Color in the World of Visuals

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Everyday life gives us a view of the world, and we learn from all the things we experience and observe. When a person sees something, they do not necessarily fully recognize it, nor notice it as a definite idea. Color is part of our life from birth, and the eye is the first thing that observes and processes the formation of vibrational signals transmitted, allowing us to identify and give name to different colors, eventually comprehending the psychology of color as the meaning of color itself. Art practices which deal in color include the fine arts, photography, and film, and are part and parcel of how color is interpreted in the space of expression. The mechanism that records our accumulated visual memory is what determines the development of our visual experience, and thus possesses vast meaning implication.

Keywords: Color, Expression and Meaning

ABSTRAK:

Kehidupan sehari-hari menghadirkan sebuah pandangan sebagai pembelajaran dari apa yang dialami dan dilihat. Apa yang dilihat belum tentu juga dapat dikenali dengan baik, dan kemudian diperhatikan sebagai satu pemikiran. Warna merupakan bagian kehidupan manusia sejak lahir, mata merupakan bagian pertama yang mampu melihat dan memproses bentuk pengirim sinyal getaran yang kemudian membuat kita dapat mengenali nama warna sampai psikologi warna sebagai pemakna dari warna itu sendiri. Seni yang berkaitan dengan rupa warna seperti seni rupa, fotografi dan film tidak akan lepas dari bagaimana warna dapat diterjemahkan ke dalam ruang ekspresi. Proses sistem rekam dari akumulasi memori visual menjadi penentu pengalaman visual berkembang dan memiliki makna tersirat.

Kata kunci: Warna, Ekspresi dan Makna

INTRODUCTION

The element of color is integral to daily life, and the progress and development of technology. The band of additive colors is known as the spectrum, while subtractive colors are how colors blend within material known as pigments, i.e. the colors produced by mixtures of ingredients. Color is encompassed in philosophy, symbolism, and emotions related to the interpretation of the meaning of certain colors, which in turn form the psychology of color. The development of this field is related to the progress of various fields of knowledge observing color, including philosophy, the arts, religion, the self, semiotics, and hermeneutics or interpretation. As the visual arts progressed, color became one of the basic elements of art, together with line, shape, form, pattern, and texture. In film, color is the basic element supporting the visual aspect known as the *mise en scene,* which comprises lighting, setting, movement, and character expression, which in its turn makes use of costume and makeup.

In the visual arts (the plastic arts, photography, film), color is the characteristic that signifies the type or genre which differentiates time. Color is also present as a measurement of temperature describing the warmth or coolness of white light, whereby blue-ish colors denote a cool atmosphere and orange-y and reddish colors denote warmth. As an example, films employing monochrome or grades of black and white or sepia are characterized as *film noir.* Amber and orangey colors characterize cowboy movies and westerns. Aside from that, monochromes are also employed to identify time, or connote a period already past.

From whence did this convention emerge, giving different meanings to color? For this writer, this is a fascinating question to analyze. The theme of color is multidimensional and is related to myriad aspects in human existence. It provides a challenge to assess and discover how value was given to the meaning of colors in the world of visuals.

EARLY HISTORY OF COLOR

The early history of color is obviously closely connected to human vision. Humans saw their surroundings with their eyes, and so emerged a need to assess all the things humans looked at and observed, and their individual colors. As early as 550 BCE, Pythagoras gave birth to the idea of 'visual light' or 'occular light', regarding something being beamed from the eye in a straight line, or extra-mission. Around 490-435 BCE, Empedocles of Akragas became the first Greek philosopher to write about color. To Empedocles, all things permanent

comprised four elements, i.e fire, air, water, and earth, as the cause of all things. These elements were represented by the sun, sky, sea, and ground.

"Empedocles's idea was that the four elements gave birth to the form and colors of black, white, red, and yellowish green existing in all things in the world, and were united by Aphrodite, the goddess of love. Meanwhile, Aristoteles added the four qualities, consisting of warm, dry, moist, and cold. Hippocrates came up with the four bodily fluids, namely blood, phlegm, yellow bile, and black bile. These fluids correlate with the four systems of medicine, i.e. melancolic, sanguine, choleric and phlegmatic". (Crone, 4)

There is an inter-relationship between human psychology and physiognomy and its unity with the universe. The writer tabulated this inter-relationship to facilitate easy classification when observing interconnectedness of it.

Musim/Season	Usia/Ages	Unsur/Element	Bagian Badan/Organ	Kondisi/Qualities	Perangai/Temperament
Musim Semi/Spring	Masa Bayi/Infancy	Udara/Air	Hati/Liver	Lembab dan Hangat/Moist and Warm	Optimis/Sanguine
Musim Panas/Summer	Pemuda/Youth	Api/Fire	Kantong Empedu/Gallbladder	Hangat dan Kering/Warm and Dry	Mudah Tersinggung/Choleric
Musim Gugur/Autumn	Masa Dewasa/Adulthood	Bumi/Earth	Limpa/Spleen	Kering dan Dingin/Dry and Cold	Melankolik/Melancholic
Musim Dingin/Winter	Usia Tua/Old Age	Air/Water	Otak/Paru-Paru/Brain/Lungs	Dingin dan Lembab/Cold and Moist	Apatis/Phlegmatic

Table 1. Classic elements

Source: Personal Document

After this early exploration of color and Ancient Greece thought, many scholars later emerged who developed the corpus of knowledge regarding color, including color theory, color schemes, color temperatures, color psychology and human characteristics, color combinations, color coding, color harmonizing, naming of colors, color conventions, color intensities, the colors of light, the colors in pigments, the meanings of color, and color terminology, all which were coined to enable people to communicate and reach consensus when reading color systems. Thus, the presence of color became something very specific, despite big numbers in the population being colorblind or capable of only perceiving single colors due to malfunction in the sensor differentiating color identities.

PERCEPTION AND PSYCHOLOGY OF COLOR

The issue regarding color is not limited to how we comprehend it and how effectively we use it, but rather our tendency to perceive color better than really seeing it. Color vision and perception are steps in responding to visual stimulation from light. Our response to this stimulation we understand as a sensation to light receptors which form the foundation of perception.
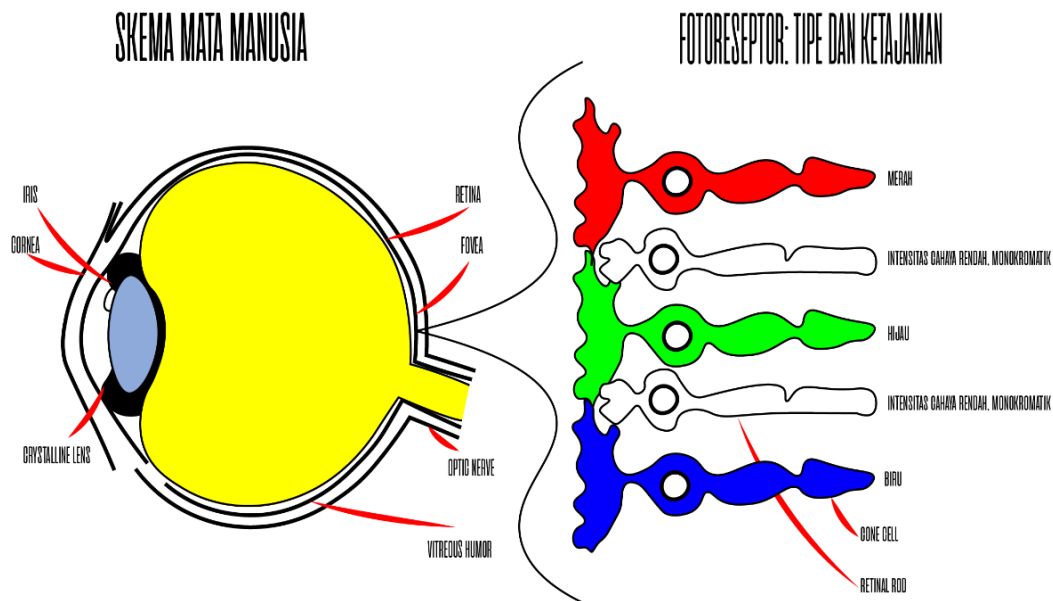

Figure 2. Diagram of the Human Eye and Photoreceptors

Source: Personal Document adapted from Webvision.Med

Alhazen's doctrine regarding color perception, which shows influences from Aristoteles and Ptolemeus, was derived empirically. Light and color are the major source of visual information. Perception is arrived at by the comparison of established information. "There are two types of photoreceptor cells in the human eye, the retinal rod and the cone. Both change light into nerve signals. The rod adjusts to low light conditions and is insensitive to color, while the cone functions best in daytime and is very sensitive to color. There are three different types of cone cells, each one sensitive to different ranges of color frequency. The three cone types are sensitive to the entire frequency spectrum that can be seen and makes it possible for full color vision". (Misek, 1)

How important color psychology is in people's lives is compelling to analyze because people have conscious and unconscious aspects in their association with color. Understanding the presence of color is no easy task because of the human tendency to dismiss or find

mundane things which are too often seen or experienced. Things turn different once a person begins to recognize the presence of color. It is absorbing to scrutinize how the presence of color stimulates spontaneous changes in a person's emotion, both as regard to their feelings and in relation to their behavior. This in turn is known as the psychological response.

Color psychology is a branch in the science of psychology that studies color as a factor influencing human behavior. Color can influence perception and process valuation with logic closely associated to the elements of similarity of meaning. This can involve stimulation using visual attraction to increase a person's desire, feeling and emotions to create a feeling or a mood.

Color helps establish the image of a situation and condition which is part of building perception, allowing us to express a thought spontaneously. One of color's strong traits is it assists people respond to things grabbing their attention.

COLOR IN ART AND TECHNOLOGY

The expression of color esthetics refers to meaning derived from the use of color in picture design and visual experience. The expression of color semantics refers to meaning derived from all possible color connections or groupings which provide ideas from outside the realm of art, by association, metaphor, or convention. The presence of light makes any surface clearly visible and brings each pigment color close to its reality while showing shape in all its beauty. Harmony in visuals stimulates emotion and underscores how color makes all the elements in a piece of art so appealing.

THE PERCEPTION OF SURFACE COLOR

Colors are normally regarded in terms of wavelength and intensity.
The colors of surfaces are much more complex. Consider the subtle
variations of color in a blue scarf carelessly thrown on a table

by Jacob Beck

View a wall some distance away through a hole in a dark screen, and the part of the wall within the hole will no longer be perceived as a material substance, standing in a specific illumination and having a definite spatial location. Since it is possible to focus one's eyes only on the edge of the hole and on the screen, the texture of the distant wall will be blurred, and an area of uniform luminance and hue will be projected on the retina. The color seen through the hole will appear as a filmlike expanse rather than as an attribute of a surface. Homogeneous areas of luminance and hue in a dark surround lead to what is termed a nonsurface perception of color.

Colors viewed in this way, sometimes called film colors, vary in brightness, saturation and hue. Brightness is the attribute that can be described as ranging from dim to dazzling. Saturation is the attribute that determines the degree to which a color differs from a white of the same brightness. Hue is the attribute that makes it possible to classify colors as red, yellow, green, blue or intermediates of these. Geometrically the family of film colors can be described in terms of a double cone. Variations in brightness are represented along the axis of the cone. Variations in hue are represented around the circumference. Variations in saturation are represented along the radii. Colors of increasing saturation are located at increasing distances from the axis. The highest degree of saturation is perceived for colors of medium brightness; as brightness increases or decreases, the attainable saturation becomes less. The attributes of hue, saturation and brightness exhaust the degrees of freedom of a film color. If two film colors are separately equated for their hue, saturation and brightness, the colors will appear identical.

The term surface color is used to refer to a color that is perceived as an attribute of a surface. The simplest condition for the perception of a surface color is to present a stimulus consisting of two different luminances adjacent to each other. If an orange light of homogeneous luminance and hue is viewed through a hole in a white screen that is at a slightly higher luminance, for example, the color within the hole will be seen not as a film color but as the color of an opaque surface. The color will be seen as though it were a piece of orange paper pasted on the white screen.

Surface colors exhibit attributes not possessed by film colors. Thus there are no gray, brown, maroon or olive green film colors. These colors represent variations in lightness that emerge when one views contrasting luminance variations, such as those that typically give rise to the perception of a surface. Physically the difference between a yellow and a brown is not the same as that between, say, a yellow and a red or a green and a blue. Differences in hue correspond to differences in wavelength. The wavelength composition of the light reflected from a yellow surface and from a brown surface can be identical. Differences in lightness do not correspond to differences in wavelength. The perception of brown can accordingly result from a contrast effect in which an adjacent area of higher luminance darkens the yellow col-

or. The double-cone illustration can also be used to describe the variations of surface colors. Variations in lightness from white through gray to black are now arranged from top to bottom along the axis of the cone. Variations in hue and saturation are represented as they are in the case of film colors [see illustration on page 66].

The attributes of hue, saturation and lightness do not exhaust the variations possible with surface colors. Two surface colors that have been equated on the basis of these three attributes will not necessarily appear identical. For example, the appearance of a surface color changes with its illumination. If a white card is folded in half and placed so that one side of the card is illuminated and the other side is in shadow, both sides of the card are seen as white [see top illustration on page 68]. Yet the two sides do not look the same. One is able to perceive the difference in illumination. The illuminated side is seen as a bright or strongly illuminated white, the shadowed side as a dull or dimly illuminated white. The ability of the human perceptual system to separate the lightness of the surface from the brightness of the illumination is a manifestation of what psychologists refer to as color constancy. This term is used to describe the tendency of colors to retain their daylight appearance in spite of large changes in the

VARIATIONS OF SURFACE COLORS are captured in the still-life photograph on the opposite page. In spite of large differences in the intensity and wavelength of the illumination the human visual system tends to separate the perceived hue and lightness of a colored surface from the hue and brightness of the illumination; psychologists refer to this tendency of surface colors to retain their normal daylight appearance as color constancy. In addition to the various surface colors represented, which result primarily from differences in the composition, texture, smoothness and depth of finish of the assorted objects, an example of a film color is included; it is the red surface seen through a hole in black cardboard.

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In a light source, we see colors in electromagnetic waves. These waves contain a frequency known as the electromagnetic spectrum. These waves are radiation which we call light and is imperceptible to the human eye. On one end of the spectrum are the low frequencies (radio, microwaves, infrared), while on the other end are the high frequencies (ultraviolet, x-rays, gamma rays).

This electromagnetic wave contains color. Thomas Kelvin discovered that light colors give off heat and in different temperatures. A light color such as blue has a temperature of 5600K usually called daylight, green is 4900K in temperature usually known as fluorescent, and red has a temperature of 3600K known as tungsten. Measurement of these color temperatures are done in Kelvinmeter.
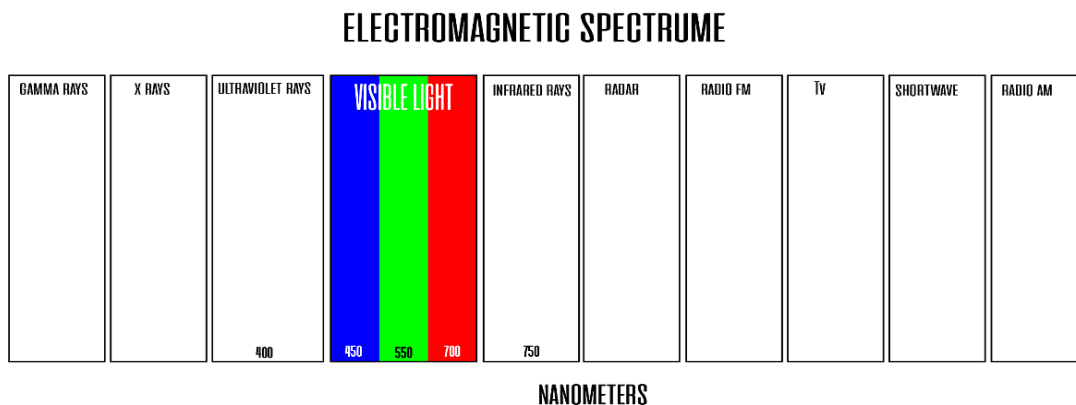
ELECTROMAGNETIC SPECTRUME

GAMMA RAYS	X RAYS	ULTRAVIOLET RAYS	VISIBLE LIGHT	INFRARED RAYS	RADAR	RADIO FM	TV	SHORTWAVE	RADIO AM

400   450   550   700   750

NANOMETERS

Figure 3. Electromagnetic Spectrum

Source: Personal Document

Aristoteles observed in his work, *On The Soul,* that, "it is impossible to see color with no light, while it is possible to see light with no colors in a monochromatic picture. But in between the low and the high frequencies, there is a frequency detectable to the human eye called the visible light spectrum. This frequency contains among others infrared and ultraviolet which are also representations of certain colors. Particles of light which enter the retina directly in a specific way create the sensation of color ". (Misek 1)

In the light frequency, additive colors are the main light colors. Light illumination occurs in red, green, and blue. These three colors united become white. We know that light

sources can be natural or artificial. Artificial light is employed in photography and films. Colors are present in material that specifically absorb pigments. This material contains the colors magenta, yellow and cyan. Some color pigments have been standardized, especially for human skin colors, because human skin colors vary widely. Sometimes certain pigment colors simply depend on the material's surface, for instance earth, plants, water, fire, wood, cloth, iron, or plastic. Pigment colors are usually called subtractive colors.

WARNA ADITIF

WARNA SUBTRAKTIF

Diagram 4. Additive and Subtractive colors

Source: Personal Document

Regarding shape, color gives authority to the harmonization and combination of HSL (*hue*, *saturation*, *lightness*) and HSV (*hue*, *saturation*, *value*), also HSB (*hue*, *saturation*, *brightness*) between color/hue, saturation and lightness/value/brightness making shape and form clear and sharp. In this respect, a myriad of meanings become recognizable.

Color accentuates the surface of a subject as the signifier of similar perception present in the frame. The shape of color is also part of the composition presented showing the dominant and minor visual elements by the combination of additive and subtractive colors.

HUE

SATURATION/INTENSITY

LIGHTNESS/BRIGHNESS/VALUE

Figure 5. Harmonization and Color Combinations

Source: Personal Document

As technology progressed, color in photography and film advanced coupled with the awareness of visual psychology, beginning with the changes in the electromagnetic spectrum wave received by chemical elements in emulsion, to the changes in the electromagnetic spectrum wave received by the image sensor to create an image. This made the image part of the development of illusion into interpretation and perception, which created sensation for the viewer.

COLOR AS EXPRESSIVE FORM

A digital colorist can very easily click a particular color on the dashboard in post-production and shift the entire frame to another hue. Yet, before the 1990s, pro-filmic colors were unchangeable. Blue remained blue once it was filmed, regardless of the color of the film stock used. When a photographer or filmmaker wished to make a transformative touch to natural color, they needed extreme techniques while focusing on available colors in front of the lens. Michaelangelo Antonioni formed his expression by changing natural colors to create what Rudolf Arnheim called in his discussion of the film, *L'Avventura* (1960), "cosmetic correction to reality". Antonioni's basic assumption was that to create a color to express what he wished to, he needed to break the indexical connection between an object and the colors connected to it. (Misek 35)

COLOR AS INTERPRETATION OF FEELING

In their individual color choices, photographers and cinematographers have need for a narrative motivation. This they base on how color is associated by the viewer to ordinary things in their daily lives which become imbued with individual meaning. In principle, cinematographers limit themselves in expressing their ideas and experience to manifest a positioning of color and its elements to provide certain meaning, while the audience itself has an in-built ability to assess and provide meanings they also based on their own backgrounds and personal references.

According to perception philosophy theory, naïve realism (also known as direct realism, perceptual realism, or commonsense realism) came from the notion that the senses provide us with direct awareness to objects as is, or as they are (Snijders 157). Consistent to the theory of naive realist perception or relationalism, according to Keith Allen (2016) perceptual experience is not representational, but rather a relational event partly shaped by the object, its traits, and independent thought relations. (Allen 12)

In a view combining naïve realism and naïve relationist perception theory, color is an independent-thought trait separate from the objects in the environment connected to or 'acquainted' to perception, making the attribute and the color event constitutionally dependent on the independent-thought color traits comprising experience. (Allen 12)

COLOR AS REPRESENTATION OF A FEEL

Similarities in experience of certain situations can be scrutinized for their value in people freely interpreting the situation while deriving meaning. Many works of photography and film use color to convey psychological nuance. The meaning's presence can be gentle or strident merely by the way the color is delivered. A new or old feeling can also be interpreted through color. This is apparent in many works of film whereby color is appealing not only in conveying a look but also creating a mood.

The writer looked at color conveying an atmosphere constructed from an event. To create an intimate and personal feel, the color meaning message can be wholly received by the audience from their view of the frame. Obviously, the color will have correlation with the dialog and movement expression of the characters, molding synchronization between look and feel.

Indeed, color has a distinct personality and its own language which visually can help define the main or supporting characters in a narrative. Certain works of photography and film use color transformation to support the character and storyline's evolution. Each frame conveys an important scene, capturing the role of color in determining the figures or expanding the narrative. As a result, certain tensions as seen in the frame are extended longer than others. If more than one color is explored visually, then the film's color is the main influence bearer to the story. Other colors will be coded under the icon for "supporting colors" in each story. (Bellatoni xxv-xxiv)

Color, like mood, joy, friendship, and sadness are employed to portray a character's emotions. This reflects the psychological makeup of the figure, their personality, and their emotion. One of the emotional indications would be when the figure enters a time frame in his or her social environment. In consequence, viewers will identify themselves with the figure, alongside all his or her turmoil as if they are the subject.

Renowned figure in color psychology from Switzerland and the founder of analytical psychology, Carl Jung, wrote on the psyche's disposition or the archetype, which is a representation of the unconscious mind. Jung gave meanings to particular colors to attain understanding. Sigmund Freud, the father of modern psychology, was also curious about how color could influence the mind. Freud's exploration on the importance of dreams also covered analysis on the meaning of certain colors in dreams and their influence to the conscious life of a person. (Sherin 80)

COLOR AND VISUALIZATION OF FEEL

One of the things that represents conveyance of emotion is the feel. Feel is the final determinant for character portrayal in the *mise en scene*. The character is reinforced by color making the presence of emotion concordant with the mood being constructed. This construction then becomes representation, from the viewpoint of whoever decides the visuals, as regards the situation of the event, for it to represent the feel of response to the event. The feel represents the objective and subjective view to convey a statement and a meaning.

The feel would be incomplete if the physical form captured visually is ignored. The physical shape is the part that provides the surface color. The shape, which is the basis of the dimension of space is what conveys the esthetic because it is the structure displaying all the lines of the two-dimensional and three-dimensional form. A form that possesses color may provide a different meaning based on emotive factors, or instead trigger emotions, which is a shift in meaning indicated by the presence of association, analogy, or comparison in the use of language. Thinking about association, analogy and comparison is part of interpreting metaphorical shape or a shift in form, be it anthropomorphic metaphor, beastly metaphor, or cine-esthetic metaphor.

CONCLUSION

Giving meaning to color in the world of visuals is no easy matter. Often, we do not notice colors in our awareness processing what we are seeing. To pinpoint color as a separate message or meaning needs serious observation of the presence of color itself. Nature has provided myriad examples of phenomenon occurring on every element with a surface of color constancy. Changes will occur in relation to the natural event itself. How then should we hone our ability to interpret meaning from color? Should it be through association, or should it only be through correlating it with the visual experiences stored away in our visual memory. Only after, do we realize that color provides profound meaning to life itself.

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