35,	7R-2YR 4.5-6.5/7-13 2YR-7YR 4.5-7.5/10-14 3YR-7YR 4.5-7.5/6-10 2YR-3YR 4.5-7.5/7-10 plus 6.5-7.5/6-7
Geranium	4	s. R 12, v. R 11	1R-7R 3.5-5.5/11-13, 1R-9R 0-5.5/11-14 minus 3.5-5.5/11-13
Tomato	5	d. rO 38	7R-2YR 3.5-4.5/7-11
Apricot	6	s. OY 68, m. O 53, l. O 52, s. O 50	2YR-7YR 7.5-10/6-10 2YR-7YR 5.5-7.5/6-14 minus 5.5-6.5/6-7 7YR-1Y 6.5-8/10-14
Peach	7	p. OY 73, l. yPK 28, m. yPK 29, l. O 52	6R-2YR 6.5-10/3-7 2YR-7YR 6.5-10/3-6 2YR-7YR 7.5-10/6-10 7YR-1Y 7.5-10/3-6
Coral Dust	8	d. Pk 6, l. gy. R 18, m. yPK 29, d. yPK 30	9RP-6R 5.5-6.5/5-7 1R-8R 5.5-6.5/1.5-5 6R-7YR 6.5-8/3-6 6R-8R 5.5-6.5/5-7
Ash Rose	9	gy. R 19, gy. pR 262	3RP-1R 3.5-5.5/3-7 8R-1YR 4.5-5.5/1.5-3 1R-8R 3.5-5.5/1.5-7
Brick Red	10	s. rO 35, s. Br 55, m. Br 58	3YR-8YR 2.5-4.5/2.5-14 2YR-3YR 2.5-4.5/5-14 9RP-2YR 3.5-4.5/7-11

Table C.3 (continued)

Bordeaux	11	d. pR 259, v. d. pR 260, gy. pR 262	3RP-1R 0-5.5/3-7 plus 0-2.2/2-3 plus 2-3.5/7-9
Curry	12	-	-
Khaki	13	l. yBr 76, l. OlBr 94, m. yBr 77	7YR-8YR 6.5-7.5/3-5 8YR-1Y 3.5-7.5/3-5 plus 3.5-4.5/2.5-3 and 5.5-7.5/5-6 1Y-4Y 4.5-5.5/1.2-14 and 5.5-6.5/1.2-3
Bay Leaf	14	s. yBr 74	7YR-8YR 4.5-5.5/6-14+ 8YR-1Y 3.5-5.5/5-14+
Dill	15	-	-
Hunter	16	d. yG 137, v. d. yG 139	8GY-3G 0-4.5/2.5-7 plus 0-2.5/2-2.5
Avocado	17	-	-
Dusty Blue	18	pB 185, gy. B 186	10BG-9PB 3-7.5/1.5-3 9B-5PB 3-7.5/3-5
Cadet Blue	19	m. B 182, s. B 178,	10BG-9B 3-5.5/1.5-3 9B-5PB 3-5.5/1.5-13 5PB-7PB 3-5.5/7-13 plus 3-4.5/5-7 5PB-9PB 3-5.5/1.5-3
Deep Periwinkle	20	l. pB 199, l. V 210	5PB-9PB 3-7.5/3-5 plus 2-3/3-5 and 2-2.5/2-3 7PB-3P 4.5-7.5/5-9 5PB-7PB 4.5-7.5/5-7
Antique Turquoise	21	-	-
Peacock	22	m. gB 173, d. gB 174	10BG-9B 2-5.5/3-7 plus 2-2.5/2-2.5
Deep Teal Green	23	m. bG 164, d. bG 165	9G-10BG 2-5.5/2.5-7 plus 0-2.5/2-2.5

Table C.3 (continued)

Smoke Grey	24	gy. Y 90, yGY 93	1Y-7Y 6.5-8.5/2-5 8YR-9Y 6.5-8.5/.5-2 9Y-4GY 6.5-8.5/.5-1.2 7YR-8YR 6.5-8.5/.7-1.2
Warm Taupe	25	-	-
Magenta Haze	26	-	-
Horizon Purple	27	-	-
Lilac Dusk	28	-	-
Purple Heather	29	m. P 223	3P-9P 3.5-5.5/5-9
Cream White	30	yWhite 92	7YR-8YR 8.5-10/.7-1.2 8YR-9Y 8.5-10/.7-2 9Y-4GY 8.5-10/.5-1.2
Carmel	31	br. Gy 64, l. Br 76, m. yBr 77, l. gy. yBr 79, l. OlBr 94	1YR-4Y 2.5-4.5/.5-1.5 7YR-8YR 6.5-7.5/3-6 8YR-1Y 5.5-7.5/1.2-6 8YR-1Y 3.5-5.5/2.5-5 1Y-4Y 4.5-5.5/1.2-14 and 5.5-6.5/1.2-3
Terra Cotta	32	l. rBr 42, deep O 51, br. O 54, gy. rO 39, d. rO 38, s. Br 55, s. r Br 40, m. rBr 43	8R-3YR 2.5-6.5/3-7 7R-2YR 3.5-4.5/7-10 9R-2YR 2.5-3.5/7-14 2YR-7YR 4.5-5.5/6-10 2YR-8YR 2.5-4.5/4.5-14
Cinnamon	33	l. Br 57, l. yBr 76, br. O 54, d. OY 72, s. yBr 74	2YR-3YR 4.5-5.5/7-10 3YR-7YR 4.5-6.5/3-6 plus 4.5-5.5/6-10 7YR-8YR 4.5-7.5/3-6 plus 4.5-6.5/6-10 plus 4.5-5.5/10-14 plus 5.5-6.5/6-10 8YR-1Y 5.5-715/3-6 plus 3.5-5.5/5-14
Paprika	34	d. rO 38, deep rO 36, m. rO 37	7R-2YR 3.5-6.5/7-11 and 3.5-4.5/11-13
Bronze	35	m. OlBr 95	1Y-4Y 2.5-4.5/1.2-14

APPENDIX D

HUE, VALUE AND CHROMA RANGES OF COLOR CHIP PRESENTATIONS

Table D.1

Hue, Value and Chroma Range of Color Chip Presentation

Book: Alive with Color Author: Eiseman

Category: Sunrise Palette

Hue Name	Number of Chips	Hue Range	Value Range	Chroma Range
Red	7	6.25-10	4-8.5	1-10
Yellow-red	8	2.5-10	2-7	1-4
Yellow	8	1.25-10	3-9	1-9
Green-yellow	3	2.5-10	3.5-7.5	3-10
Green	3	1.25-5	7-10	3-7
Blue-green	3	7.5-10	6.5-9	1-4
Blue	5	5-10	6-7.5	2-8
Purple-blue	6	2.5-10	3-8	3-8
Purple	2	7.5-10	4-7	5-6
Red-purple	4	5-7.5	5-8	3-9

Table D.2

Hue, Value and Chroma Range of Color Chip Presentation

Book: Alive with Color Author: Eiseman

Category: Sunlight Palette

Hue Name	Number of Chips	Hue Range	Value Range	Chroma Range
Red	5	2.5-5	4-8	4-12
Yellow-red	8	1.25-10	4-8	2-8
Yellow	8	3.75-10	7-9	1-8
Green-yellow	5	2.5-10	3-9	1-7
Green	4	2.5	4-8	5-8
Blue-green	1	10	8.5	1
Blue	5	5-10	4-8.5	1-8
Purple-blue	4	6.25-10	3-6	3-6
Purple	3	7.5-10	3-7	3-4
Red-purple	5	5-10	2.5-7	1-6

Table D.3

Hue, Value and Chroma Range of Color Chip Presentation

Book: Alive with Color Author: Eiseman

Category: Sunset Palette

Hue Name	Number of Chips	Hue Range	Value Range	Chroma Range
Red	13	1.25-10	2-7	2-10
Yellow-red	1	1.25	7	8
Yellow	10	1.25-10	3-9	1-6
Green-yellow	4	2.5-10	3-7	1-7
Green	3	2.5	5-6	4-10
Blue-green	3	2.5-10	4-8.5	1-4
Blue	2	5-10	6.5-8	1-8
Purple-blue	4	2.5-10	3-6.5	3-8
Purple	2	5-10	3-4	1-6
Red-purple	6	2.5-10	2.5-5.5	1.8