

# Factors that influence color choice – a study of cultural, symbolical and synesthetic behaviors

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2021

Ng, W. L. (2021). Factors that influence color choice – a study of cultural, symbolical and synesthetic behaviors. 14th International Colour Association (AIC) Conference 2021, 1085-1090.

<https://hdl.handle.net/10356/153117>

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# **Title of the paper: Factors that Influence Color Choice – A Study of Cultural, Symbolical and Synesthetic Behaviors.**

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## **Abstract**

This paper is a study of color choice based on cultural, symbolic, or emotional context. This contextual background especially emotional context further connects to basic and strong synesthetic behaviors. In general, there was minimum statistical proof of any universal human response that has a closed relation to cultural or emotional context. The only exception is the basic synesthetic behavior that connects to people's daily and common experiences. The findings suggest that there are diverse decisions made based on every contextual background. The research findings serve as a guideline for a pedagogical design that needs to include the teaching of color application related to the cultural, symbolic, or emotional context. The training of color application has to be bound by the pre-defined contextual background. Some basic synesthetic responses may be taught. Extensive discussion of the synesthetic connection between color and other sensing responses should be avoided.

**Keywords:** *Color, Cultural, Symbolical, Synesthesia, Pedagogy.*

## **Background Information**

In practical color theory training for art students or artists involves two main aspects of knowledge. First is the visual response of human eyes which is common to everyone. For example, yellow has a lighter tone than black which is universally true to everyone. Therefore, the construction of any scientific color theory framework is a process to identify the independent parameters that affect the final human visual response. The most common independent parameters are hue, lightness (or tone), and chroma (or saturation - based on the difference in the definition of how measurements are carried out). There are more complex and sophisticated independent parameters like brightness and brilliance which are connected to the strength of the light source. Anyway, it does not matter how sophisticated a mathematically constructed color theory model is, everyone's visual response is overall consistent though there might be minor differences due to each person's visual capacity. Therefore, three attributes of color, hue, tone, and chroma are acceptable parameters that can be used for practical color theory training without question. These parameters are common physical responses of our vision to colors except for people who are visually impaired.

However, the second set of factors introduced to the teaching and learning of color theory always raise many issues. It is the cultural, symbolical, or emotional choice of colors. There are too diverse meanings of colors across cultures to arrive at any consistent or shared meanings. In a cross-cultural study related to the meaning of colors, out of 23 samples, a researcher accepted up to 5 exceptions and used this to determine the affective meanings of each color. Thereafter decided if each color meaning analyzed was 'universal'. 5 out of 23 is not a number that can be ignored and hence this has indicated it is harder to

have universal agreements related to the affective meanings of colors (Adams et al., 1973). Moreover, there are colors that carry very opposite meanings which creates more confusion. Naz's study of college students related to color and emotion (2004) also presented the same colors that carry opposite meanings. Red and green were examples used by other researchers' studies that had similar discrepancies (Davey, 1998; Mahnke, 1996; Saito, 1996). A study also shows that color preferences are highly associated with age, racial groups, and cultures (Adams et al., 1973; Eysenck, 1941). Even across different geographical regions within the same country, colors do not carry common meanings (Naz et al., 2004). This is further supported by studies done across distinct cultures. Colors are arbitrarily associated with certain meanings across different cultures (Osgood et al., 1957; Young, 1971).

Among the three attributes of color, tone (lightness), hue, and chroma, Gao's study found that lightness and chroma are correlated to two extreme ends of emotional response while hue could be correlated to a certain extend. The results are also independent of cultural background (2007). A similar outcome is supported by another research. Emotional associations were found to be correlated to brightness and saturation. Brightness and saturation are equivalences to lightness and chroma respectively with slightly different mathematical definitions but similar practical meanings. The author uses yellow as an example. A yellow object presents a cheerful outcome only because it is light and saturated. It is not because of the hue (D'Andrade et al., 1974).

However, this is not difficult to understand this fact. Lightness, a measurement of our visual response to the strength of light, and chroma, the purity of a hue are both connected to the physical response of human vision. Therefore, these two factors are easily correlated to the speed or level of response of human vision. The level of this visual response can be generally linked to two ends of emotion. For example, slow responses are generally related to cozy, comfortable, relaxed, meditating, or any subtle modes while fast response likely related to aggressive, strong, impulsive, or any fast and immediate modes. On the contrary, the hue is not a measurement of any physical strength of our visual response, therefore, it could not be correlated.

Even with the evidence of correlation of lightness and chroma with the human visual response, it is just a general guideline about how lightness and chroma can be used to enhance a visual presentation of two extreme ends of emotional states. Any effort to narrow down and specify how each color is connected to certain emotions may not function. One evidence has shown that while most people connect high lightness to softness, Italians also see lower chroma colors giving the feeling of softness. The Swedes instead differentiate softness or hardness through hues; seeing red and yellow as soft and blue as hard. Therefore, any quantification or correlation could not be conducted for this case again. There is no unit in common to be measured. The result is more contextually dependent (Gao et al., 2007).

In a syllabus of 'Special Topics in Graphic Design: GD 390-501' from Depaul University, it indicates that the color wheel is used for the teaching of fundamental color theory covering both the scientific and emotive aspects (Quinn, 2015). In the brief description of the emotive part, it specifies that students will learn how colors affect people emotively using color choice in branding as an example. However, in another training syllabus, the instructor further indicates that there is no universal truth in various emotive responses related to colors (Leong). Leong's discussion in his training syllabus is more about common color synesthetic responses which are to be discussed in a subsequent topic. His syllabus covers color representations of seasons, environment and human behaviors. Some representations even fall into both positive and negative realms. That can be easily understood, for example, we may use red color as

an emergency code while it is also a color that represents a season of celebration like Christmas and Chinese New Year.

### ***Cultural, Symbolic and Emotional Representations with Colors***

Cultural, symbolic and emotional representations are three major areas of application of colors connected closely to human activities besides all the practical application in the industries, education, and fine art. Researchers have been exploring these areas. The major research effort is to address if there is any specific linkage that is universal between colors and certain choices our ancestors have made. This part of the literature review will allow me to see different researchers' output and understand if the result may assist in forming a pedagogical structure to cover color applications in these areas.

In cross-cultural research related to the symbolic meanings of colors, Yu (2014) looked into color symbolism that covered cultural, mythical, historical, religious, political, and linguistic connections. The research data showed that ancient color symbolism largely derived its reference from nature. For example, blue would stand for the sky, and it was further connected to spirit and truth. In a case study, this point was further proven that ancient human-beings translated their experience into concepts for ease of comprehension. Therefore, red means fire, white means frost, and blue means sky. One important point raised was that the interpretations of color may be different for diverse cultural environments (Yu, 2014).

*'For the ancient Mayas of Central America, the directions east, north, west, and south were associated with red, white, black, and yellow, while in ancient China east, south, west, north, and center, with blue, red, white, black, and yellow. Religion often overlaid this with other significance (Yu, 2014).'*

For indications of directions, the research findings above did not indicate the reasons for the choice from various cultures. However, the findings clearly indicate the subjective difference from culture to culture. A similar difference is also seen in religion; where the Buddhists use yellow as the color of humility while in Christianity, white is the color used to indicate purity. The difference also extends to different geopolitical locations, in accordance with the people and religions based on the author's study of minority tribes in China. This has confirmed that the cognition of colors and their symbolic meanings differ from culture to culture (Yu, 2014).

Some examples of symbolic representation differences of color are shown. Yellow means 'deceit' or 'cowardice' in Northern Europe, while it carries positive meaning in Chinese culture and Buddhism, representing imperial quality and humility or renunciation respectively (Yu, 2014).

The author believes that a cultural elite dominates the meaning of color over time which restricts the creativity of the human mind. However, I will argue that it has nothing to do with that. It was just a creative choice of any culture at that moment of definition. Since there is no universal truth about color meaning. No restriction could be imposed even when it comes from an elite culture. The minorities continue to use diverse meanings of colors they have defined through their belief and ancient definitions. This is different from the universally true property of color, for example, black color is darker than white color. No one in this universe could see white darker than black, or else we have to rethink about how to use or teach color.

There are too many examples that indicate the difference of color meanings from culture to culture. The author chose three very concrete examples between English language and Chinese language as tabulated below, Table 2 (Yu, 2014).

| English     | Chinese           |
|-------------|-------------------|
| Black Tea   | Red Tea (红茶)      |
| Brown bread | Black bread (黑面包) |
| Green-eyed  | Red-eyed (眼红)     |

Table 1. Comparing the difference in color representation between English and Chinese language, of the same subjects (Yu, 2014).

One important fact stated by the author further explains the difference. The various perceptual experience of colors can be easily explained with scientific knowledge as natural phenomena. However, in the ancient world, these were mysteries that could only be explained through myths based on diverse human imaginations and life experiences (Yu, 2014).

Two more similar types of research related to the diversity of colors (Bradfield, 2014) and color-symbolism (Dixon, 1899) further confirmed the huge diversity in color-symbolism from culture to culture. Bradfield found that even internet culture today could start to influence meanings of color. One interesting finding by Dixon is the nomenclature difference between cultures which further complicates the issue.

*'... for instance, Blue and Green are not distinguished in the languages of some peoples, while others confuse Dark Blue with Black. Not that the difference between the colors is not recognized, but that the principles of color-nomenclature are different. ... (Dixon, 1899).'*

Dixon concluded that diversity and non-uniformity are the characters of color-symbolism. Any effort to generalize the meanings would not be meaningful. The meanings lie in people's choices based on their diverse cultural backgrounds.

### **Colors and Synesthesia**

Synesthesia is a kind of sensory association between color and other human senses. One synesthetic phenomenon commonly observed and studied is the association between colors, musical notes, alphabets, or even weathers (Lone et al., 2003). A neuro-history and arts research listed scientists, artists, writers, and musicians who carried this synesthetic experience, namely Charles Baudelaire, Arthur Rimbaud, Alexander Scriabin, Vassily Kandinsky, Vladimir Nabokov, Seigei Eisenstein, David Hockney, and Richard Feynman.

The syndrome of synesthesia is an individual's complex sensual response. When one receives a stimulus in one sense modality, at the same time, one experiences a sensation in another (Lone et al., 2003). Kandinsky is probably the most interesting one as he was the Bauhaus master who attempts to teach meanings of colors in relation to music equivalence (Kandinsky, 2005)

*'Keen lemon-yellow hurts the eye in time as a prolonged and shrill trumpet-note the ear, and the gazer turns away to seek relief in blue or green (Kandinsky, 2005, p. 28).'*

In Kandinsky's research and teaching, he indicated the psychic effect of colors. He used common natural observed phenomena to explain his argument.

*'For example, red may cause a sensation analogous to that caused by flame, because red is the colour of flame. A warm red will prove exciting, another shade of red will cause pain or disgust through association with running blood. In these cases colour awakens a corresponding physical sensation, which undoubtedly works upon the soul (Kandinsky, 2005, p. 28).'*

These results above were also discussed in the section 4.2.1. There were derived from nature or human experience which some could also differ from culture to culture (Yu, 2014).

Kandinsky of experience of 'colored hearing' was a common form of synesthesia. His efforts to relate colors with music was connected to his personal experience from his synesthetic response of cross-modal sensitivity. His objective of connecting painting experience independent of naturalistic observation, instead of connecting with music could be better understood as synesthesia, which was a genetic response. This special genetic response only appears in a small population of human beings. Therefore, his effort of generalizing cross-sensual exchange could not function in a larger population (Lone et al., 2003). The fact that Kandinsky's idealistic approach at the Bauhaus to scientifically correlate artistic responses to visual elements and visual approach failed, could be explained partially here. It was only his personal experience of synesthesia. This quality is not in people at large (Jones, 1929).

Interestingly, the famous art critic of abstract art, Clement Greenberg thought that Kandinsky had drawn too many connections between painting, music, and mathematics (Berry, 1995). However, he probably did not realize that this quality was flowing in the blood of the artist as a genetic response.

Another research has confirmed that synesthesia is a special perceptual phenomenon, and is not connected with any special memory, either childhood or metaphorical. It was suggested that synesthesia was caused by a genetic mutation of neural sensory (Ramachandran et al., 2001). This enhances our understanding that the attempt to teach the cross-modal sensual association will not be appropriate for every student.

Interestingly, in a sampling study of 358 fine art students, 84 (23%) reported synesthetic experience. The research was trying to address the relationship between creativity and synesthesia since early data showed that a list of artists, writers, and musicians experienced synesthesia (Dailey et al., 1997; Lone et al., 2003). Creative and less creative participants had a different level of associations to perceptual correspondences. More creative people are inclined towards color-emotional associations while less creative people are inclined towards judgmental associations (Ramachandran et al., 2001).

The basic synesthetic response does exist in people at large as illustrated by the example below where kiki with sharper voice is thought to be connected with a sharper shape on the left while bouba as a rounded shape on the right as shown in Figure. 44 (Ramachandran et al., 2001). This is an indication of cross-wiring of our brains. It further explains that artists, poets, and writers may have a high level of synaesthesia in general as compared to people at large.

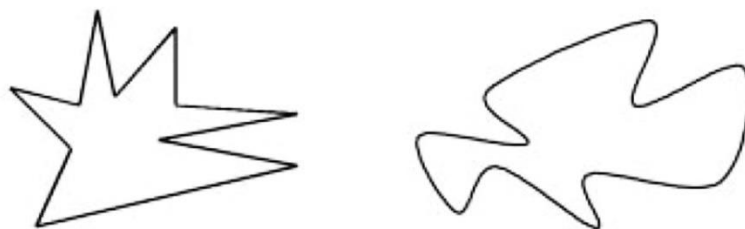


Figure 1. Demonstration of kiki and bouba. On the left, the sharper shape is generally (95%) connected with kiki while bouba is thought to be the shape on the right with more rounded edges. This is a synesthetic relation of shapes and voices. (Ramachandran et al., 2001)

Another study of our positive emotional responses to green color is another evidence of common synesthetic response. The green color commonly suggests feelings of relaxation, calmness, happiness, comfort, peace, and hope (Saito, 1996). In our living environment, a green color is generally associated with nature and the most positive season, the spring (Hemphill, 1996). Hence, it directly builds a positive synesthetic response visually.

In a film-making research, colors were studied against different sensual responses. The study suggested that the color application in the film was connected with senses of feeling (Yumibe, 2009). Tinted colors were found to be more continuous while high chroma colors generated more discretions, affecting visual continuity. Therefore, color application in the film would use these data to generate emotional atmospheres (Jones, 1929). However, I will argue that these are just more generic responses which commonly developed from human experiences. For example, almost everyone knows that dark and cloudy weather suggests that it may rain. When it rains as compared to hot and shiny weather, it definitely makes everyone feel cooler. Therefore, cooler weather is associated with gray, blue, purple, or dull green while warmer weather is associated with sunshine or hot things like fire; while the related colors are yellow, orange, or red. However, these generic qualities do not require any effort or education. It comes naturally from daily experience. For the case tinted colors, naturally, our eyes see them as more continuous against a strong jump of high chroma colors that contrast each other in color attributes. For the former, it allows more visual continuity. It does provide a more soothing emotional response. However, it is too optimistic to simply generalize towards a lot of more complex situations. Therefore, the synesthetic connection could not be derived easily. For example, although we know that tinted colors are more soothing, we are not likely to be able to tell the difference between the emotional continuity between a tinted red-tinted yellow pair against a tinted orange-tinted yellow pair. Practically, these two pairings are different. However, there is no way to related correctly to differential their emotional response, because the difference we are looking at is just too generic.

Similar to the objective of Kandinsky at the Bauhaus, more recent research was carried out to generalize color responses synesthetically to emotions (Cowan, 2015). First, more generic examples like warm colors (red, orange, and yellow) are compared against cold colors (green, blue, and violet). Followed by colors mixed with white and color mixed with gray, the author referred to another source to suggest emotional responses (Kalmus, 1935).

*'Grouping the colors in another manner we find that colors mixed with white indicate youth, gaiety, informality. Colors mixed with gray suggest subtlety, refinement, charm. When mixed with black, colors show strength, seriousness, dignity, but sometimes represent the baser emotions of life (Kalmus, 1935, p. 143).'*

What has been confirmed at a very broad level as I have argued in the film study above, could not be generalized to more sophisticated and refined emotions. Looking at Kalmus's statement above, it not only could not be measured, it further carried a subjective personal judgment. The problem can be easily verified. I may ask, "how dark the gray do I have to add to my pink to make it show seriousness or dignity?" This could hardly be answered. From here, we can understand that intensive and focused teaching of color

symbolism runs the risk of a problem similar to focusing on a synesthetic response that does not exist in everyone genetically. Forming such a virtual dogma will not help in training practical color skills.

Another danger is also reflected in Kalmus's study of color consciousness. Red was pointed out to represent both positive and negative experiences in human life. It indicates love, happiness, physical strength, wine, passion, power, excitement, turmoil, tragedy, cruelty, etc. (Kalmus, 1935). I would argue that these are too wide a range of varying emotional states. No way we can derive any systematic connection between the red hue and these emotional states. Therefore, it is dangerous to construct a pedagogical approach to teach these inconclusive responses. These data may serve only as a reference for experience building. Practitioners in the field selectively learn these experiences and accepted them as norms in their particular industry. Norms in different industries I would expect to have some level of difference, which is acceptable since, within the same industry, practitioners can communicate without conflicts. For example, if a red color code is confused as love instead of danger in a hospital, a severe consequence may arise.

### ***Summary of Color, Culture, Emotional Response and Synesthesia***

Through the substantial amount of literature, we understand that color-cultural or color-emotional connections derived naturally through shared experiences of people at large and are acceptable as simple synesthetic responses. However, any attempt to extend this to a sophisticated and subtle relationship will not function well. Some generic responses are just common norms that do not need any extensive training. Hence, it is not advisable to focus on formulating a structural approach to teach students these topics. The more specific correlations differ from industry to industry. Artists pick up the specific meaning only when they join a particular industry, or they will be given the requirements to work for that specific industry. The focus on art students' training should be placed on universal qualities of colors in applications.

### ***ACKNOWLEDGEMENTS***

The research is supported by School of Art, Design and Media, Nanyang Technological University, Singapore.

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