



Conference Proceedings *AIC 2012 In Color We Live: Color and Environment*



In Color We Live: Color and Environment

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Interim Meeting of the
International Colour Association (AIC)
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Conference Proceedings

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Can you imagine a world without colors? The physical and psychological effects of colors contribute to a satisfying and joyful way of life, far beyond aesthetic pleasure, in both natural and man-made environments. Color as an interface connects us with our surrounding environment, and color differentiates the things we need not only to survive, but to indulge in life and to appreciate it. The aim of the conference is to explore how colors interact with our daily life, to approach the conscious and unconscious influence color may have on individual thought and perception, and how we can identify and apply colors from a healthier and more sustainable perspective. Seven fields of discussion have been selected for discussion: Color and Environment, Color Culture, Art and Design, Color Communication, Color Synesthesia and Visionary Projects, Color Science and Technology, Color Psychology, and Color Education.

"In Color We Live - Color and Environment" hopes to emphasize the importance of a colorful environment for a sustainable and healthy way of life, by addressing both individual and basic human needs, and by giving examples drawn from all aspects of life.



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International Colour Association
Internationale Vereinigung für die Farne
Association Internationale de la Couleur

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Comparison of Color Preference in Different Color Appearance Mode Between Thai and Japanese People

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ABSTRACT

We investigated color preference in different color appearance mode of Thai and Japanese people. Twenty four color chips consisted of eight hues (5R, 5YR, 5Y, 5GY, 5G, 10BG, 10B, and 5P) with three value (5/2, 5/5 and 5/8) were presented in different color appearance modes. Subjects were asked to rate his/her color preference on each color. They were asked to judge color appearance mode of each color whether it appeared as object color mode or unnatural object color mode or light source color mode. The result indicated that both Thai and Japanese people preferred colors appeared as unnatural object color mode and light source color mode to those appeared as object color mode. However, Thai people preferred cool colors such as green, blue and cyan to warm colors (red, and orange), whereas Japanese people preferred warm colors to cool colors. Yellow color was the least preferable hue for both groups of people.

1. INTRODUCTION

Color preference was a powerful tool to attract a subject's attention and to arouse the desire to consume in marketing. Several factors such as age, gender, cognition, and circumstances were said to be responsible for color preference. Culture was also one of factors which influence color preference. For example, in Thailand, red color refers to meaning of "healthy, wealth and prosperous". However, for Japanese people, red color is related to "danger, blood, and irritation". Therefore Thai people are more prefer to use red color in their daily life than Japanese people. There were previous researches compared color preference between several nations, but none of them include mode of color appearance as a factor. Most of those works studied color preference with real and simulated reflected surface which appeared in object color mode. In our daily life, however, colors are perceived not only as an object color mode, but also as other modes.

In this work, the color appearance mode was classified based on the *Recognized Visual Space of Illumination theory* into three modes: object color mode (OB-mode), light source color mode (LS-mode), and unnatural object color mode (UN-mode). For object color mode, color appeared as a color on a paper or a reflected surface. For light source color mode, color appeared as a light or color from self-emitting source. However, there was an ambiguous mode which color was hardly classified into those two modes because it contained both properties of those two modes. For example, color which seemed to be a color on reflected surface but also looked like color appear from light behind the hole. This mode was named unnatural object color mode. In this study, we investigated color preference in different color appearance mode of Thai and Japanese people.

2. METHODOLOGY

2.1 Apparatus

The schematic diagram of apparatus was illustrated in Figure 1. Two rooms (subject room and test chart room) were separated by a wall with a small square aperture. In the test chart room, there was a rotating wheel for placing color chips. The color chips were illuminated by a set of intensity-controllable fluorescent lamp (FL_T) faced to the rotating wheel. The illuminance in the test chart room denoted by I_T was controlled by the experimenter. In the subject room, the inside wall was covered with white wall paper. A set of intensity-controllable fluorescent lamp (FL_S) was attached on the ceiling. The subject room illuminance (I_S) was measured by an illuminometer placed on the shelf closed to the front wall. On the front wall, there was a $1^\circ \times 1^\circ$ aperture placed at the subject eye's level. The distance between the front wall and the subject's eye was fixed at 1.3 m. When the subjects looked through this aperture, the color chip in the test chart room appeared as if it was placed on the front wall in the subject room.

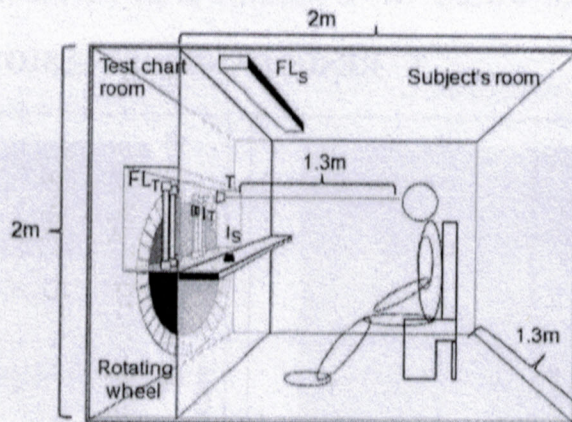


Figure 1 Schematic diagram of the apparatus

2.2 Subjects

Eleven Thai and nine Japanese (age: 22-36) were participated in this experiment. All subjects had normal or corrected to normal visual acuity. All passed Ishihara test to check normal color vision.

2.3 Stimuli and Conditions

Eight Munsell colors (5R, 5Y, 5G, 10B, 5YR, 5P, 5GY, and 10BG) were selected to represent red, yellow, green, blue, orange, purple, greenish yellow and bluish green colors. Each hue consisted of three values/chromas (5/2, 5/5 and 5/8) which was a total of twenty four color chips. The color chips were presented in the different color appearance modes by changing the subject room illuminance and the test room illuminance. The experimental condition was consisted of a combination of two subject room illuminance levels (I_S : 50, and 500 lux) and three test chart room illuminance levels (I_T : 300, 500, and 700 lux).

2.3 Experimental Procedure

The experiment composed of two tasks. One was the color preference score task. Another was color appearance mode task. In the color preference score task, the subjects were asked to rate

their color preference on each color according to the categories of like, dislike, or neutral by using a color preference scale. The scale was divided into seven steps from -3 to +3, where -3 means "most dislike", +3 means "most preferable", and 0 means "neutral". In the second task, the subjects were asked to judge the color appearance mode of the color chips whether it appeared as an "object color mode", "unnatural object color mode" or "light source color mode". Each subject was asked to complete both tasks. Each task was done in separated session.

To analyze color appearance mode quantitatively, the color appearance mode index (i_{CAM}) was defined by equation (1):

$$\text{Color appearance mode index } (i_{CAM}) = \frac{-1(N_{OB}) + 0(N_{UN}) + 1(N_{LS})}{N_{OB} + N_{UN} + N_{LS}} \quad (1)$$

where N_{OB} , N_{UN} , and N_{LS} are the numbers of response in the OB-mode, UN-mode, and LS-mode, respectively. If the i_{CAM} is higher than +0.5, the color chip is classified in the LS-mode. On the other hand, if the i_{CAM} is lower than -0.5, the color chip is classified in the OB-mode. An i_{CAM} between -0.5 and +0.5 is classified in the UN-mode.

3. RESULT AND DISCUSSION

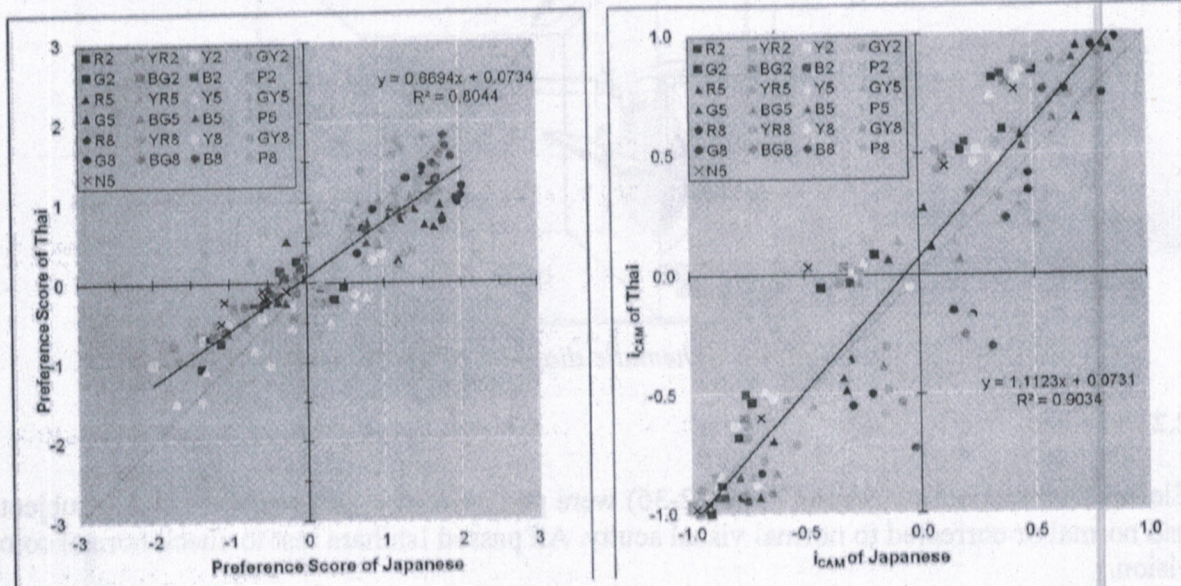


Figure 2 Relationship of results between Thai and Japanese subjects. Square, triangle, and circle represent color chips with chroma 2, 5, and 8, respectively. Left: Color preference score. Right: i_{CAM} .

Relationship of color preference between Thai and Japanese subjects was shown in Figure 2 (Left). The result indicated that Thai and Japanese people had similar color preference as their preference score had positive correlation. Both Thai and Japanese people preferred vivid color (circle symbol) to pale color (square symbol). In this experiment, yellow hue was the least preferred color while blue and red hues were the high preferred colors for both groups.

Figure 2 (Right) showed relationship between color appearance mode perceived by Thai and Japanese subjects. The result showed that both Thai and Japanese subjects perceived each color in similar color appearance mode. There was no strong conflict in color appearance mode. For example, one perceived color in object color mode and the other perceived color in light source color mode.

When color preference of color appeared in each mode were compared, the result of both Thai and Japanese people also showed similar tendency. Color appeared as unnatural object color mode and light source color mode were preferable to those appeared as object color mode as shown in Figure 3. The explanation of this result is that colors appeared in unnatural object color mode and light source color mode contain less blackness than colors appeared in object color mode. The results agreed well with previous work done by our colleague (Tangkijviwat et al (2010a, 2010b)).

We also found an unexpected result of color preference between the two groups. Thai people preferred cool colors such as green, blue and cyan to warm colors (red and orange), whereas Japanese people preferred warm colors to cool colors. One possible explanation is that country location and climate possibly play an important role in color preference.

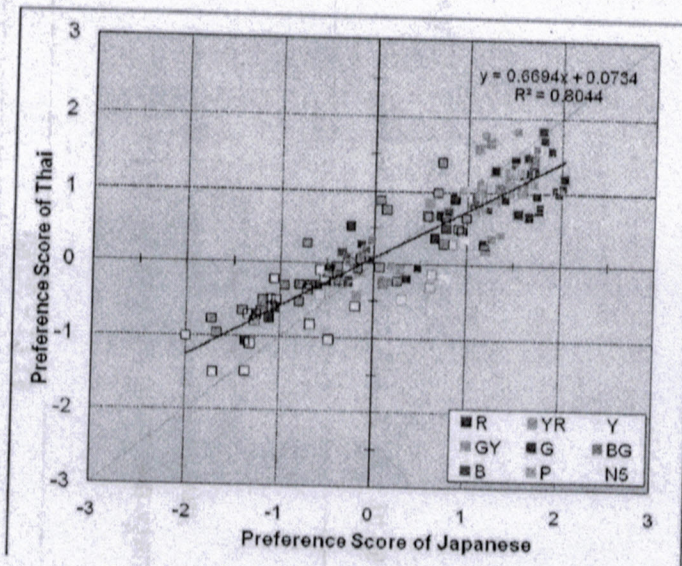


Figure 3 Relationship of preference score between Thai and Japanese subjects was replotted by including result of color appearance mode. Black, gray, and white border represent color appeared in OB, UN, and LS Mode, respectively.

4. CONCLUSION

Compared between Thai and Japanese people, color preference of the two groups was quite similar. Both groups preferred colors appeared as unnatural object color mode and light source color mode to those appeared as object color mode. Vivid colors were more preferable than pale color. Yellow was the least preferable hue for both groups of people.

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