

“THE COLOR WE USE IN OUR DAILY LIFE - COMMUNICATING WITH COLOR”.

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ABSTRACT

Human vision enables us to see color every day and everywhere whenever we open our eyes. Perceiving color in our environment is a matter of both conscious and unconscious visual pathways, some of which have been explored well and others have not. What are the physical processes of seeing color, what influences the understanding of color, and what are the ways of communicating through color? By applying different models of color experience, this study aims to explore the processes involved in color perception and color communication. Starting with an introduction of the complex path of seeing color, physiological and psychological factors are explained, followed by an understanding of general color functions, and an interpretation of the origins and evolution of human color needs.

INTRODUCTION

As an infinite number of colors surround us in our everyday lives, we take it pretty much for granted, not recognizing its many roles in our daily lives. The color of a product may attract or disgust us, we can read emotions from the color of a face, and we decide rather intuitively on buying colorful packaged gifts. However, our knowledge of color and its ways of communication is still insufficient, giving way to further studies on product color, packaging, publishing, fashion, healthy foods, and much more. By introducing the paths of visual perception and color communication models, this study explores the scope and limitations of modern color research approaches. Color as a means of information and communication serves for interpreting and understanding our living environment: Colors have been used in cultural traditions since the early ages of mankind. There are four Principles of Color Selection in folklore: by the contrast displayed, as a transfer from the perceived or actual usefulness of the color, by association, and by availability (Hutchings, 2004). In Thai tradition, a specific color is assigned for each day of the week, related to the God who protects that day. On Sunday, red is the color of the day, the unfortunate color is blue, the celestial body is the sun, and Surya the God of the day. On Monday, yellow is the color of the day, the unfortunate color is red, the celestial body is the moon, and Chandra the God of the day, and so on. In India, the colored chakras are used in traditional healing techniques. In Chinese philosophy, the five basic needs of human beings are listed as food (shi), clothing (Yi), dwelling (Zhu), moving (Xing), entertainment (Le), and education (Yu), and relate to the daily practice of applying the Five-Elements-Theory, which is a practical tool to achieve a life in balance and harmony, based on five basic colors (Lee, 2012). In Traditional Chinese Medicine, medical treatments are based on colored food, i.e. as Green is the color related to the liver, green food (such as green beans) is helpful in strengthening this organ. Yellow resembling the center of the cardinal directions is also the imperial color, so the roofs of the emperor's palaces are covered with yellow glazed tiles. On joyful occasions, like Chinese New Year, weddings, and child birth, the color red expresses the vibrant energy of life and happiness. These culture-specific examples reflecting traditional color applications, though of great value to the local people, remain largely unknown to the foreigner, and there is certainly a need for further empirical study.

1. THE VISUAL PATH AND COLOR FUNCTIONS

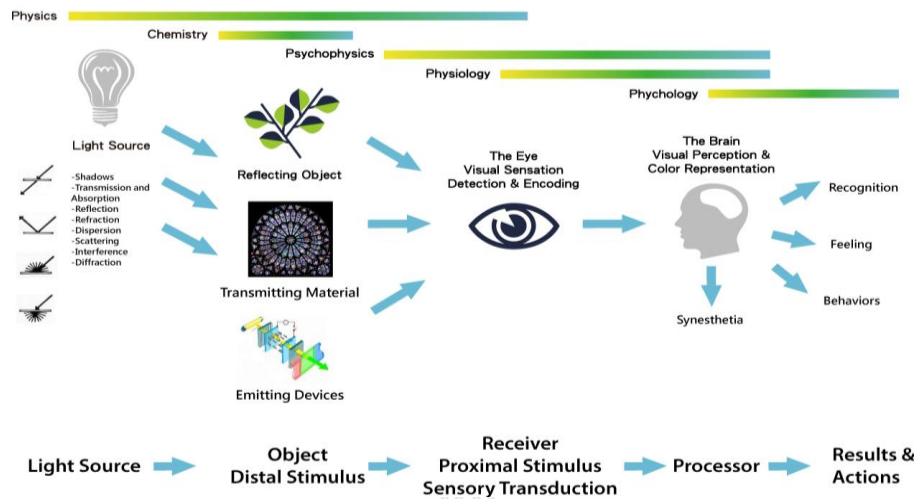


Figure 1: Human path of visual perception (Lee, 2013)

Three major elements define the way we encounter and see color, perceive and experience it: light source, an object and a recipient (Figure 1). The path of visual perception is a complex process of partly physical, chemical, psychophysical, physiological, and psychological reactions as functions of color. From the light source result physical phenomena, realized as shadows, transmission, absorption, reflections, etc. Light meeting an object or emitted through devices, i.e. LED displays, is influenced by the material. It is therefore defined by reflecting or transmitting chemical processes. This distal stimulus is detected and encoded by the physiological capacity of the human eye, becoming a proximal stimulus of the receiver, and performing a sensory transduction evoking a psychological sensation in the human brain. It is here that people experience the phenomenon of synesthesia. Visual perception and color representation are now being processed and synthesized, and turned into reactions like recognition, feelings, and behavior.

Generally, color research differentiates color by three functional categories of transmitting information: affective, communicative, and diagnostic. Affective color functions cover hedonic sensory pleasure, modulate emotions, possess expressive power and aesthetical value as applied in exploring color preference, or as found in the Fine Arts, design, media, and therapy. Diagnostic functions of color are used in status checking like reality proof and examining conditions, i.e. in medical applications, digital archiving, or quality control. Communicative functions of color mainly involve measurements like indexing and classification found in all kinds of human-product, human-machine, human-computer, and human-environment interfaces.

2. COLOR EXPERIENCE AND COLOR NEEDS

In Mahnke's pyramid (1990) of color experience, seeing is explained as more than an optical (physical) process, involving individual consciousness: at the ground level, biological reactions are the basic, inescapable response to the colorful environment. Color perception and response develops from an unconscious level towards a conscious one, where associations and symbolisms take place. Here, humans are influenced by culture and mannerisms, and create fashion, trends and styles. At the top, the individual person defines a personal relationship to color. The pyramid resembles Maslow's model of human needs, starting with physical needs like breath, food, water and sleep, followed by safety and security of the body and health, then asking for family ties and

friendship on the level for love and belonging. If all these needs are fulfilled, a person will then strive for esteem, related to confidence and achievements, and finally, for self-actualization.

In pre-historic times, colors were endowed with healing properties because at that time, the sun and rainbows were divine symbols. In the seventeenth century, scientific color theories were mostly influenced by experiences in painting. This was even more noticeable in the search for “primary colors.” In the eighteenth century, scientific theories of colors gradually became universal and artists also started to incorporate color-related knowledge from science researchers into their works. As early as 1810, painters such as Overback and Pforr believed that colors of the clothes of characters in paintings represented their personalities (Gage, 1999). This represented a practical method of utilizing colors to transmit messages.

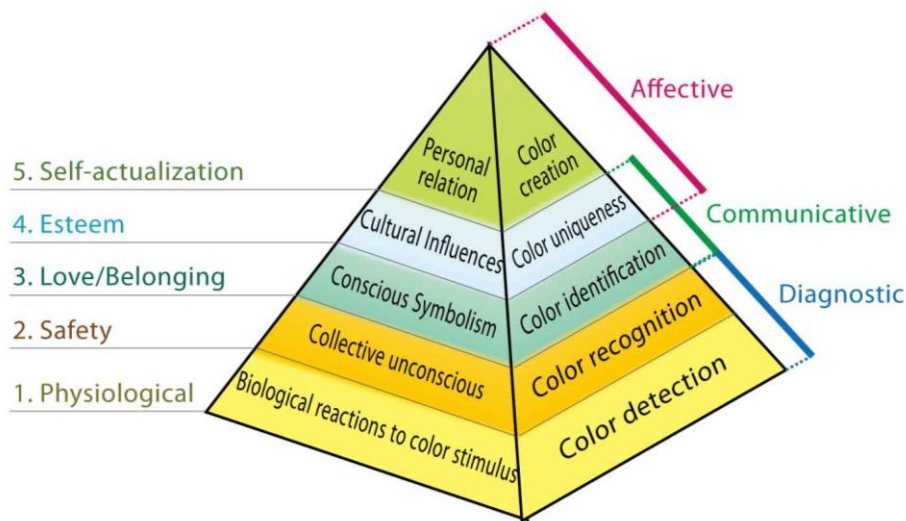


Figure 2: The Color Actualization Pyramid - hierarchy of color needs (Lee, 2013)

The Color Actualization Pyramid shows the color communication process combining Maslow's and Mahnke's pyramids, corresponding to a level of human color experience. On the first level of basic physiological response, humans see color as light presents it to the human eye, like the necessity of physical needs for food, sleep, etc. On the second level, the color experience can be described as the recognition and differentiation of the colored environment as far as needed for survival, i.e. to identify food and avoid potential threats, as it is common to all humans, and not yet a process of individual color interpretation. Next, equal to the need for love and belonging, color becomes aware to the individual through associations with symbols, and therefore, becomes a social issue in a way that color and symbols can connect humans among each other in their family relations and friendship. Proceeding to the level of esteem, color becomes a key element of culture in the sense that the individual now defines and decides on a personal style of fashion elements, creates and follows trends, and develops confidence through these kinds of achievements. On top of this process, color experience becomes a matter of identification, when the individual starts a relationship with color that is unique and personalized.

3. COLOR COMMUNICATION

While the visual path is based on a light source, an object and a recipient of the encoded information, the color response depends on the horizon of the individual color experience. In any given environment, color communication is determined by the local culture and its characteristic color codes. A foreigner who is not familiar with Thai tradition will not understand when Thai people wear yellow clothes to praise their king. The Thai people find color identification through conscious color symbolism, whereas the foreigner relates to the level of unconscious color

recognition. Anybody not involved in the local color experience won't be able to understand its encoded color messages, or decode and share the color coded information. This example offers new areas for future color research. For understanding color and human vision and the many fields of research involved, Gerbner's model is used to illustrate the color communication process (in: Severin & Tankard, 1992).

By adding another layer to the model, the process can also be explained by asking for Who, What, When, Where, Why, and How. An observing subject (Who) perceiving a color stimulus becomes the interpreter and encoder, as explored in color preference studies. The observing subject sends out a message and the reaction can be measured. The guiding question of a study is defined by What. A set environment (Where) is described by geographic determinants such as longitude and latitude. Lighting, the season or the weather become constants of the study regarding the time of the event taking place (When). Why stands for the purpose of the study, and How defines the process or reasoning. The scenario shown in Figure 3 includes two subjects communicating in their specific environment, exchanging in a dialogue over certain objects. Each of them can be a sender or recipient, so there are two subjects (Who) encoding and decoding messages.

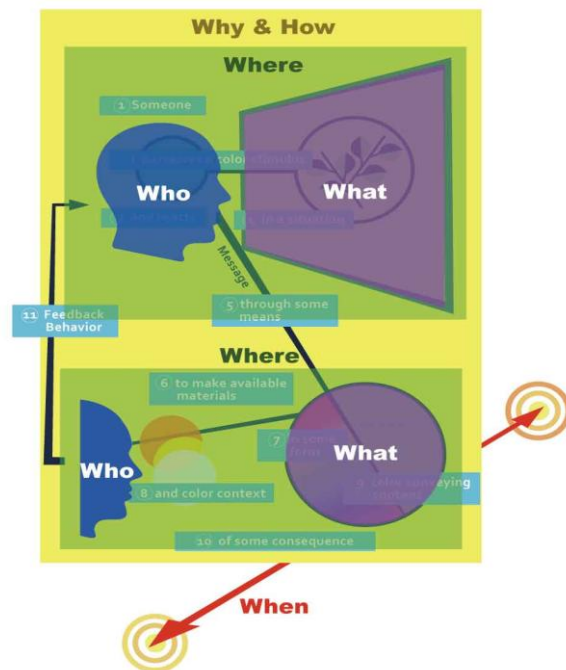


Figure 3: Color communication model (Lee, after Gerbner 1992)

4. CONCLUSION

Modern color research and understanding investigates color from many perspectives. But in spite of the great achievements made, the individual character of human perception remains a topic still involving many questions and challenges to become investigated. Human color perception has led to a great cultural variety of color interpretations and applications worldwide, grown from habitual practice towards conscious well-known patterns of identity. It seems that as color is always available, understanding color can still be applied even more widely. And as color can be enjoyed in cultures and their specific settings, a universal color culture cannot be defined yet.

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A Comparative Study in Asian Countries on Color Preference for Factory Products

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INTRODUCTION

Japanese industries export various products such as cameras, games, laptops, camcorders, etc., and those products are very popular in overseas markets. We are currently researching the designing conditions for more attractive materials of products in cooperation with a Japanese material manufacture. It is significant for us to understand the customers' preference for each material in each country.

The appearance of a product is one of the important factors for the customers' visual impressions. What kind of impression do you desire for metallic products such as in Fig. 1? And what kind of silver metallic color do you prefer for each product? The desired impression and color preference of the customers may be different by age, gender and nationality.

In this presentation, I'll show you the up-to-date results which we surveyed about the relationship between the desired feelings and the surface colors (Fig. 2) for not only Japanese people but also foreigners, especially Asians.

METHODS OF SURVEY

A questionnaire on the Web was used for our investigation and written both in English and in Japanese. Figure 3 shows an example of questions. Computer graphics have been used to represent the metallic product in the questionnaire and its surface colors have been controlled to reddish, yellowish, greenish, bluish, or a purplish silver color. Then we set five target feelings: "clean / pure", "stylish", "high-quality", "relaxing", and "favorite", which were chosen as the most important feelings of Japanese customers from our previous investigations. The respondents answered with the color that they felt was the most "clean / pure", for example, for five target products: a digital camera, a laptop computer, a DVD player, a television, and a fridge (Fig. 1). The required time was ten minutes on average. More than three hundred persons from seventeen nations have cooperated with us in total and there were four nations where more than twenty responses participated: Japan, China, Korea, and Thailand. We've examined the relationship between the desired feelings and the surface colors in each product and compared them among the four nationalities.



Fig. 1. Target products

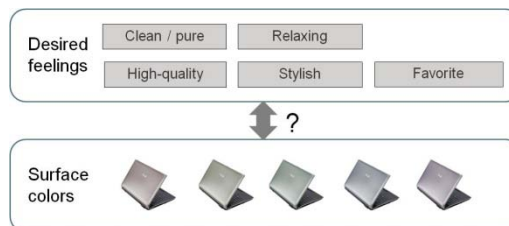


Fig. 2. Our purpose

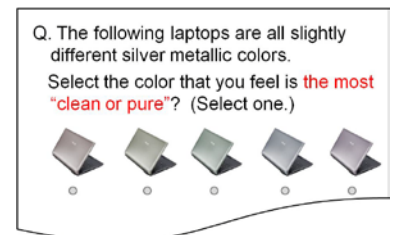


Fig. 3. An example of questions

COMPARATIVE RESULTS BY NATIONALITY

As the result of the survey, we found that many people selected the bluish silver color for all feelings and the yellowish silver color for “relaxing” and “high-quality”. The differences among the five products were small. Some results are shown in Figures 4 and 5 by line graphs. The abscissa shows the color and the ordinate the percentage of choice for the colors. Different line types indicate the products. Figure 4 shows the comparative results for the feeling “clean / pure” for four nationalities: Japanese, Chinese, Korean, and Thai people. The results indicate that the bluish silver color has the highest rate for “clean / pure” in every product and by every nationality. On the other hand, Figure 5 shows comparative results for the feeling “relaxing”. The bluish and yellowish silver colors have higher rates among Japanese, Chinese, and Korean people. In contrast, many Thai people selected the greenish silver color for “relaxing” in every product. For other feelings we found that many Chinese people selected the purplish silver color for “stylish” for the television. The differences among gender were mostly very small with some tendency that women select the reddish silver color for “favorite” and “relaxing” more than men.

SUMMARY AND FUTURE PLANS

We’ve examined the relationship between the customers’ feelings and the surface colors of products by an online survey and compared their results among four nations. Some interesting data were found. For instance, most Thai people selected the greenish silver color for “relaxing” and it is different from other nations. I found out later that Thai people have a traditional culture for inherent colors depending on birthdays. It’s also a fact that a lot of green colored products are often seen in Thailand. In our new investigation, we’ll add some helpful questions for the analysis from a cultural and social point of view. A new questionnaire has been opened on the Web. If you are interested, please contact me.

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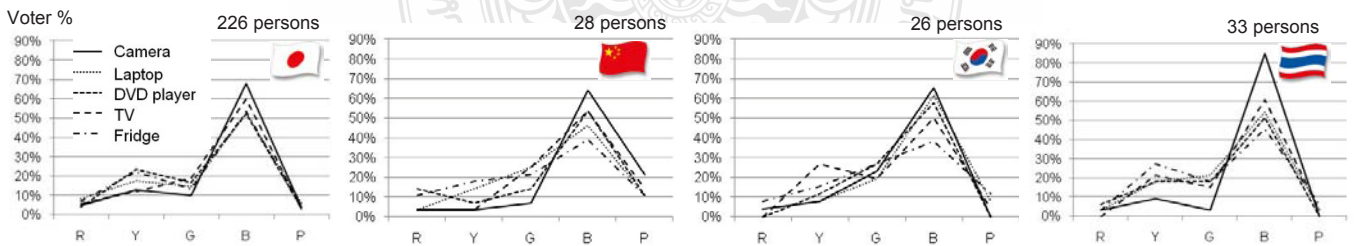


Fig. 4. Comparison by nationality for “clean / pure”

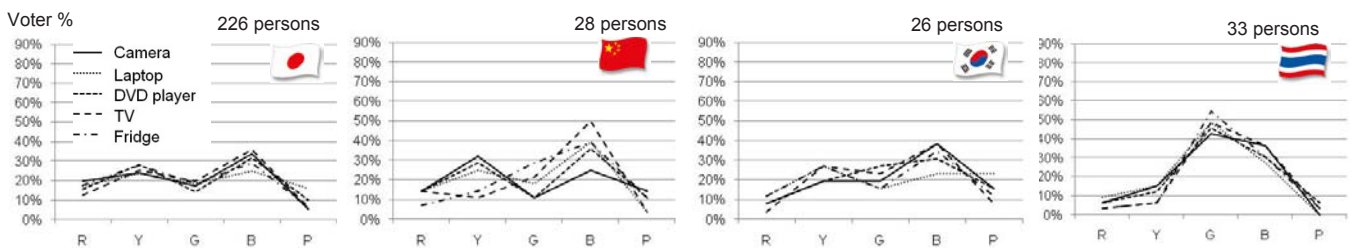


Fig. 5. Comparison by nationality for “relaxing”